

**RMLA.**

Planning Consultants

**Environmental Impact  
Assessment Report – Retail  
Development, Cock Hill, Cavan  
Town**

**Volume II Main Report**

**Prepared by RMLA Limited**

On behalf of Tesco Ireland Limited

December 2022

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## Table of Contents

- 1.0 Introduction
- 2.0 Description of Proposed Development
- 3.0 Planning and Development Context
- 4.0 Examination of Alternatives
- 5.0 Population and Human Health
- 6.0 Traffic and Transportation
- 7.0 Land, Soils, Geology and Hydrogeology
- 8.0 Hydrology
- 9.0 Biodiversity
- 10.0 Waste Management
- 11.0 Noise and Vibration
- 12.0 Air Quality and Climate
- 13.0 Micro-Climate
- 14.0 Landscape and Visual Impact Assessment
- 15.0 Archaeology, Architectural and Cultural Heritage
- 16.0 Material Assets
- 17.0 Risk Management
- 18.0 Interactions and Cumulative Effects

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Status: FINAL

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## 1.0 Introduction

This Environmental Impact Assessment (EIAR) has been prepared on behalf of Tesco Ireland Limited for submission with planning application for permission in respect of the proposed mixed retail development on townlands of Townparks and Tullymongan Lower to the east of the Main Street at Cock Hill, Cavan town, Co. Cavan.

This Chapter was prepared Robert McLoughlin, Brendan Boyle and Rachel Lawler of RMLA Limited, Planning Consultants. Robert McLoughlin holds a Bachelor of Agricultural Science (Landscape Horticulture) from University College Dublin (UCD) and a Master of Urban and Regional Planning also from UCD. Robert is a Corporate Member of the Irish Planning Institute and has 18 years postgraduate experience in the preparation of EIAR for residential, retail, commercial and healthcare developments.

Brendan holds a Bachelor of Science Degree in Environmental Planning from Queen's University Belfast (QUB) and a Postgraduate Diploma in Town and Country Planning, also from QUB. Brendan has a Postgraduate Diploma in Environmental Management with Geographic Information Systems from Ulster University and has over 14 years postgraduate experience in planning and development. Brendan is a Member of the Irish Planning Institute. Rachel Lawler holds a Bachelor of Arts Degree in Geography and Psychology from University of Galway and a Master of Urban and Regional Planning from UCD. Rachel is a graduate member of the Irish Planning Institute and has 2 years experience in planning and development.

### 1.1 Purpose of the EIAR

The EIAR identifies the potential environmental effects, both positive and negative, that are predicated to arise due to the proposed development and outlines measures to address them where required. It is a methodical and detailed evaluation of the environment within which the development is proposed. The EIAR provides the competent authority with the necessary information to enable an Environmental Impact Assessment to be carried out which shall identify, describe and assess in an appropriate manner, the effects of the proposed development on the environment.

The undertaking of an Environmental Impact Assessment is prescribed by the requirements codified by Directive 2014/52/EU. For the purposes of this application for permission, the relevant requirements of the EIA Directives are implemented into Irish law through the provisions of Part X of the Planning and Development Act 2000 (as amended) (hereafter 'the 2000 Act') and the regulations made thereunder.

### 1.2 Overview of the Proposed Development

The subject site is located on townlands of Townparks and Tullymongan Lower to the east of the Main Street at Cock Hill, Cavan town. The subject site is approximately c. 4.126 hectares in area. The subject site has the potential to accommodate a sustainable expansion of the town centre area through the provision of a mixed retail development while facilitating the use of a key brownfield site in Cavan Town. It is considered that the appropriate development of this area could significantly enhance the profile of Cavan Town, generate employment and attract people to the town.

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to Chapter 2 for the full description of development.

### **1.3 Legislative Context**

#### **1.3.1 European Legislative Context**

The Environmental Impact Assessment Directive (Directive 2011/92/EU, amended by Directive 2014/52/EU, hereafter the 'EIA Directive') requires that, before development consent is given, projects likely to have effects on the environment by virtue of their nature, size or location are made subject to a requirement for development consent and an assessment of their effects on the environment. This is referred to as an 'Environmental Impact Assessment' (EIA). Where an EIA is required, the developer must prepare an EIAR, and the EIA Directive sets out minimum information which the EIAR must include.

The Department has prepared the August 2018 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' to provide practical guidance on procedural issues and the EIA process arising from the requirements of Directive 2014/52/EU and to assist with the achievement of a consistency of approach in the implementation of the Directive. The Guidelines replace Guidelines for Planning Authorities and An Bord Pleanála on carrying out environmental impact assessment issued by the Department of the Environment, Community and Local Government in March 2013.

EIA practice has evolved substantially since the introduction of the EIA Directive in 1985. Practice continues to evolve and takes into account the growing body of experience in carrying out EIARs in the development sector. Table 1.1 sets out the relevant key EIA Guidance which has been consulted in the preparation of this EIAR document. In addition, the individual chapters of this EIAR should be referred to for further information on the documents consulted by each individual consultant.

**Table 1.1 EIA Guidelines Consulted as Part of the Preparation of this EIAR**

<b>Irish</b>	
	Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning, Community and Local Government 2018)
	Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA 2022)
	Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems
	Issues Consultation Paper (Department of Housing, Planning, Community and Local Government 2017)
	Circular letter PL 1/2017 -Advice on Administrative Provisions in Advance of Transposition (Department of Housing, Planning, Community and Local Government 2017)
<b>European Union</b>	
	Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017)
	Environmental Impact Assessment of Projects – Guidance on Screening (European Commission 2017)
	Environmental Impact Assessment of Projects – Guidance on Scoping (European Commission 2017)
	Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999)

The Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment published by the Department of Housing, Planning and Local Government in 2018 provide practical guidance to planning authorities, An Bord Pleanála, and other relevant stakeholders, on procedural issues and the EIA process, and outline the key changes introduced by Directive 2014/52/EU. The key issues consultation paper published by the Department also provides useful guidance. The Environmental Protection Agency (EPA) Guidelines published in 2022 have been prepared to help practitioners interpret the amended EIA Directive and take account of the transposition of the amending EIA Directive (2014/52/EU).

### 1.3.2 Irish Legislative Context

The adoption of the 2000 Act consolidated the previous Planning Acts and the existing Environmental Impact Assessment Regulations at that time. The Planning and Development Regulations, 2001 (as amended, hereafter 'the 2001 Regulations') provide for the implementation of the 2000 Act as well as incorporating and updating the Local Government (Planning and Development Regulations) 1994 – 2001, and Regulations made to date under the Act itself. The 2001 Regulations outlines the classes of projects subject to Environmental Impact Assessment and the statutory format and content for an EIAR. Schedule 5 of the 2001 Regulations set out a wide range of development categories with associated thresholds for which an EIA is required, while schedule 6 outlines the information to be contained in an EIAR. Schedule 7 outlines the criteria for determining whether a development would or would not be likely to have significant effects on the environment.

The proposed development falls into the category of Infrastructure Projects, described in Paragraph 10 (b)(iv) (Part 2) of Schedule 5 includes:

*“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 schedule, a business district is defined as:

*“a district within a city or town in which the predominant land use is retail or commercial use.”*

The proposed development includes an area of c.4.126 ha which exceeds the aforementioned threshold and, therefore, an EIA is required.

The EIAR Chapters have been prepared following best practice described in the abovementioned documents from the EPA. In this regard, the content of this EIAR confirms to the current relevant Environmental Impact Assessment requirements.

#### **1.4 Objectives of Environmental Impact Assessment**

Environmental Impact Assessment (EIA) is a process for anticipating the effects on the environment caused by a development. EIA is a process, involving inter alia; statutory consultations; examination of information in the EIAR; the reasoned conclusion of the competent authority on the significant effects (if any) on the environment, taking into account the examination referred to; and the integration of the reasoned conclusions into decision on the proposed development.

The aim of the approach is to identify and predict any effect of significance for a given proposed development; to describe the means and extent by which they can be reduced or ameliorated; to interpret and communicate information about the potential effects; and to provide an input into the decision-making and planning processes. Where effects are identified that are unacceptable, these can then be avoided or reduced during the design process.

As described above, the EPA provides guidance on the information to be contained in an EIAR and advice notes on its preparation. Specifically, the environmental areas that may be affected by the proposed development are Population and Human Health; Traffic and Transport; Land, Soils, Geology and Hydrogeology; Hydrology; Biodiversity; Waste Management; Noise and Vibration; Air Quality and Climate; Micro Climate (Wind/Daylight/Sunlight); Landscape and Visual Impact Assessment; Archaeological and Architectural Heritage; Material Assets – Site Services and Risk Management.

This EIAR addresses potential environmental effects of the proposed development under these headings and having regard to a scoping exercise that was conducted as outlined below.

#### **1.5 Informal Scoping**

Scoping is an early stage in the EIA process and the purpose of scoping is to identify what information should be contained in an EIAR and what methods should be used to gather and assess that information. It should provide focus for the EIAR and ensure that all relevant issues are identified and addressed in the EIAR.



An informal scoping exercise was conducted to establish the parameters of the issues to be addressed in the EIAR. Existing activities on site were examined and assessed, as were other comparable development and EIARs prepared for similar schemes. The informal scoping of the EIAR also had regard to the following:

- Guidelines published by the European Union and Irish Institutes;
- The policy requirements of Cavan County Council as set out in the Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town, 2022-2028;
- The existing environment, including any vulnerable or sensitive features, including ecological features and items of archaeological significance;
- The location, scale and nature of the proposed development;
- The likely significant impacts of the proposal on the environment; and
- Mitigation measures for reducing or eliminating any potential undesirable impacts.

The EIAR covers both the construction and operation periods for the proposed development. It is anticipated that the construction period for the development will take c. 12 months. The scope of the operation phase is extended beyond the opening date to ensure account is taken for the longer-term nature of some impacts.

## 1.6 Format of this EIAR and EIAR Methodology

Environmental Impact Assessment is a systematic integrated evaluation of both direct and indirect potential effects of a project on the natural environment, on beneficial uses of the environment, including man-made structures, amenities and facilities, and the socio-cultural environment.

This EIAR comprises 3 no. documents as follows:

- Volume I - Non-Technical Summary
- Volume II - Environmental Impact Assessment Report
- Volume III - Environmental Impact Assessment Report Appendices

This EIAR comprises the presentation of an extensive range of information and analysis from the EIAR Team. The content of this EIAR is split into the following Chapters:

- Chapter 1 - Introduction
- Chapter 2 - Description of Proposed Development
- Chapter 3 – Planning and Development Context
- Chapter 4 - Examination of Alternatives
- Chapter 5 - Population and Human Health
- Chapter 6 -Traffic and Transport
- Chapter 7 - Land and Soils –Geology & Hydrogeology
- Chapter 8 - Hydrology
- Chapter 9 - Biodiversity
- Chapter 10 - Waste Management

- Chapter 11 – Noise and Vibration
- Chapter 12 – Air Quality and Climate
- Chapter 13 – Micro Climate
- Chapter 14 – Landscape Visual Impact Assessment
- Chapter 15 – Archaeological and Architectural Heritage
- Chapter 16 – Material Assets – Site Services
- Chapter 17 – Risk Management
- Chapter 18 – Interactions and Potential Cumulative Impacts

Each competent expert has prepared their relevant chapters which are primarily set out in the following format:

- Introduction
- Consultation
- Legislation, Policy and Guidance
- Receiving Environment
- Characteristics of the Proposed Development
- Predicated Effects of the Proposed Development
- Mitigation Measures
- Monitoring
- Residual Effects
- Reinstatement
- Interactions and Potential Cumulative Effects

Additionally, the EIAR identifies measures where necessary to avoid, reduce and, if possible, offset any significant impacts on the environment arising from the proposed development. This EIAR addresses the potential environmental impacts of the proposed development under the above headings.

## 1.7 Consultation

In relation to the Environmental Impact Assessment process, the consultation undertaken has included:

- Early consultation to inform and help define the scope of the EIAR in terms of what needed to be examined, including consultation with Cavan County Council.
- Consultation during the process to identify any emerging issues, to clarify any concerns and to ensure that all such issues were considered.
- Pre-application planning meetings with Cavan County Council 6<sup>th</sup> August 2020, 13<sup>th</sup> October 2020, 30<sup>th</sup> September 2021 and 8<sup>th</sup> November 2022.

Further details regarding consultation are set out within each EIAR Chapter as appropriate.

## 1.8 The EIAR Team

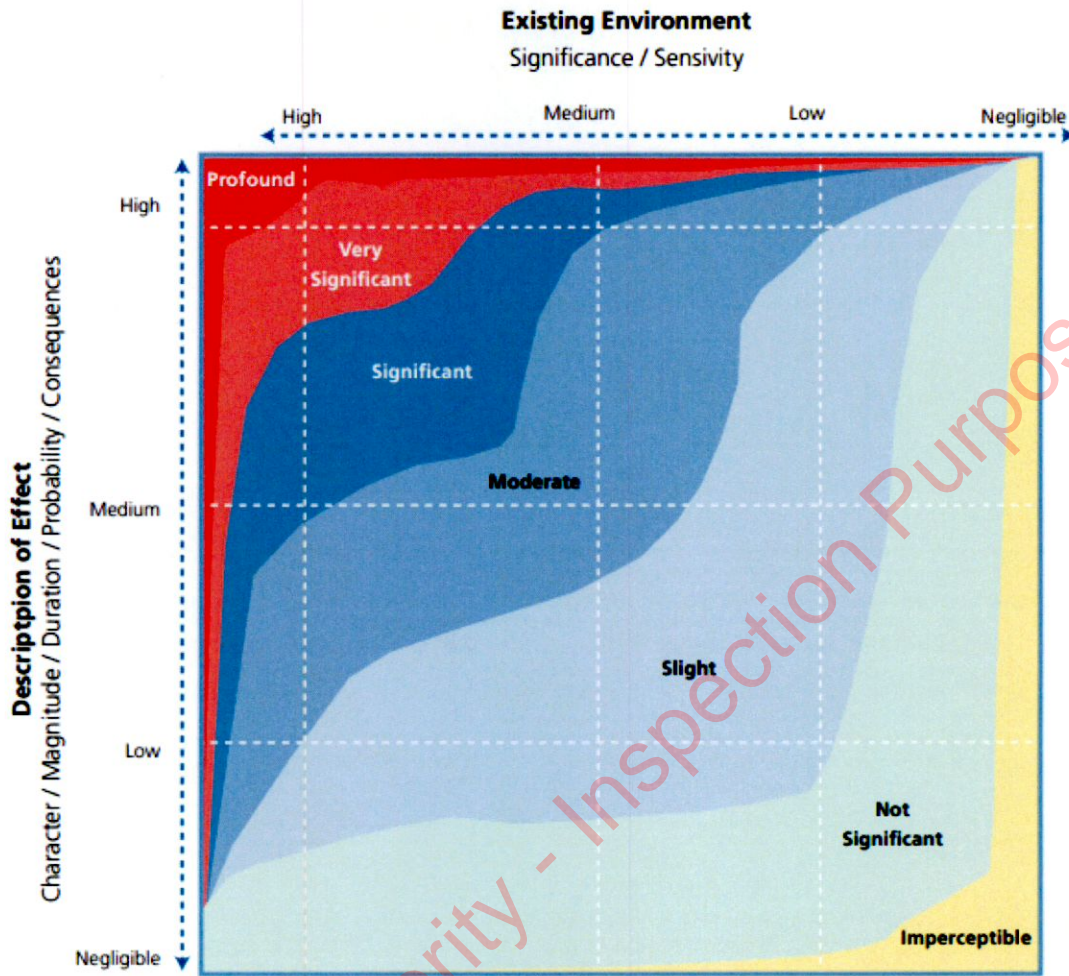
This EIAR has been compiled by RMLA Limited with input from an experienced team of consultants. Details of each consultant are outlined in Table 1.5, while their expertise will also be included at the start of each relevant Chapter. Each consultant is appropriately qualified and competent in accordance with Article 5(3)(a) of the Directive and Section 172(1B) of the 2000 Act (as amended, hereafter 'the 2000 Act').

## 1.9 Describing the Effects

This EIAR follows the guidance set out in the Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) in relation to describing accurately the full range of likely significant effects. Figure 1.1 is taken from the EPA's EIAR Guidelines (2022) and provides a classification of significance of effects (or impacts).

The EPA Guidelines (2022) outlines that the probability of effects can be described as likely or unlikely and the duration of effects can range from momentary, brief, temporary, short-term, medium-term, long-term, permanent, reversible while the frequency describes how often the effects will occur (see Table 1.2). The quality of effects can be described as positive, neutral, or negative/adverse with varying degrees of significance (see Table 1.3) with the type of effects illustrated at Table 1.4.

Figure 1.1 Comparing the character of the predicated effect to the sensitivity of the receiving environment to determine the significance of the effect (EPA Guidelines, 2022)



Source: EPA Guidelines 2022

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Table 1.2 Probability and Duration of Effects

<p><b>Quality of Effects</b></p> <p>It is important to inform the non-specialist reader whether an effect is positive, negative or neutral.</p>	<p><b>Positive Effects</b></p> <p>A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).</p>
	<p><b>Neutral Effects</b></p> <p>No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.</p>
	<p><b>Negative/Adverse Effects</b></p> <p>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).</p>
<p><b>Describing the Significance of Effects</b></p> <p>'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see <i>Determining Significance</i>).</p>	<p><b>Imperceptible</b></p> <p>An effect capable of measurement but without significant consequences.</p>
	<p><b>Not Significant</b></p> <p>An effect which causes noticeable changes in the character of the environment but without significant consequences.</p>
	<p><b>Slight Effects</b></p> <p>An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.</p>
	<p><b>Moderate Effects</b></p> <p>An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.</p>
	<p><b>Significant Effects</b></p> <p>An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.</p>
	<p><b>Very Significant</b></p> <p>An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.</p>
	<p><b>Profound Effects</b></p> <p>An effect which obliterates sensitive characteristics.</p>
<p><b>Describing the Extent and Context of Effects</b></p> <p>Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.</p>	<p><b>Extent</b></p> <p>Describe the size of the area, the number of sites and the proportion of a population affected by an effect.</p>
	<p><b>Context</b></p> <p>Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)</p>

Source: EPA Guidelines 2022

Table 1.3 Probability and Duration of Effects

<p><b>Describing the Probability of Effects</b></p> <p>Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.</p>	<p><b>Likely Effects</b></p> <p>The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.</p>
	<p><b>Unlikely Effects</b></p> <p>The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.</p>
<p><b>Describing the Duration and Frequency of Effects</b></p> <p>'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.</p>	<p><b>Momentary Effects</b></p> <p>Effects lasting from seconds to minutes.</p>
	<p><b>Brief Effects</b></p> <p>Effects lasting less than a day.</p>
	<p><b>Temporary Effects</b></p> <p>Effects lasting less than a year.</p>
	<p><b>Short-term Effects</b></p> <p>Effects lasting one to seven years.</p>
	<p><b>Medium-term Effects</b></p> <p>Effects lasting seven to fifteen years.</p>
	<p><b>Long-term Effects</b></p> <p>Effects lasting fifteen to sixty years.</p>
	<p><b>Permanent Effects</b></p> <p>Effects lasting over sixty years.</p>
	<p><b>Reversible Effects</b></p> <p>Effects that can be undone, for example through remediation or restoration.</p>
	<p><b>Frequency of Effects</b></p> <p>Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).</p>

Source: EPA Guidelines 2022

Table 1.4 Type of Effects

<b>Describing the Types of Effects</b>	<b>Indirect Effects (a.k.a. Secondary or Off-site Effects)</b> 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.
	<b>Cumulative Effects</b> The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	<b>'Do-nothing Effects'</b> The environment as it would be in the future should the subject project not be carried out.
	<b>'Worst-case' Effects</b> The effects arising from a project in the case where mitigation measures substantially fail.
	<b>Indeterminable Effects</b> When the full consequences of a change in the environment cannot be described.
	<b>Irreversible Effects</b> When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	<b>Residual Effects</b> The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	<b>Synergistic Effects</b> Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SO <sub>x</sub> and NO <sub>x</sub> to produce smog).

Source: EPA Guidelines 2022

Table 1.5 EIAR Structure and Competent Experts

Ch. No	Chapter Title	Consultant	Author
1	Introduction	RMLA	<p><b>Robert McLoughlin</b>, BAgrSC (Landscape Horticulture), MRUP, MIPI (Managing Director)</p> <p><b>Brendan Boyle</b>, BSc (Environmental Planning) PG Dip. (Town &amp; Country Planning), PG Dip. (Environmental Management with GIS), MIPI (Associate)</p> <p><b>Rachel Lawler</b>, BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)</p>
2	Description of Proposed Development	RMLA	<p><b>Robert McLoughlin</b>, BAgrSC (Landscape Horticulture), MRUP, MIPI (Managing Director)</p> <p><b>Brendan Boyle</b>, BSc (Environmental Planning) PG Dip. (Town &amp; Country Planning), PG Dip. (Environmental Management with GIS), MIPI (Associate)</p> <p><b>Rachel Lawler</b>, BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)</p>
3	Planning and Development Context	RMLA	<p><b>Robert McLoughlin</b>, BAgrSC (Landscape Horticulture), MRUP, MIPI (Managing Director)</p> <p><b>Brendan Boyle</b>, BSc (Environmental Planning) PG Dip. (Town &amp; Country Planning), PG Dip. (Environmental Management with GIS), MIPI (Associate)</p> <p><b>Rachel Lawler</b>, BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)</p>
4	Examination of Alternatives	RMLA	<p><b>Robert McLoughlin</b>, BAgrSC (Landscape Horticulture), MRUP, MIPI (Managing Director)</p> <p><b>Brendan Boyle</b>, BSc (Environmental Planning) PG Dip. (Town &amp; Country Planning), PG Dip. (Environmental Management with GIS), MIPI (Associate)</p> <p><b>Rachel Lawler</b>, BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)</p>
5	Population and Human Health	RMLA	<p><b>Robert McLoughlin</b>, BAgrSC (Landscape Horticulture), MRUP, MIPI (Managing Director)</p> <p><b>Brendan Boyle</b>, BSc (Environmental Planning) PG Dip. (Town &amp; Country Planning), PG Dip. (Environmental Management with GIS), MIPI (Associate)</p>



			<b>Rachel Lawler</b> , BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)
6	Traffic and Transportation	Systra	<b>Alan Connolly</b> , BSc (Civil Engineering) (Hons), Chartered Engineer Institute of Engineers Ireland, (Associate Director)
7	Land, Soils, Geology and Hydrogeology	ORS	<b>Cathal Tighe</b> , B.Agr.Sc (Agricultural-Environmental Science), (Environmental Consultant) <b>Luke Martin</b> , B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc, (Senior Environmental Consultant) <b>Oisín Doherty</b> , B.Sc. (Hons) (Geography with Environmental Science), MSc. (Environmental Management), CEnv, MIEEnvSc, (Senior Environmental Consultant)
8	Hydrology	ORS	<b>Cathal Tighe</b> , B.Agr.Sc (Agricultural-Environmental Science), (Environmental Consultant) <b>Luke Martin</b> , B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc, (Senior Environmental Consultant)
9	Biodiversity	ORS	<b>Noreen McLoughlin</b> , B.A (Hons) (Zoology), MSc (Freshwater Ecology), CIEEM. (Principal Ecologist) <b>Luke Martin</b> , B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc, (Senior Environmental Consultant)
10	Waste Management	ORS	<b>Ross Kearney</b> , PG Dip. (Environmental Protection), MCIWEM (Senior Environmental Consultant) <b>Alan Kiernan</b> , BEnvSc, PG Dip. Env Engineering, MCIWEM, (Associate Director, Environmental Consultant) <b>Oisín Doherty</b> , B.Sc. (Hons) (Geography with Environmental Science), MSc. (Environmental Management), CEnv, MIEEnvSc, (Senior Environmental Consultant)
11	Noise and Vibration	ORS	<b>Dr. Conor Tonra</b> , BSc (Analytical Science), PhD (Physical Chemistry), MIEMA, CEnv, (Certificate in Training and Continuing Education), IOSH (Environmental Noise Competency Certificate), (Principal Consultant/Company Director) <b>Luke Martin</b> , B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc, (Senior Environmental Consultant)

12	Air Quality and Climate	ORS	<p><b>Cormac Dunne</b>, B.A. (MOD) (Environmental Science), M.Sc. (Civil Engineering), MCERTs, MIEEnvSc, MIAQM (Senior Environmental Scientist)</p> <p><b>Luke Martin</b>, B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc, (Senior Environmental Consultant)</p>
13	Micro Climate (Daylight/Sunlight & Wind)	ORS	<p><b>John Healy</b>, Diploma (Architectural Technology), MSc (Environmental Design of Buildings), PG Dip. (Digital Media) MSc (Daylight and Sunlight Consultant and Director)</p> <p><b>Luke Martin</b>, B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc, Senior Environmental Consultant.</p>
14	Landscape and Visual Impact Assessment	Macro Works	<p><b>Richard Baker</b>, MSc (Landscape Architecture) BA (Environmental Management) PG Dip. (Forestry) (Principal) MILI</p>
15	Archaeology, Architectural and Cultural Heritage	IAC	<p><b>Faith Bailey</b>, MA (Cultural Landscape Management) BA (Archaeology) (Hons), MIAI, MCIfA (Associate Director)</p> <p><b>Christina O'Regan</b> MSc (Environmental Archaeology), BA (Archaeology with History) (Hons), MIAI (Project Manager)</p>
16	Material Assets – Site Services	ORS	<p><b>Ross Kearney</b>, PG Dip. (Environmental Protection), MCIWEM (Senior Environmental Consultant)</p> <p><b>Alan Kiernan</b>, BEnvSc, PG Dip. (Environmental Engineering), MCIWEM (Associate Director/Environmental Consultant)</p>
17	Risk Management	RMLA	<p><b>Robert McLoughlin</b>, BAgSC (Landscape Horticulture), MRUP, MIPI (Managing Director)</p> <p><b>Brendan Boyle</b>, BSc (Environmental Planning) PG Dip. (Town &amp; Country Planning), PG Dip. (Environmental Management with GIS), MIPI (Associate)</p> <p><b>Rachel Lawler</b>, BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)</p>
18	Interactions and Cumulative Effects	RMLA	<p><b>Robert McLoughlin</b>, BAgSC (Landscape Horticulture), MRUP, MIPI (Managing Director)</p> <p><b>Brendan Boyle</b>, BSc (Environmental Planning) PG Dip. (Town &amp; Country Planning), PG Dip. (Environmental Management with GIS), MIPI (Associate)</p>

			<p><b>Rachel Lawler</b>, BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)</p>
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**1.10 Non-Technical Summary**

A copy of the Non-Technical Summary of the EIAR is provided as a separate and self-contained document and is available to the public online and at the office of the Planning Department of Cavan County Council. It is bound separately in order to assist in its dissemination to interested parties.

**1.11 Natural Resources**

As the proposed development will not require the use of natural resources that are in short supply, nor will the development result in the emission of pollutants that will create nuisance or hazard, the matters referred to in Paragraph 2(a)(iii) of the Second Schedule of European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999 (S.I. No. 93 of 1999) do not apply.

**1.12 Difficulties in Compiling Specified Information**

No significant difficulties were experienced in compiling the necessary information for the proposed development.

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## 2.0 Description of Proposed Development

### 2.1 Introduction

This chapter of the Environmental Impact Assessment (EIAR) provides a description of the proposed development. This chapter has been informed by, and should be read in conjunction with, the planning application documents including the Architect's Design Statement and the Construction Environment Management Plan which accompany the application. In addition, the precise details of this proposal are contained in the public notices, plans, drawings, reports and all related particulars contained in the overall planning application package. The chapter provides information regarding the following:

- An overview of the proposed development.
- A description of the site and surroundings.
- A description of the various elements of the projects.
- Details relating to the phasing and construction of the proposed development.

This Chapter was prepared Robert McLoughlin, Brendan Boyle and Rachel Lawler of RMLA Limited, Planning Consultants. Robert McLoughlin holds a Bachelor of Agricultural Science (Landscape Horticulture) from University College Dublin (UCD) and a Master of Urban and Regional Planning also from UCD. Robert is a Corporate Member of the Irish Planning Institute and has 18 years postgraduate experience in the preparation of EIAR for residential, retail, commercial and healthcare developments.

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### 2.2 Overview of the Proposed Development

The subject site is located on townlands of Townparks and Tullymongan Lower to the east of the Main Street at Cock Hill, Cavan town. The subject site is approximately c. 4.126 hectares in area. The subject site has the potential to accommodate a sustainable expansion of the town centre area through the provision of a mixed retail development. It is considered that the appropriate development of this area could significantly enhance the profile of Cavan Town, generate employment and attract people to the town.

The proposed scheme will provide a single storey Tesco supermarket (c. 5,197 sq.m), a drive thru café unit (c.174 sq.m) and a petrol filling station to the eastern boundary of the site. Additionally, the proposed

development will provide pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site.

## **2.3 Description of the Site and Surroundings**

### **2.3.1 Cavan Town**

Cavan Town is located in the centre of the County and is situated on the N3/A509 between Dublin and Enniskillen and the N55 Athlone to Cavan Town Road. Areas to the north and west of the Town are characterised by a series of connected lakes.

Cavan Town is the largest town in the County and administrative and primary location for shopping in the County. The Town offers a range of national and international convenience and comparison retailers both within the town centre and retail parks located on the outskirts of the town. The Town is also an employment and recreational centre with office parks, cinema complex, bars and restaurants.

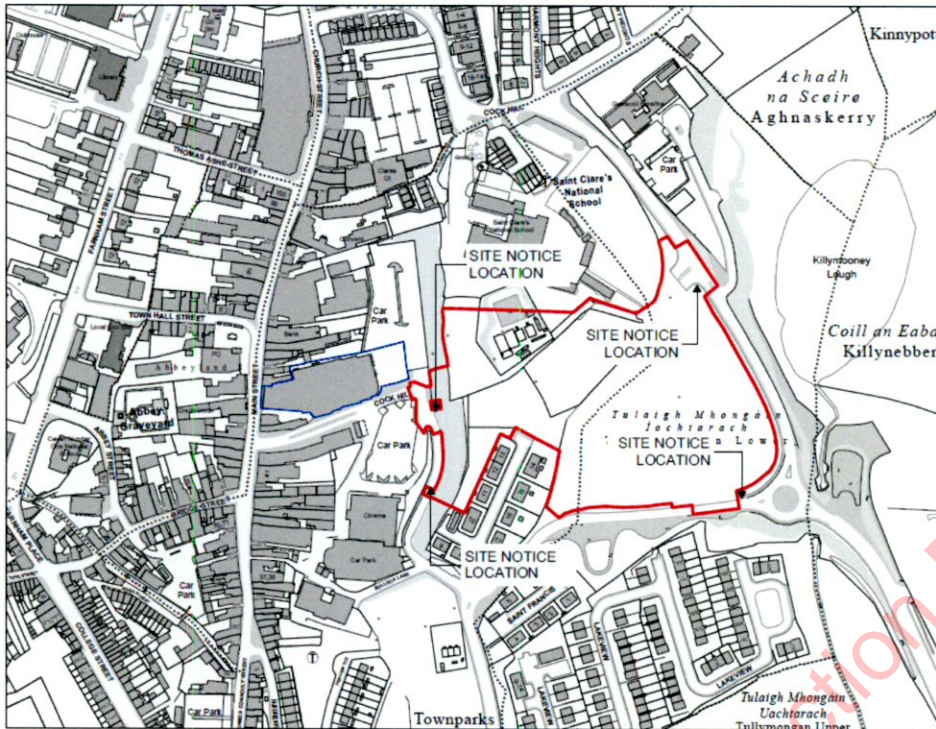
### **2.3.2 Site Context**

The subject site is located within the designated Town Core as identified in the Cavan Local Area Plan, incorporated in the Cavan County Development Plan 2022-2018. The site located to the east of Main Street and is approximately c. 4.126 hectares in size. The subject site is currently undeveloped and is brownfield in nature. The subject site is under the control of Cavan County Council.

The site is currently bounded to the north by the St. Clare's National School, to the west by the Local Authority public car park adjacent to the existing Tesco supermarket, to east by Killymooney Lough and open countryside and to the south by single storey residential units.

The topography of the site differs as much as c. 20 metres between the highest and lowest points of the site. The site also falls from its highest point in the western direction towards the town centre with a similar vertical interval.

Figure 2.1 Extract of Site Location Map (JDA Drawing No. 002)



## 2.4 Detailed Project Description

The development as described in the public notices is as follows:

The development will consist of the construction of:

- (i) a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area, bulk store, ancillary offices, staff facilities, cage marshalling area, bin storage, service yard and associated directional signage;
- (ii) 1 no. drive thru café unit (c.174 sq.m gross floor area) with external seating and the provision of 5 no. car parking spaces (including 2 no. electric parking spaces, 2 no. disabled and 1 no. standard) and 2 no. set down bay areas;
- (iii) 1 no. 4 pump (8 stand) petrol filling station incorporating an automatic car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height) and associated signage, oil interceptors, underground storage tanks and tanker fill point;
- (iv) 4 no. internally illuminated elevation signage on the eastern, western and southern elevations;
- (v) 297 no. car parking spaces associated with the retail unit (including parent and toddler, disabled and electric parking spaces), 120 no. cycle parking spaces in freestanding external shelters and set down/loading bay areas;
- (vi) 2 no. dedicated "Click and Collect" car spaces with canopy structure and associated signage;

- (vii) Grocery Home Shopping delivery vehicle docking area situated in the service yard;
- (viii) 1 no. vehicle access point from Cock Hill Road at the north east boundary of the site and 1 no. vehicle left-in/left-out access point at the southern boundary of the site, all with associated pedestrian and cycle access facilities;
- (ix) pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road;
- (x) 1 no. internally illuminated double-sided totem sign associated with the retail unit (7m x 2.3m) and 1 no. internally illuminated double-sided totem associated with the petrol filling station (7.2m x 1.7m);
- (xi) ESB substation and switch room, pump house, sprinkler tank, 2 no. attenuation tanks, 3 no. detention basins, feature and street lighting, plant, store canopy, trolley shelter/bays and all ancillary site development works, landscaping, ramps, fences, enabling works and site services. An Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) are submitted with the application.

Figure 2.2 Extract of Proposed Site Layout (JDA Drawing No. 101)





### 2.4.1 Architectural Design Concept

The urban design principles for the site framework were discussed with the Local Authority through a series of pre-application planning meetings. As set out in the Architectural Design Statement prepared by JDA, and as submitted as part of this application, some of the key principles on which the design framework was based include the following:

#### Design & Quality

The proposed development design creates a series of places that are attractive, inclusive, durable and adaptable places to work, shop and visit. This has been achieved through the provision of a mixed retail development with active elevations including the southern elevation nearest the town centre with high quality finishes.

#### Access & Connectivity

The proposed development site is situated to the east of the existing town centre, and as such, the subject site provides a natural extension to the town centre. The site will be permeated with a network of pedestrian footpaths and crossings. Bench seating will be provided to enhance the user experience with the addition of a series of gentle slopes that have been integrated into the proposed development landscaping design.

#### Public Realm

A high-quality landscape scheme has been included within the proposed development which will enhance the overall public realm. As contained in Chapter 14 – Landscape and Visual Impact Assessment, the proposed development will make a positive contribution to an urban setting that is in need of appropriate infill development.

#### Built Form

The built form has been designed to address and respond to the urban context and emerging local context to Cock Hill, Cavan town centre and the newly built Eastern Access Route. The development as proposed will be outward facing. Car parking and service areas are screened from public view with an established landscape buffer along the western boundary.

The proposed urban design solution for the application site has been developed in accordance with the Retail Design Manual Guidelines, a companion document to the Retail Planning Guidelines for Planning Authorities as issued by the Department of Arts, Heritage, and the Gaeltacht in April 2012.

**2.4.2 Proposed Facilities and Floor Areas**

The proposed mixed-use scheme comprises a mix of land uses including retail, drive thru café and petrol filling station.

**Table 2.1 Breakdown of Proposed Units**

Use	SQM Area
Tesco Supermarket	c. 5,197
Drive thru Café unit	c. 174
Petrol Filling Station	Car wash/jet wash c. 89 sq.m and forecourt canopy covering c. 255 sq.m. and 4.8m in height

**2.4.3 Access and Circulation**

**2.4.3.1 Vehicular Access**

Customer car parking is provided to the front of the supermarket and will not be visible from the town centre public realm areas to the west of the site. The proposed development will provide 297 no. car parking spaces including parent and toddler, disabled and electric parking spaces associated with the supermarket. The drive thru café situated to the east of the subject site will provide 5 no. car parking spaces including 2 no. electric parking spaces, 2 disabled, 1 standard and 2 no. set down bay areas. The petrol filling station has no store component, and no car parking is proposed.

As set out in the Chapter 6 – Traffic and Transportation prepared by SYSTRA, 2 no. vehicular access points will be provided along Cock Hill Road at the northeast and southern boundary of the site. The proposed development will take its main access from Cock Hill Road (Cavan Town Eastern Access Link Road 2) via an existing priority junction.

**2.4.3.2 Pedestrian & Cycle Access**

The proposed development will consist of 120 no. sheltered cycle parking spaces at convenient locations to the southern portion of the subject site to encourage active travel. Access for cyclists is provided from Cock Hill Road to the south and east of the site via existing off-road shared path facilities.

As set out in Chapter 6 – Traffic and Transportation, a dedicated pedestrian access route consisting of a plaza, sloped walkway, resting areas and steps is provided to the western boundary of the subject site, providing linkages with the town centre. There will be a series of pedestrian crossings and footpath improvements provided along this route to enhance accessibility for vulnerable road users. This includes a raised table crossing on Cock Hill to reduce traffic speeds and help prioritise vulnerable road user movements.

Additionally, a network of footways and shared spaces are provided within the proposed development, providing permeable links through and into / out of the site. The site layout reflects likely desire lines between key external links and key points of access to the building and open public spaces within the development with crossing points on key desire lines.

### 2.3.3.3 Public Transport

As set out in Chapter 6 – Traffic and Transportation, the closest bus stops are located on the Cavan Town Main Street c. 220m west of the subject site (as the crow flies). Using existing routes available to pedestrians, the walking distance is closer to 1km in length. It is considered that bus journeys to and from the subject site are a viable mode of travel for end-users.

The proposal will also provide a dedicated set down area in the car park and adjacent to the store entrance which can accommodate taxis and local buses.

## 2.5 Phasing and Construction of the Proposed Development

### 2.5.1 Construction Management

A Construction Environmental Management Plan has been prepared by ORS to form the basis for management of the main environmental aspects of the construction of the development in order to protect residential and local business community in close proximity to the site and local environ.

The CEMP outlines how works on site can be delivered in a logical, sensible and safe sequence with the incorporation of specific measures to mitigate the potential impact on people, property and the environment. The indicative construction programme summarises the scale of construction activities that are necessary to undertake a project of this size couples with the logistical implications of the works and their effect on the adjacent locality. The CEMP will be required to be interrogated, developed and fully implemented by the Main Contractor prior to commencing works on site and will subject to conditions.

The construction of the proposed development will be delivered under a construction contract. This procurement approach will minimise risks to construction workers and local residents from dust, noise and vibration and to watercourses from pollution.

It is envisioned that the hours of work for the project will be as follows, unless conditioned otherwise:

- Monday to Friday – 07:00 – 19:00
- Saturday – 9:00 – 13:00
- Sundays and Bank Holidays – No activity on site

We note that certain activities may be required, subject to prior agreement with Cavan County Council, to be undertaken outside of these working hours. Special events, such as large concrete pours, will require (in addition to the prior agreement with Cavan County Council) agreement with An Garda Síochána and extensive pre-planning and programme management of site operations.

### 2.5.3 Construction Phasing

The CEMP provides information regarding the phasing of the construction programme (c.12 months in duration), which is provisionally scheduled as follows:

- Pre-Construction Phase: construction activities include site set-up, establishing temporary services and staff welfare facilities, installation of appropriate signing, hoarding, security fencing and removal of topsoil and landscaping.
- Main Construction Phase: this phase refers to the physical construction of the proposed development as described.
- Ancillary Works: this phase includes works such as landscaping, enabling works and site services.

A summary of construction operations, that will take place within the aforesaid phases, as set out in the CEMP, are provided at Table 2.2 for information.

Table 2.2 Summary of Operations (Extract from CEMP prepared by ORS)

External envelopes will require the following operations:	Internal works will require the following operations:
<ul style="list-style-type: none"> <li>• Steel Framing</li> <li>• Blockwork/Brickwork</li> <li>• Cladding</li> <li>• Window/Curtain Walling/Roof Lighting</li> <li>• Roof Coverings</li> <li>• Flashing, Aprons and Tray – Leadwork/Powder coated metal</li> </ul>	<ul style="list-style-type: none"> <li>• Electrical installation</li> <li>• Mechanical installation</li> <li>• Fireproofing</li> <li>• Partitions and ceilings – use of gypsum based products</li> <li>• Painting</li> <li>• Plastering</li> <li>• Joinery</li> <li>• Stairs</li> <li>• Labour – Only Carpentry</li> <li>• Air Tightness sealing and testing</li> <li>• Tiling</li> <li>• Sanitary-ware installation</li> <li>• Vanity Units</li> <li>• Kitchen installation</li> <li>• Metal Work</li> <li>• Carpet Installation</li> <li>• Industrial Cleaners</li> </ul>
Above ground external operations:	
<ul style="list-style-type: none"> <li>• Boundary construction – block work and stone walls</li> <li>• Landscaping</li> <li>• Paving</li> <li>• Signage</li> </ul>	

### 2.5.4 Construction Traffic

A site-specific Traffic Management Plan, (TMP) has been produced in order to introduce temporary measures to facilitate access to the site by plant, machinery, and trucks during the construction phase.

The main contractor will be required to ensure that the elements of the TMP shall be incorporated into the final TMP. The contractor shall also agree and implement monitoring measures to confirm the effectiveness of the mitigation measures outlined in the TMP. The construction phase TMP shall address the following issues (including all aspects identified in this planning phase TMP):

- Site Access & Egress
- Traffic Management Signage
- Routing of Construction Traffic / Road Closures•
- Timings of Material Deliveries to Site
- Traffic Management Speed Limits
- Road Cleaning
- Road Condition
- Road Closures
- Enforcement of Construction Traffic Management Plan
- Details of Working Hours and Days
- Details of Emergency plan
- Communication
- Construction Methodologies
- Particular Construction Impacts.

#### 2.5.4 Reinstatement

Following completion of the building construction works, the Main Contractor will progress a phased removal of compound, welfare facilities and site offices to facilitate the completion of external landscaping and building handover.

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## 3.0 Planning and Development Context

### 3.1 Introduction

This chapter sets out the strategic and statutory context governing planning and development at the subject site. This includes an assessment of the planning policy context at a national, regional and local level and other relevant statutory and non-statutory planning documents.

This Chapter was prepared Robert McLoughlin, Brendan Boyle and Rachel Lawler of RMLA Limited, Planning Consultants. Robert holds a Bachelor of Agricultural Science (Landscape Horticulture) from University College Dublin (UCD) and a Master of Urban and Regional Planning also from UCD. Robert is a Corporate Member of the Irish Planning Institute and has 18 years postgraduate experience in the preparation of EIAR for residential, retail, commercial and healthcare developments.

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### 3.2 National Level

The documents assessed as part of the National Level Planning Framework are listed below with a brief summary of each provided.

#### 3.2.1 Statutory Planning Policy Framework – National Planning Framework 2040

The National Planning Framework (hereafter 'NPF'), which has been published as part of Project Ireland 2040, succeeds the National Spatial Strategy 2002-2040. The Framework provides a long-term strategy for the spatial development of Ireland and forms the top tier of Ireland's planning policy. The Framework has influenced the preparation of the Regional Economic and Spatial Strategies (hereafter 'RSES') and will also serve to influence the preparation of County Development Plans through the inclusion of clear objectives surrounding the future development of Ireland.

Although Cavan is in the Northern and Western Region, the NPF states that most of County Cavan and County Monaghan have a more easterly focus as the region is influenced by the Dublin-Belfast cross-border network and the Dublin Metropolitan area which extends into Cavan and Monaghan.

The NPF sets out key future planning and development and place-making policy priorities for Cavan-Monaghan/ North East that include:

*“Addressing economic resilience and connectivity will be strategic priorities for this area. The maintenance of seamless cross-border movement for people, goods and services, together*

*with improvements in digital and physical infrastructure will create new opportunities to leverage employment and for sustainable population growth, focused on the county towns. Enhanced connectivity would result in this area being strategically located almost equidistant between the Dublin, Belfast and Derry City regions in terms of time, as well as distance.”<sup>1</sup>*

### 3.2.2 Supplementary Policy Framework – Retail Planning Guidelines, 2012

The Retail Planning Guidelines for Planning Authorities 2012 (hereafter ‘Retail Guidelines’) recognises the importance of retailing to the economy, emphasising that c. 14.7 % of people employed in the State are employed in the retail and wholesale sector<sup>2</sup>. The Retail Guidelines states that retailing plays a major role in attracting people to the centre of cities, towns and villages, thus contributing to the overall economic vitality of those centres and supporting their role as centres of social and business interaction in the community.<sup>3</sup>

The Retail Guidelines set out several national policy objectives, the third of which seeks to ensure that the planning system continues to play its part in ensuring an effective range of choice for the consumer, thereby promoting a competitive marketplace.<sup>4</sup> Furthermore, the Retail Guidelines state that:

*“The planning system should not be used to inhibit competition, preserve existing commercial interests or prevent innovation.”<sup>5</sup>*

The Retail Guidelines for the State are typically high level and indicate that retail development must follow the settlement hierarchy of the State and should be appropriate to the scale and function of the settlement.<sup>6</sup> Furthermore, the Retail Guidelines set out that the development management process should proactively support retail developments which comply with Development Plan policies and objectives, the Retail Strategy, and which promote a viable and vital retail sector.<sup>7</sup>

The Retail Guidelines provide guidance on the design of retail developments stating that high quality design can make an important contribution to the vitality and attractiveness of city and town centres.<sup>8</sup>

A Retail Design Manual (2012) accompanies the Retail Guidelines and intends to provide:

*“a planning framework for future development of the retail sector in a way which meets the needs of modern shopping formats while contributing to protecting, supporting and promoting the attractiveness and competitiveness of city and town centres as places to live, work, shop and visit.”<sup>9</sup>*

<sup>1</sup> Project Ireland 2040, Building Ireland’s Future, National Planning Framework, pg. 40

<sup>2</sup> Retail Planning Guidelines for Planning Authorities, 2012, pg. 4

<sup>3</sup> Retail Planning Guidelines for Planning Authorities, 2012, pg. 4

<sup>4</sup> Retail Planning Guidelines for Planning Authorities, 2012, pg. 15

<sup>5</sup> Retail Planning Guidelines for Planning Authorities, 2012, pg. 15

<sup>6</sup> Retail Planning Guidelines for Planning Authorities, 2012, pg. 10

<sup>7</sup> Retail Planning Guidelines for Planning Authorities, 2012, pg. 28

<sup>8</sup> Retail Planning Guidelines for Planning Authorities, 2012, pg. 44

<sup>9</sup> Retail Design Manual – A Good Practice Guide, 2012, Introduction



### 3.3 Regional Level

The documents assessed as part of the Regional Level Planning Framework are listed below with a brief summary of each provided.

#### 3.3.1 Statutory Planning Policy Framework – Northern & Western Regional Assembly Regional Spatial & Economic Strategy (RSES) 2020-2032

The RSES outlines the regional policies for the next 12 years of growth and provides the basis for sustainable development. The RSES primarily aims to support the delivery of the programme for change set out that supports the implementation of the National Planning Framework (NPF) and the relevant economic policies and objectives of Government. The RSES identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form Regional Policy Objectives. The Regional Policy Objectives, which are linked to National Strategic Outcomes (NSOs) of the NPF.

Cavan is identified as a key town within the RSES and performs a regional function, being the largest town within the Cavan/ Monaghan/Leitrim sub-region and being the town, which experienced the largest growth within the past 10 years. The RSES states town is well positioned to deliver the principal strategic function within the sub-region in terms of housing, job delivery and education.<sup>10</sup>

The RSES further states the Retail Planning Guidelines, 2012, set out the framework for plan led retail development within our towns, and villages. The sequential test remains a key component of this approach, and the facilitation of access to retail offer via public transport corridors is a further key element of future trade offer. Additionally, the RSES states since the adoption of the Retail Guidelines, the dynamics influencing retail activity in our larger towns, and our villages have changed. However, notwithstanding online retail growth, growth in consumer spending, product demand, and population growth across the country should ensure that there remains a significant retained requirement for Town Centre stores across many areas.<sup>11</sup>

**RPO 3.1:** *Develop urban places of regional scale through:*

- *Delivering on the population targets for the Metropolitan and Regional Growth Centres through compact growth:*
- *Delivering significant compact growth in Key Towns; and g Developing derelict and underutilised sites, with an initial focus within town cores.*

**RPO 4.45:** *To support retail in town and village centres through the sequential approach, as provided within the Retail Guidelines, and to encourage appropriate development formats within the town and village centres.*

<sup>10</sup> Northern Regional Assembly Regional Spatial & Economic Strategy (RSES), 2020-2032, pg. 128

<sup>11</sup> Northern Regional Assembly Regional Spatial & Economic Strategy (RSES), 2020-2032, pg. 186

### 3.4 Local Level

The proposed development is located within the administrative area of Cavan County Council, therefore, the Cavan County Development Plan incorporating a Local Area Plan for Cavan Town 2022-2028 is the relevant statutory plan and provides the local statutory policy for the County and Town.

#### 3.4.1 Statutory Planning Policy Framework – Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028

The Cavan County Development Plan (hereafter 'CDP') was adopted at a Special Council Meeting by the Elected members of Cavan County Council on Monday, 30th May 2022. The Plan came into effect on Monday, 11th July 2022 and sets out the overall planning and sustainable strategy for the County and town. A Cavan County Retail Strategy 2021-2028 also accompanies the Development Plan documentation. The County Retail Strategy considers current retailing trends, including the growth of online shopping and its impact on retail floorspace, consumer behaviours and the impact from the COVID-19 pandemic and the Brexit Withdrawal Agreement, in addition to the geographic location of Cavan close to the border with Northern Ireland and the good transport links to the Dublin Region.

The Development Plan identifies Cavan Town as the only Key Town in its settlement hierarchy and describes the town as follows:

*“County Town with large economically active services that provide employment for their surrounding areas and with high-quality transport links and the capacity to act as growth drivers”.*

To achieve the targeted 30% population uplift as set out in the RSES, the Development Plan notes that the Council is committed to the delivery of sustainable, compact, sequential growth in Cavan Town by consolidating the built-up footprint with a focus on the development of town centre infill and brownfield sites and the regeneration of underutilised, vacant, and derelict land.

In terms of the retail hierarchy, Cavan Town is identified as the sole Tier 1 Primary Retail Centre within the County. Retail Development Objectives include the following:

**ER 02** *Permit retail development of a size and scale that is appropriate to the level of the town/settlement area, including its population, as defined within the County Retail Hierarchy. This policy will aim to consolidate and reinforce all existing retail enterprises within the County and permit the development of additional retail floorspace where such development is deemed to be appropriate by Cavan County Council.*

**ER 04** *Guide retail development where practical and viable in accordance with the framework provided by the “Sequential Approach”, in order to enable the vitality and viability of existing town and village centres to be sustained and strengthened.*

The Development Plan states it is a development objective of Cavan County Council to:

*“Support commercial opportunities within Cavan town centre which harnesses the potential of the town for economic growth and sustainability.”<sup>12</sup>*

The aim of the Economic Development Strategy for the County is to promote Cavan’s existing economic profile, maximise its strategic border location, its green environment and availability of a skilled and educated workforce within the County and surrounding region. In relation to Cavan Town, it is the policy of the Council to make the town a more attractive place to live, work, shop and do business in.

Under the CDP the subject site is zoned Town Core which aims to *“protect and enhance the special physical and social character of the town and village core while providing and/or improving town/village centre facilities”<sup>13</sup>*. A range of uses are permitted in principle under this zoning objective including retail comparison, retail shops-major, restaurant/café and commercial car park.

There are a wide range of Development Plan policies and development management standards that apply to the proposed development. These are outlined in the Planning Report prepared by RMLA and submitted under separate cover.

<sup>12</sup> Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 90

<sup>13</sup> Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 603

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## 4.0 Examination of Alternatives

### 4.1 Introduction

This chapter sets out an overview of the alternative sites, designs and concepts that have been considered for the proposed development. This chapter outlines how the final design of the proposed development was informed by a robust examination of the alternative options have regard to all relevant perspectives i.e. local planning policy, environmental considerations and site design at the subject site.

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### 4.2. Consultation

Pre-planning meetings were held with Cavan County Council on 6<sup>th</sup> August 2020, 13<sup>th</sup> October 2020, 30<sup>th</sup> September 2021 and 8<sup>th</sup> November 2022.

### 4.3 Legislation, Policy and Guidance

#### 4.3.1 EU Legislation

Directive 2011/92/EU of the European Parliament and of the Council of 13th December 2011 (amended by Directive 2014/52/EU of the European Parliament and of the Council of 16<sup>th</sup> April 2014) on the assessment of the effects of certain public and private projects on the environment ('the EIA Directive') contains certain requirements in relation to the assessment of alternatives. It is noted that the information to be provided by the developer shall include:

*"A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the Environment."*<sup>1</sup>

<sup>1</sup> Article (5) (d) of Directive 2014/52/EU of the European Parliament and of the Council of 16th April 2014

This is expanded upon under Annex IV, subparagraph 2, as follows:

*“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 project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”<sup>2</sup>*

In relation to alternatives, the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) authored by the EPA states that:

*“Effect avoidance is principally achieved by consideration of alternatives. Where significant adverse effects are identified then alternative options are identified and evaluated. The objective is to adopt the combination of options that presents the best balance between avoidance of significant adverse environmental effects and achievement of the objectives that drive the project.”<sup>3</sup>*

Guidance on the Preparation of the Environmental Impact Assessment Report authored by the EU Commission (2017) defines “alternatives” as:

*“Different ways of carrying out the Project in order to meet the agreed objective. Alternatives can take diverse forms and may range from minor adjustments to the Project, to a complete reimagining of the Project.”*

#### **4.3.2 Irish Legislation**

Schedule 6 of the Planning and Development Regulations, 2001 (as amended) sets out the information which is to be contained in an EIAR and Part 1(d) of Schedule 6 states that the following shall be included:

*“An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.”*

In relation to alternatives, the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) authored by the EPA states that:

*“Effect avoidance is principally achieved by consideration of alternatives. Where significant adverse effects are identified then alternative options are identified and evaluated. The objective is to adopt the combination of options that presents the best balance between avoidance of significant adverse environmental effects and achievement of the objectives that drive the project.”*

<sup>2</sup> Annex IV, paragraph 2, of Directive 2014/52/EU of the European Parliament and of the Council of 16<sup>th</sup> April 2014

<sup>3</sup> Annex IV, paragraph 2, of Directive 2014/52/EU of the European Parliament and of the Council of 16<sup>th</sup> April 2014

Section 3.4 of the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) authored by the EPA provides further information in relation to the consideration of alternatives. The EPA Guidelines (at section 3.4.1) states that:

*“The presentation and consideration of the various reasonable alternatives investigated by the developer is an important requirement of the EIA process. 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 in deciding on the selected option”.*

Cavan County Development Plan incorporating a Local Area Plan for Cavan Town 2022-2028 is the relevant statutory plan and provides the local statutory policy for the County and town.

#### **4.3.3 Cavan County Development Plan (incorporating a Local Area Plan for Cavan Town 2022-2028)**

The Cavan County Development Plan (hereafter ‘CDP’) was adopted at a Special Council Meeting by the Elected members of Cavan County Council on Monday, 30<sup>th</sup> May 2022. The Plan came into effect on Monday, 11<sup>th</sup> July 2022 and sets out the overall planning and sustainable strategy for the County and town.

Under the CDP, the subject site is zoned Town Core which aims to “*protect and enhance the special physical and social character of the town and village core while providing and/or improving town/village centre facilities*”<sup>4</sup>. A range of uses are permitted in principle under this zoning objective including retail comparison, retail shops-major and commercial car park.

In addition to the majority Town Core zoning of the site, there is a small portion of the site zoned ‘Existing Residential’ immediately west of the St. Francis residential estate. This area of the site will be planted by a mix of native tree and shrubs with ornamental edge planting along the boundary of the gently sloped Tree Canopy Walk which links the development site to the established Town Centre. It is noted that Open Space/Park are considered to be permitted in principle under the Existing Residential zoning matrix.

### **4.4 Methodology**

This chapter assesses a variety of factors including, inter alia, an expansion of the design rationale contained in the relevant reports, an examination of the land use and planning context and an explanation of the reasonable alternatives considered having regard to the environmental effects of the options considered.

<sup>4</sup> Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 603

The evolution of the project is outlined from the early design stage through a series of stages that take account of planning, land-use and environmental effects. The six levels identified in the EPA Guidelines (2022) inform the consideration of alternatives, where applicable, as follows:

- Do-Nothing' Alternative – examination of trends currently occurring at the site;
- Alternative Processes – an outline of the different options as to how the processes of activities of the project are carried out;
- Alternative Layouts – an outline of the how different elements could be arranged on site;
- Alternative Locations – an outline of considerations relating to site suitability and the Brief;
- Alternative Designs – an outline of planning considerations, considerations about the Masterplan / layout and building design considerations; and
- Alternative Mitigation Measures – description of the various mitigation options and the reasons for selecting a chosen option, including comparison of environmental effects.

However, it is stated in the EPA Guidelines (2022), that:

*“Clearly, in some instances some of the alternatives described below will not be applicable – e.g. there may be no relevant ‘alternative location’ for the upgrading of an existing road but there may be alternative design options.”<sup>5</sup>*

A comparison of the environmental effects was carried out throughout the design stage which informed the choices made for pursuing each option and a summary of these comparisons are provided for each alternative.

## 4.5 Receiving Environment

### 4.5.1 Site Location

The subject site is located on a backland site in the townlands of Townparks and Tullymongan Lower to the east of the Main Street at Cock Hill, Cavan Town. The site is bounded to the north by St. Clare's National School and Gaelscoil Bhréifne, to the east by Killymooney Lough and green fields, to the south by residential lands and to the west by the Main Street backlands. The subject site is brownfield in nature relating to former water works that has been since been prepared and terraced in anticipation of strategic scale urban development.

The subject site is c. 4.126ha hectares in area and is situated in the Electoral Division (hereafter 'ED') of Cavan Urban and Rural. The subject site is under the ownership of Cavan County Council.

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<sup>5</sup> EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, 2022, pg 33



**Figure 4.1 Existing Site Layout (extract of JDA drawing No. 003, Existing Site Layout Plan)**



#### 4.6 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to Chapter 2 for the full description of development.

#### 4.7 'Do-Nothing' Alternative

This section considers the potential impacts arising on the receiving environment should the proposed development not take place. In a 'Do Nothing' scenario, would result in the subject site, which is currently zoned 'Town Core' in the Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town, 2022-2028, remain in its current underutilised state which would represent an inefficient use of urban land within an existing built-up area and would not be consistent with the Local Authority's objective of providing and/or improving town centre facilities at this location. The potential for any likely significant adverse environmental effects arising from the proposed development would therefore not arise in the event of a 'Do Nothing' scenario.

Additionally, if the proposed development does not take place the potential for any positive effects from the construction and operation of the proposed development would also not arise.

#### 4.8 Alternative Locations

The subject site is zoned under the 'Town Core' land use zoning objective of the Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town, 2022-2028. The 'Town Core' zoning objective seeks to:

*"protect and enhance the special physical and social character of the town and village core while **providing and/or improving town/village centre facilities.**"<sup>6</sup>*

The vision for 'Town Core' lands is as follows:

*"Develop and consolidate these town/village cores with an appropriate **mix of commercial, recreational, cultural, leisure and residential uses, and to enhance and develop their urban fabric in accordance with the principles of urban design, conservation and sustainable development. **Refurbishment, renewal, reuse and regeneration** of existing buildings and **derelict sites will be encouraged.** Retail provision will be in accordance with County Retail Strategy"***<sup>7</sup>

A range of uses are permitted in principle under this zoning objective including retail comparison, retail shops-major and commercial car park.

Having regard to the fact that the zoning of the subject site expressly provides for town centre facilities including retail/commercial development, it was not considered necessary to consider alternative locations in detail.

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<sup>6</sup> Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 603

<sup>7</sup> Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 603

## 4.9 Alternative Uses

The Proposed Development is situated on a backland site in the townlands of Townparks and Tullymongan Lower to the east of the Main Street at Cock Hill, Cavan Town in close proximity to existing services, residential population and transport links. As previously mentioned, the subject site is zoned under the 'Town Core' zoning objective, as set out in the Cavan County Development Plan.

The characteristic of the site lends itself to the delivery of a mixed retail development as being the most appropriate and efficient use, and one that could suitably accommodate the mixes of uses proposed in order to take advantage of proximity to local services, amenities, sustainable transport links and the residential population.

As such, alternative uses at the subject site were not considered in detail.

## 4.10 Alternative Layouts and Designs

The scheme has been designed by JDA Architects and is presented in the Architectural Drawings and Architectural Design Statement which should be read in conjunction with this chapter of the EIAR.

The proposed scheme which is guided by current national, regional and local policy will appropriately assimilate into the surrounding context to provide a sustainable mixed retail development in close proximity to public transport, services, facilities and employment locations. The layout and design of the scheme has involved an iterative process having regard to inter alia, the site context, environmental factors and development management standards.

This section provides examples of how the scheme has developed from initial concepts through to finalised design. Summaries of each Design Option and their merits, in respect of environmental factors are provided. This information also provides an overview of the design iteration process that has been undertaken which has ultimately led to the final design layout as submitted.

### 4.10.1 Pre-Application Process

During the pre-application process, 4 no. consultation meetings took place with Cavan County Council in accordance with Section 247 of the Planning and Development Act 2000 (as amended). Design options were presented to the Local Authority and feedback incorporated into the design of the scheme. The dates of the meeting are as follows:

- 6<sup>th</sup> August 2020;
- 13<sup>th</sup> October 2020;
- 30<sup>th</sup> September 2021; and
- 8<sup>th</sup> November 2022.

The following section provides a summary of the alternative designs considered at pre-application stage and the reasons for choosing those options, having regard to their environmental effects.

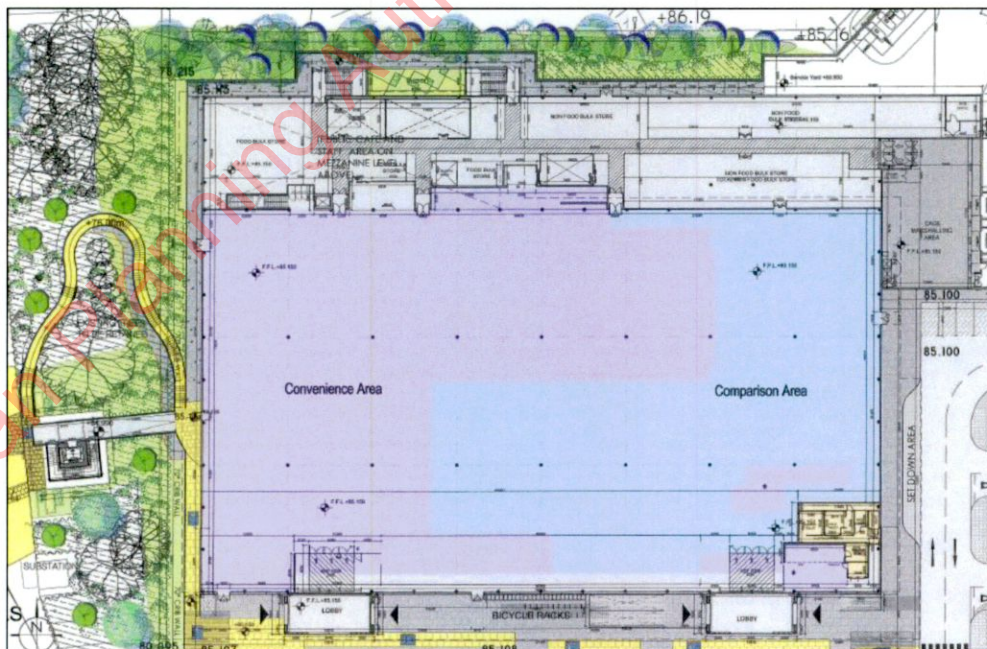
**4.10.2 Design Option A (Previously Approved Layout)**

Design Option A is illustrated below in Figure 4.2. Design Option A considered was the previously approved layout under Cavan County Council Reg. Ref. 11/1992; ABP Ref. No. PL48.240097. Permission was granted by An Bord Pleanála (ABP) on 14<sup>th</sup> January 2013.

**Figure 4.2 Initial Design Option (previously approved scheme Reg. Ref. 11/1992; ABP Ref. No. PL48.240097)**



**Figure 4.3 Initial Design Option Ground Floor Layout (previously approved scheme Reg. Ref. 11/1992; ABP Ref. No. PL48.240097)**



The option proposed was ultimately granted by ABP subject to 14 no. conditions and proposed a double height structure incorporating a mezzanine level and consisting of a Foodstore and café unit. The proposed Foodstore had a gross floor area of c. c.8,239 sqm and consisted of a net retail area of c. 5,009 sq.m (providing 2,954 sq.m net convenience and 2,055 sq.m net comparison retail space). The café was located on mezzanine level to the north of the Foodstore. The service yard was located to the east of the anchor unit with access from the newly constructed relief road. Additionally, pedestrian linkages with the Town Centre by way of the provision of a pedestrian lift and the provision of 471 no. car parking spaces.

The reasons for not proceeding with Option A are as follows:

- There was no longer a requirement for a store of this size and was not commercially viable
- The service yard was visible from Cock Hill Road
- The design did not provide any linkages between the southern portion of the site adjacent Cock Hill Road.
- The total quantum of parking provided is above the maximum standard set out in the Cavan County Development Plan and Cavan Town Local Area Plan.

### 4.10.3 Design Option B

Design Option B is illustrated below in Figure 4.4.

Option B was the Format 50 Tesco store under previously approved layout (Cavan County Council Reg. Ref. 11/1992; ABP Ref. No. PL48.240097). The floorspace area of the Format 50 store was reduced internally with 1 no. Grocery Home Shopping (GHS) and 3 no. new units added to the carpark elevation (eastern elevation). The pedestrian linkages with the Town Centre, by way of the provision of a pedestrian lift, was maintained along with the provision of 386 no. car parking spaces. A second entrance point was provided to the southern portion of Cock Hill Road.

The reasons for not proceeding with Option B are as follows:

- There was no longer a requirement for a store of this floorspace area as this was not commercially viable.
- The visual impact of the service yard from Cock Hill Road.

Figure 4.4 Design Option B



#### 4.10.4 Design Option C

Design Option C is illustrated below under Figure 4.5.

Option C again provided the Format 50 Tesco store footprint however, the 3 no. new units to the east were removed due to commercial viability. The pedestrian linkages with the Town Centre, by way of the provision of a pedestrian lift and the second entrance point, were provided to the southern portion of Cock Hill Road were maintained along with the provision of 386 no. car parking spaces.

The reasons for proceeding with Option C are as follows:

- There was no longer a requirement for a store of this size as it was not commercially viable.
- The visual impact of the service yard from Cock Hill Road.

Figure 4.5 Design Option C



**4.10.5 Design Option D**

Figure 4.6 provides the Proposed Site Layout presented to the Local Authority at the second pre-planning meeting on 13<sup>th</sup> October 2020.

The previously approved Format F50 store was reduced in floorspace area by c. 30%. The proposed Tesco store footprint was now set back further into the site from the western boundary to remove the need for extensive ground works (piling) and to reduce the visual impact. The proposed lift to the western boundary had been removed due to relevant considerations in terms of health and safety and potential for anti-social behaviour.

At the pre-planning meeting it was requested that alternative routes were considered along the entire embankment that may be less challenging for pedestrians and may not result in pedestrians arriving at the back of the store.

The reasons for not proceeding with Option D are as follows:

- The visual impact of the service yard from Cock Hill Road.
- Pedestrian linkages to the town centre were limited with only one route provided to the rear of the unit.
- The southern elevation and route to the main entrance did not provide an active elevation.

**Figure 4.6 Design Option D**





### 4.10.6 Design Option E

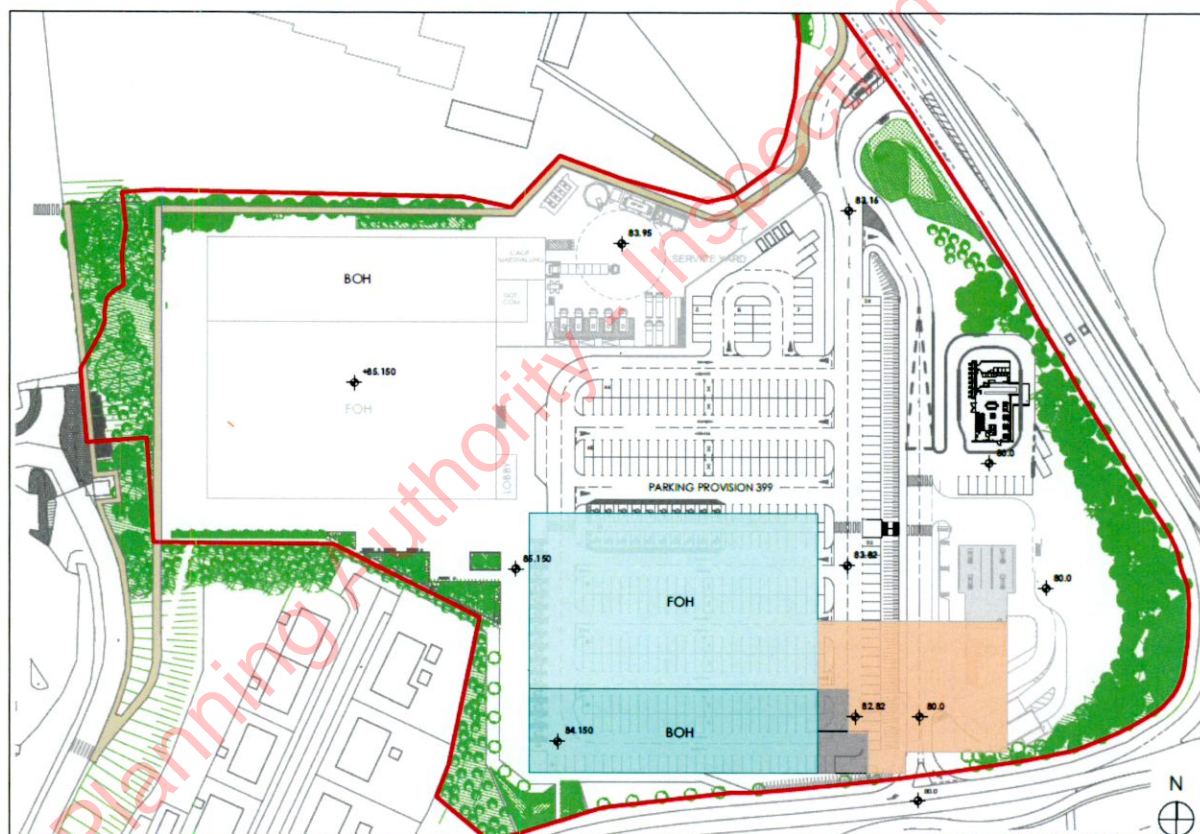
Figure 4.7 illustrates Design Option E.

The proposed layout was a study, following the pre-planning meeting on 13<sup>th</sup> October 2020, to ascertain if the proposed anchor retail unit would work in a new location on the subject site. The retail unit was positioned to the southern section of the site, however, numerous issues resulted in the placement of the store at this location due to the challenging topography of the subject site and as such, this alternative location for the anchor unit was considered to be inappropriate.

The reasons for not proceeding with Option E are as follows:

- The required ground works and soil retention posed a risk to the development in terms of soil movement.
- The proposed layout did not provide sufficient linkages to the town centre.

Figure 4.7 Design Option E



**4.10.7 Design Option F**

Figure 4.8 presents the scheme presented during the pre-planning meeting on 30<sup>th</sup> September 2021.

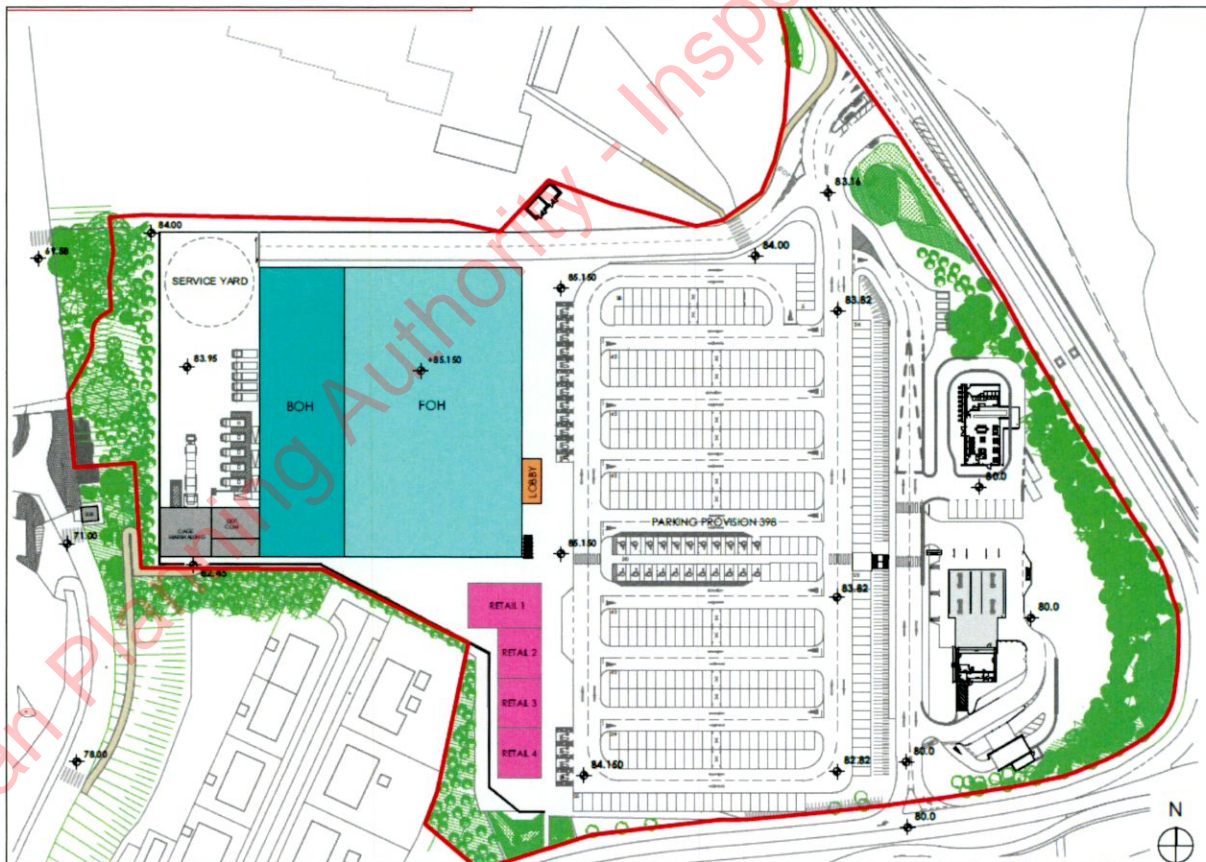
The proposed scheme was for a smaller Format 40/Format 35 store with the service yard proposed to the rear (west) further away from the adjoining school to reduce its visual impact and to also reduce the need for extensive pilling.

Three retail units were positioned to the south of the main store as standalone units, but the required ground works and soil retention posed a risk to the development in terms of soil movement.

As such, the reasons for not proceeding with Option F are as follows:

- The three retail units were positioned as standalone units, however, the required ground works and soil retention posed a risk to the development in terms of soil movement.
- Issues around the commercial viability of the proposed development.
- Further design investigation for a pedestrian link for both stepped and sloped from Main Street was required.

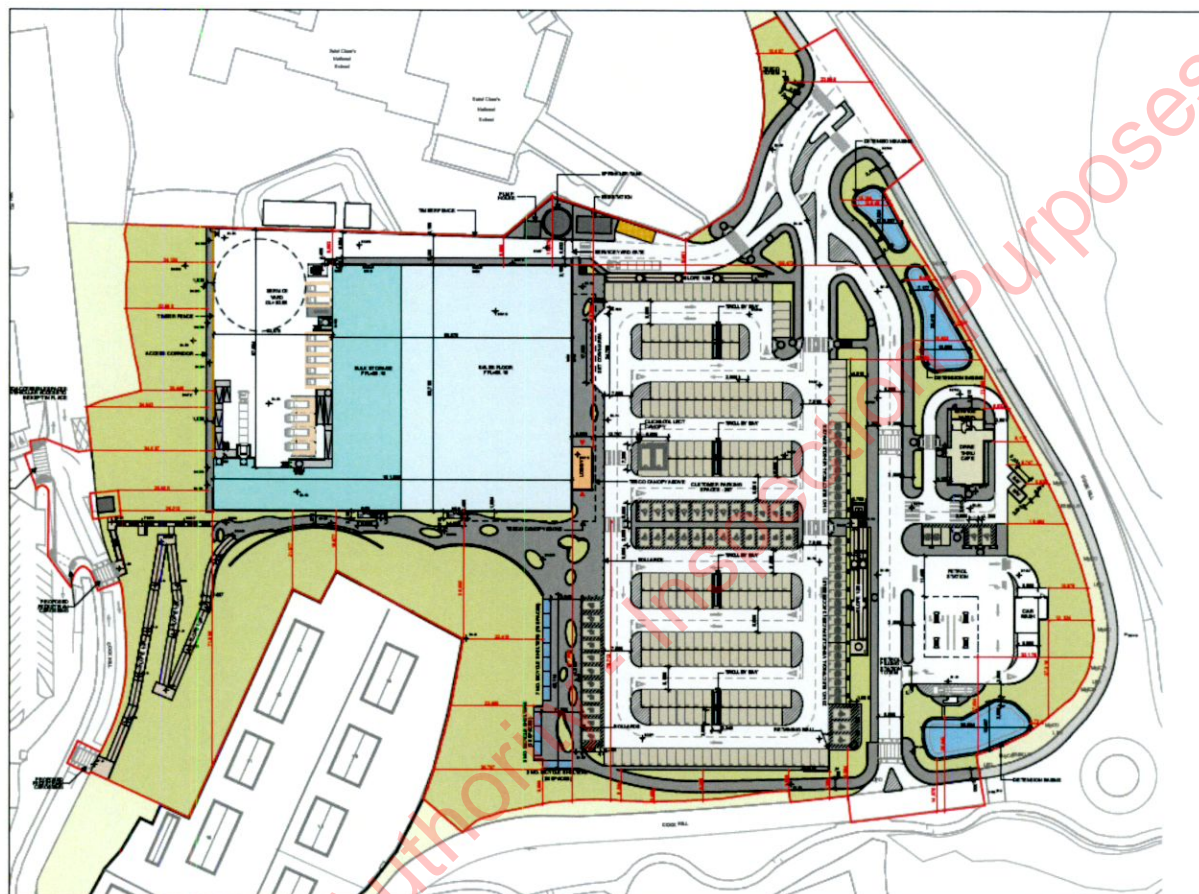
**Figure 4.8 Design Option F**



#### 4.10.8 Final Design Option

The Final Design Option chosen by the Applicant, as submitted with this application and as presented at the pre-planning meeting on 8<sup>th</sup> November 2022, is shown below in Figure 4.9. A summary of the scheme and amendments made and the reasons for the option chosen, having regard to their effects on the environment, are outlined below.

Figure 4.9 Final Design Option



#### Design

The final design option presents a single storey retail unit of c. 5,197 sq.m gross floor area including a licensed alcohol sales area, bulk store, ancillary offices, staff facilities, cage marshalling area, bin storage, service yard and associated directional signage.

In addition to the single storey retail unit, a drive thru café and petrol filling station are provided to the eastern portion of the site. As such, this option provides a mix of town centre uses in line with the 'Town Core' zoning objective that applies to this site. The final design option presents a regeneration of an underutilised Town Centre site.

Additionally, the proposed design as submitted, provides pedestrian linkages to Cavan Town Centre through the provision of a sloped ramp and steps. Other additions to the design from previous design options include the provision of a Grocery Home Shopping facility and the provision of Click and Collect

services. These have been incorporated into the design following learnings post Covid-19 and in response to changing customer shopping practices.

### **Landscaping**

The proposed site layout has created an attractive and well-detailed public realm, and the arrangement buildings, car-parking and access routes, pedestrian linkages is an efficient use of the site shape and the challenging topography of the subject site. The proposal, as submitted, is an informed response to the surrounding urban form and context.

The decision to relocate the retail unit further back into the site allows for the provision of a significant landscape buffer to the perimeter of the site. Specifically, the western boundary, where the proposed retail unit has been set into the site to remove the previously approved timber crib wall, which would have a detrimental effect to the existing mature and semi-mature tree plantation. The existing tree line will be strengthened and improved.

The relocation of the service yard to the rear of the building allows it to be removed from the front elevation and it will be integrated into the form of the building and screened from public view. Additionally, the size and location allow for the provision of GHS.

### **Pedestrian Links**

The built form addresses the eastern access route and provides an active elevational treatment to the customer car park, plaza and walkway. Additionally, the east and south elevations have been activated to overlook the public plaza and pedestrian route to the Town Centre.

A stepped walkway and sloped ramp have also been included and provide the opportunity for rest points to make it as accessible as possible. An observation area looking over the town to take advantage of view has also been included. A network of footways and shared spaces are provided within the proposed development providing permeable links through and into/out of the site.

### **Transport/Parking**

The proposed development will provide its main access from Cock Hill Road via an existing priority junction. The main access road then splits into a Tesco store servicing access, a Tesco car park access, and an internal access road to serve the Drive Thru Café and Petrol Filling Station as well as providing connectivity to a new left in/left out access on the southern portion of Cock Hill Road.

The final design option includes 297 no. spaces associated with the retail unit including parent and toddler, disabled and electric parking spaces. The café with drive thru facilities has 7 no. car parking spaces including 2 accessible parking bays and 2 electric vehicle charging space and 2 no. set down bay areas. The Petrol Filling Station has no store component, and no car parking is proposed.

The proposed development will consist of 120 no. sheltered cycle parking spaces at convenient locations within the proposed development to encourage active travel. Access for cyclist is provided from Cock Hill Road to the south and east of the site via existing off-road shared path facilities.

#### 4.11 Conclusion

This chapter has described the reasonable alternatives considered and the reasons for choosing the proposed scheme, having regard to the relevant environmental factors. The comparison of alternatives in relation to environmental factors is summarised throughout this chapter and helped to inform the decision to select the proposed development as submitted.

It is clear from the information provided throughout this chapter that the proposed scheme is the most appropriate form of development for the subject site and represents an improvement in terms of environmental effects when compared to the other design options considered.

Cavan Planning Authority - Inspection Purposes Only!

## 5.0 Population and Human Health

### 5.1 Introduction

This chapter provides an assessment of the direct and indirect significant effects of the proposed development at the townlands of Townparks and Tullymongan Lower to the east of the Main Street at Cock Hill, Cavan town may have on the human environment in the vicinity of the subject site in terms of land use, demographics, socio-economic environment and employment activity and human health.

This Chapter was prepared Robert McLoughlin, Brendan Boyle and Rachel Lawler of RMLA Limited, Planning Consultants. Robert McLoughlin holds a Bachelor of Agricultural Science (Landscape Horticulture) from University College Dublin (UCD) and a Master of Urban and Regional Planning also from UCD. Robert is a Corporate Member of the Irish Planning Institute and has 18 years postgraduate experience in the preparation of EIAR for residential, retail, commercial and healthcare developments.

Brendan holds a Bachelor of Science Degree in Environmental Planning from Queen's University Belfast (QUB) and a Postgraduate Diploma in Town and Country Planning, also from QUB. Brendan has a Postgraduate Diploma in Environmental Management with Geographic Information Systems from Ulster University and has over 14 years postgraduate experience in planning and development. Brendan is a Member of the Irish Planning Institute. Rachel Lawler holds a Bachelor of Arts Degree in Geography and Psychology from University of Galway and a Master of Urban and Regional Planning from UCD. Rachel is a graduate member of the Irish Planning Institute and has 2 years experience in planning and development.

The 2014 EIA Directive (2014/52/EU) has updated the list of topics to be addressed in an EIAR and has replaced 'Human Beings' with 'Population and Human Health'. This is described in further detail below.

### 5.2 Consultation

Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

### 5.3 Legislation, Policy and Guidance

#### 5.3.1 Methodology

The methodology for the 'Population and Human Health' Chapter of the EIAR involves the compilation, examination and analysis of relevant baseline population and socio-economic data with reference to the most appropriate guidance documents, outlined below. The assessment will examine the effects of the proposed development on Population and Human Health from national, regional and local levels. Furthermore, it will be noted where ameliorative/mitigation measures are required to minimise effects.

The guidance documents considered and consulted in the preparation of this chapter include the following, this list is non exhaustive:

- EIA Directive', Directive 2011/92/EU of the European Parliament and of the Council, as amended by Directive 2014/52/EU;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment', Department of Housing, Planning and Local Government 2018;
- 'Guidance on the Preparation of the Environmental Impact Assessment Report', European Commission 2017; and
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports, EPA 2022.

Two types of socio-economic impacts can typically arise: direct and indirect impacts. Direct impacts typically occur at a local level, through changes in the immediate environment that arise as a result of the physical works during construction phase. This level of assessment will be undertaken through the identification of a local catchment/study area. The criteria for identifying this area will include *inter alia*:

- Impacts on the residential amenity;
- Construction-related impacts; and;
- Traffic-related impacts.

Indirect impacts typically arise outside the immediate area where the physical works take place. They generally related to changes in population and economic patterns that will arise as a result of the proposed development of the environmental factors required under the EIA Directive through which effect on Population and Human Health may occur.

Environmental hazards including but not limited to, water contamination, air pollution, noise, accidents and disasters will be considered having regard to the relevant environmental factors addressed separately in this EIAR such as, *inter alia*: air, water, soil, noise and traffic. The effects of these environmental factors on Population and Human Health will be assessed with reference to accepted international standards of safety in does, exposure to risk, and/or source/pathway/receptor. Where other health and safety requirements are addressed in accordance with separate regulatory requirements, the results of such assessments will be referenced to in the EIAR.

It is stated in the Department of Housing, Planning, Community and Local Government Key Issues Paper on the Transposition of the 2014 EIA Directive in relation to Population and Human Health that:

*"it is intended that the consideration of the effect on populations and on Human Health should focus on health issues and environmental hazards arising from the other environmental factors, for example water contamination, air pollution, noise, accidents, disasters, and not requiring a wider consideration of Human Health effects which do not relate to the factors identified in the Directive."*<sup>1</sup>

Also, that:

<sup>1</sup> Department of Housing, Planning, Community and Local Governments Key Issues Paper on the Transposition of the 2014 EIA Directive, pg. 12



*“It is not considered this should be understood as requiring consideration of social and/or economic impacts.”<sup>2</sup>*

### 5.3.2 Describing the Effects

The impact assessment of the Chapter follows the guidance set out in the EPA’s Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022), the environmental Impact Assessment Directive (Directive 2011/92/EU, amended by Directive 2014/52/EU), the EPA guidance and EU Commission guidance on EIA in relation to describing accurately the full range of likely significant effect, as outlined in further detail in Chapter 2. The following publications and data sources were consulted in the preparation of this Chapter:

- National Planning Framework, Project Ireland 2040;
- Northern and Western Regional Assembly, Regional and Spatial & Economic Strategy 2020;
- Cavan County Development Plan incorporating a Local Area Plan for Cavan Town, 2022-2028;
- Census 2011 & 2016, Central Statistics Office;
- Pobal Deprivation Index;
- Google Earth Imagery; and
- Cavan County Council’s online planning portal.

The methodology for describing the effects to the proposed development is in accordance with the EPA Guidelines (2022) and as outlined in Figures 1.2, 1.3 and 1.4 in Chapter 1.

## 5.4 Receiving Environment

The subject site is located on a backland site in the townlands of Townparks and Tullymongan Lower to the east of the Main Street at Cock Hill, Cavan town. The site is bounded to the north by St. Clare’s National School and Gaelscoil Bhréifne, to the east by Killymooney Lough and green fields, to the south by residential lands and to the west by the Main Street backlands. The subject site is approximately c. 4.126ha hectares in area and is situated in the Electoral Division (hereafter ‘ED’) of Cavan Urban and Rural. The subject site is under the ownership of Cavan County Council.

### 5.4.1 Catchment Area

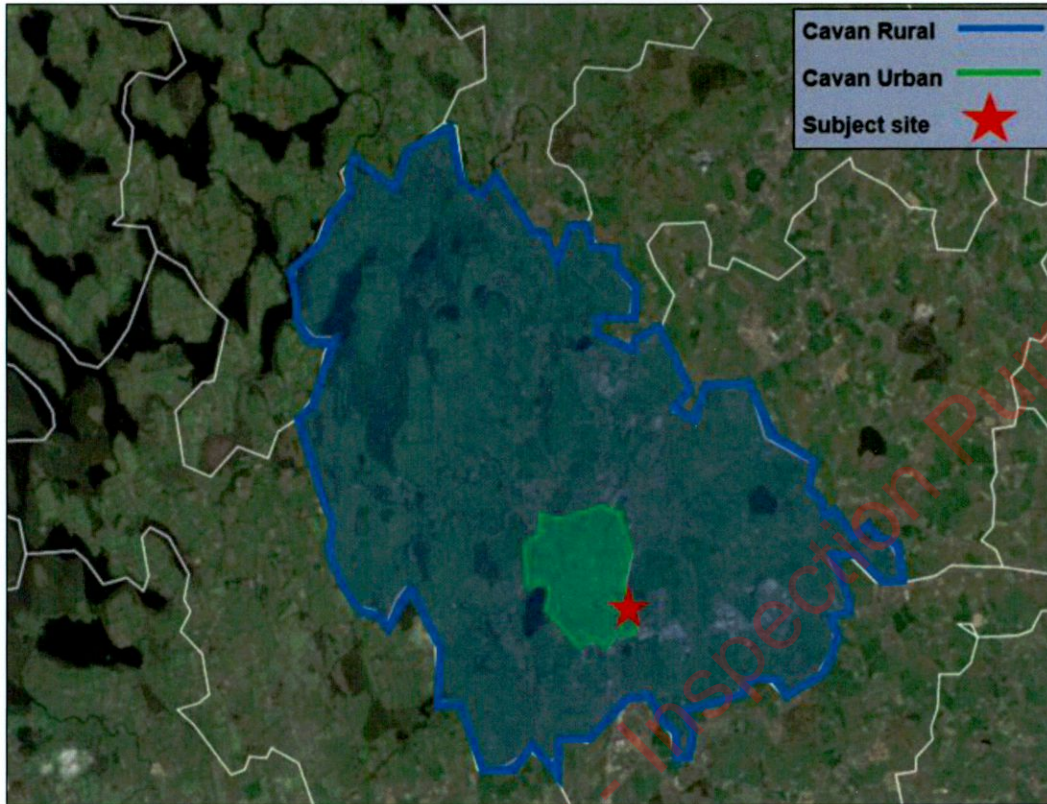
In order to assess the demographic profile, the primary study area is defined by the 2 no. ED’s of Cavan Urban and Cavan Rural that overlay the proposed Development and are likely to be affected.

This study area is considered to represent a reasonable catchment for a retail development of the nature proposed and provides the ‘local’ geographic context for which analysis throughout this Chapter is based. Once the physical parameters of the study area were established a combination of statistics for Cavan Town and environs were examined, sourced from the 2011 and 2016 censuses. In addition,

<sup>2</sup> Department of Housing, Planning, Community and Local Governments Key Issues Paper on the Transposition of the 2014 EIA Directive, pg. 12

similar statistics for the County and the State were examined. The total population of the catchment area in 2016 was 12,043 persons.

**Figure 5.1 Cavan Rural and Urban Electoral Division (Subject site identified by star)**



**5.4.2 Land Use**

The Cavan County Development Plan 2022-20 forecasted a population of 11,794 persons for the year 2022, a total population increase of c.8.06% over the 2016 population of Cavan Town.<sup>3</sup>

**5.4.2.1 Land Use Zoning Objective**

The subject site is zoned under ‘Town Core’ in which it is an objective to *“protect and enhance the special physical and social character of the town and village core while providing and/or improving town/village centre facilities.”*<sup>4</sup> The vision for the ‘Town Core’ zoning objective is to maintain and build on accessibility, vitality and viability of the existing town and village centres in the County in which the refurbishment, renewal, reuse and regeneration of existing buildings and derelict sites will be encouraged.

Under the ‘Town Core’ zoning objectives uses permitted in principle include Restaurant/Café, Retail Comparison, Retail Shops - local and Retail Shops - major.

<sup>3</sup> Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town, 2022-2028, pg. 48

<sup>4</sup> Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town, 2022-2028, pg. 603

In addition to the majority Town Core zoning of the site, there is a small portion of the site zoned 'Existing Residential' immediately west of the St. Francis residential estate. This area of the site will be planted by a mix of native tree and shrubs with ornamental edge planting along the boundary of the gently sloped Tree Canopy Walk which links the development site to the established Town Centre. It is noted that Open Space/Park are considered to be permitted in principle under the Existing Residential zoning matrix.

### 5.4.3 Demographic Profile

#### 5.4.3.1 Age Profile

The study area is characterised by the younger age cohorts with c. 35% of the population under the age of 24 years old. Table 5.1 below indicates the majority of the population within the catchment area identified are in the 25-44 years age cohort, accounting for c.33% of the total population which is higher than the national average of c.30%. Those aged 65 years and older accounted for c.13% of the catchments population as identified in the 2016 census results, identical to the national average (c.13%). Those aged 0-12 years old accounted for c.22% which is above the national average at (c.19%). As such, the catchment population is considered to be young with c. 65% below 44 years old.

**Table 5.1 Catchment and State Age Profile 2016 (CSO.ie)**

Age	Catchment Population	State
0-12	2,609 (c.22%)	880,208 (c.19%)
13-18	902 (c.7%)	371,588 (c.8%)
19-24	684 (c. 6%)	331,208 (c.7%)
25-44	4,006 (c.33%)	1,406,291 (c.30%)
45-64	2,355 (c.20%)	1,135,003 (c.24%)
65 and older	1,487 (c.13%)	637,567 (c.13%)
Total Population	12,043 (100%)	4,761,865 (100%)

### 5.4.3.2 Marital Status and Family Cycle

Table 5.2 Population by Marital Status, 2016 (CSO.ie)

Marital Status	Catchment Population		Cavan County		Ireland	
	2011	2016	2011	2016	2011	2016
Single	6,060 (c.55.8%)	6,589 (c.54.7%)	38,419 (52.5%)	39,465 (51.8%)	2,484,625 (54.2%)	2,551,414 (53.6%)
Married	3,746 (34.5%)	4,241 (35.2%)	28,699 (39.2%)	30,010 (39.4%)	1,708,604 (37.2%)	1,792,151 (37.6%)
Separated	302 (2.8%)	305 (2.5%)	1,569 (2.1%)	1,758 (2.3%)	116,194 (2.5%)	118,178 (2.5%)
Divorced	266 (c.2.5%)	383 (3.2%)	1,279 (1.7%)	1,652 (2.2%)	87,770 (1.9%)	103,895 (2.2%)
Widowed	478 (4.4%)	525 (4.4%)	3,217 (4.4%)	3,291 (4.3%)	191,059 (4.2%)	196,227 (4.1%)
Total	10,852 (100%)	12,043 (100%)	73,183 (100%)	76,176 (100%)	4,588,252 (100%)	4,761,865 (100%)

Table 5.3: Number of Families by Family Cycle 2016 (CSO.ie)

Family Cycle	Catchment Population	Cavan County	State
Pre-Family	272 (9.5%)	1,359 (7%)	111,525 (9.2%)
Empty Nest	259 (9%)	2,165 (11.1%)	121,720 (10%)
Retired	230 (8%)	1,907 (9.8%)	122,404 (10%)
Pre-school	397 (13.8%)	1,938 (9.9%)	122,285 (10%)
Early school	467 (16.3%)	2,343 (12%)	144,861 (10%)
Pre-adolescent	368 (12.6%)	2,288 (11.7%)	139,045 (11.4%)
Adolescent	398 (13.9%)	2,767 (14.2%)	150,353 (12.3%)
Adult	484 (16.9%)	4,786 (24.5%)	306,177 (25%)
Total	2,870 (100%)	19,553 (100%)	1,218,370 (100%)

**Table 5.4: Number of Persons by Family Cycle 2016 (CSO.ie)**

Family Cycle	Catchment Population	Cavan County	State
Pre-Family	544 (5.8%)	2,718 (4.1%)	223,050 (5.7%)
Empty Nest	518 (5.6%)	4,330 (6.6%)	243,440 (6.2%)
Retired	460 (4.9%)	3,814 (5.9%)	244,808 (6.3%)
Pre-school	1,266 (13.6%)	6,380 (9.8%)	391,393 (10%)
Early school	1,771 (19%)	9,262 (14.2%)	556,931 (14.3%)
Pre-adolescent	1,478 (15.9%)	9,722 (14.9%)	566,866 (14.5%)
Adolescent	1,605 (17.2%)	11,708 (18%)	608,441 (15.6%)
Adult	1,665 (17.9%)	17,230 (26.4%)	1,065,595 (27%)
Total	9,307 (100%)	65,164 (100%)	3,900,524 (100%)

#### 5.4.4 Economic Activity

##### 5.4.4.1 Employment

The working age group is defined as persons aged between 15 and 64. The Census 2016 indicates that c.63.5% of the catchment area are within the working age cohort which is slightly less than the national rate of c.65.5%.

**Table 5.5 Employment Status 2016 (CSO.ie)**

Principle Economic Status	Catchment Population	Cavan County	State
At work	4,532 (49.6%)	30,509 (52.1%)	2,006,641 (53.4%)
Looking for first regular job	160 (1.8%)	603 (1.0%)	31,434 (0.8%)
Unemployed having lost or given up previous job	1,039 (11.4%)	4,810 (8.2%)	265,962 (7.1%)
Student	833 (9.1%)	6,014 (10.3%)	427,128 (11.4%)
Looking after home/family	777 (8.5%)	5,545 (9.5%)	305,556 (8.1%)
Retired	1,314 (14.4%)	8,464 (14.5%)	545,407 (14.5%)
Unable to work due to permanent sickness or disability	461 (5%)	2,390 (4.1%)	158,348 (4.2%)
Other	16 (0.2%)	219 (0.4%)	14,837 (0.4%)
Total	9,132 (100%)	58,554 (100%)	3,755,313 (100%)

The seasonally adjusted Live Register total for November 2022 was 184,700 persons, up 900 or 0.5% from October 2022. Of the 180,884 persons on the Live Register in November 2022, 53.4% were male. The 35-44 age group made up the largest number of those on the Live Register in November 2022 at 42,707 persons or 23.6%.<sup>5</sup>

The Labour Force Survey is the official source of labour market statistics for Ireland. It includes the official rates of employment and unemployment, which are based on International Labour Organisation concepts and definitions. The CSO Labour Force Survey, published in Q3 of 2022, indicates that there are 2,554,300 persons in employment, an increase of c.3.4% from Q3 2021.<sup>6</sup>

The number of persons who were unemployed decreased by 30,000 (-20.1%) to 119,100 in the year to Q3 2022. The unadjusted unemployment rate decreased from 5.7% to 4.5% over the year to Q3 2022.<sup>7</sup>

#### 5.4.4.2 Education

For persons aged 15 years and above, a total of 16.5% of the catchment population have attained an 'Upper Secondary' level of education with 12.5% achieving a 'Technical or Vocational' qualification, this is higher than the national average of 8.8%.

In relation to third level education, 7.7% of the catchment area had achieved an 'Ordinary/Bachelor's Degree, this is in line with the national average, with a further 7.4% of the catchment population having obtained a postgraduate qualification, this is higher than the average of Cavan County (5.2%) and lower than the national average of 9.2% as identified in Table 5.6. Within the catchment area, 0.4% have achieved a Doctorate (PhD) or higher, less than the national average of 1%.

**Table 5.6 Highest Level of Education Attained 2016 (CSO.ie)**

Highest Level of Education Completed	Catchment Population	Cavan County	State
No formal education	179 (2.4%)	1,182 (2.4%)	52,214 (1.7%)
Primary education	921 (12.3%)	7,082 (14.4%)	334,284 (10.8%)
Lower secondary	927 (12.4%)	8,266 (16.8%)	449,766 (14.5%)
Upper secondary	1,238 (16.5%)	8,810 (17.9%)	573,643 (18.5%)
Technical or vocational qualification	940 (12.5%)	5,622 (11.4%)	271,532 (8.8%)
Advanced certificate/Completed apprenticeship	415 (5.5%)	3,540 (7.2%)	182,318 (5.9%)
Higher certificate	420 (5.6%)	2,528 (5.1%)	153,351 (5%)

<sup>5</sup> Central Statistics Office, Live Register November 2022, <https://www.cso.ie/en/releasesandpublications/ep/p-lr/liveregisternovember2022/>

<sup>6</sup> Central Statistics Office, Labour Force Survey Quarter 3 2022

<sup>7</sup> Central Statistics Office, Labour Force Survey Quarter 3 2022

Ordinary bachelor degree or national diploma	578 (7.7%)	3,172 (6.4%)	237,117 (7.7%)
Honours bachelor degree, professional qualification or both	640 (8.5%)	3,640 (7.4%)	331,293 (10.7%)
Postgraduate diploma or degree	553 (7.4%)	2,555 (5.2%)	284,107 (9.2%)
Doctorate (Ph.D.) or higher	33 (0.4%)	137 (0.3%)	28,759 (0.9%)
Not stated	656 (8.7%)	2,781 (5.6%)	198,668 (6.4%)
Total	7,500 (100%)	49,315 (100%)	3,097,052 (100%)

As identified below, the subject catchment is well served by educational facilities at Montessori, Primary and Secondary levels schools.

The Pobal Deprivation Index was assessed to determine the socio-economic status of the catchment which identified Cavan Urban as 'disadvantaged' and Cavan Rural as 'marginally above average'.

#### 5.4.5 Social Infrastructure

The catchment area of the subject site is well served by social and community infrastructure including a range of sport and recreational facilities, open space, educational facilities at primary and post primary level. The catchment area also includes a variety of employment centres including shops, restaurants and bars. Table 5.7 below which demonstrates the existing community infrastructure servicing the catchment population of the subject site.

**Table 5.7 Community Infrastructure on the vicinity of the subject site**

Category	Existing Infrastructure
Open Space	Con Smith Park
Sport and Recreation	Cavan Golf Club, County Cavan Cricket Club, St. Patrick's Handball Club, Cavan Lawn Tennis Club, Cavan Gaels GAA Club, Drumalee GAA Club, Cavan Shamrocks, Cavan Celtic, Cavan Town Afc, Cavan Rugby Club, Cavan Swimming Pool and Leisure Complex, Breifne Gymnastics Academy, Breifni Park, Con Smith Skate Park
Education	St. Clare's National School (Primary), St. Felim's National School (Primary), Gaelscoil Bhréifne (Primary), Farnham National School (Primary) Cavan No 1 National School (Primary), Royal School (Secondary), Loreto College (Secondary), Breifne College (Secondary), St Patrick's College (Secondary),
Childcare	Little Friends Montessori, Playaway Creche, The Children's House, Tullacmongan Childcare Service, Stepping Stones Preschool, ABC Childcare, Kavan Kids Kreche

Community Facilities	Tullacmongan Resource Centre, Johnston Central Library, Townhall Arts Space
Retail Services	Existing Tesco store, Lidl, Aldi, Dealz, Dunnes Stores, Centra, SuperValu, Mr. Price, Fresh Today and a range of comparison services in the town centre
Healthcare and Social Services	Cavan General Hospital, Cavan Primary Care Centre, Connolly Street Primary Care Centre

The local community infrastructure surrounding the subject site can be summarised by the following points:

- The area benefits from a range of sport and recreational facilities including 2 no. GAA Clubs, 3 no. Soccer Clubs, a Rugby Club and other various sporting outlets.
- The catchment area is well served by Montessori, Primary and Secondary levels schools.
- A range of shops, restaurants and bars are situated within the town centre within walking distance of the subject site.

#### 5.4.6 Human Health

Health is defined as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” by the World Health Organisation (WHO).<sup>8</sup> The Healthy Ireland Framework 2019-2025 is a roadmap for building a healthier Ireland and describes health as “everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing.”

##### 5.4.6.1 General Health Status

The Healthy Ireland Framework states that there is a higher proportion of people living longer in Ireland and whilst there has been improvement for some lifestyle risk factors, not all are living those longer lives in good health. Numerous people and their families are affected by chronic diseases and disabilities in relation to poor diet, alcohol misuse and physical inactivity in Ireland.

The 2016 Census provides an understanding into the general health status of the population. Table 5.8 indicates the proportion of the catchment population that considers themselves to have ‘very good’ health is below the regional and national average.

**Table 5.8 General Health Status 2016 (CSO.ie)**

General Health Status	Catchment Population	Cavan County	State
Very Good	6,615 (54.9%)	46,165 (60.6%)	2,827,544 (59.4%)
Good	3,423 (28.4%)	20,446 (26.8%)	1,316,467 (27.6%)

<sup>8</sup> Preamble to the Constitution of WHO as adopted by the International Health Conference, New York, 19 June – 22 July 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of WHO, no. 2, pg. 100) entered into force on 7 April 1948.



Fair	1,145 (9.5%)	6,479 (8.5%)	382,905 (8%)
Bad	218 (1.8%)	954 (1.3%)	62,697 (1.3%)
Very Bad	54 (0.4%)	210 (0.3%)	13,738 (0.3%)
Not Stated	588 (4.9%)	1,922 (2.5%)	158,514 (3.3%)
Total	12,043 (100%)	76,176 (100%)	4,761,865 (100%)

#### 5.4.6.2 Travel and Commuting

In terms of modes of transport used for commuting trips (to work, school and/or college), the dominant mode of travel in the catchment area was the 'Private Car' (accounting for both car driver and car passenger), which represented a total figure of c.69.5% of journeys (see Table 5.9). The second most popular means of travel was 'On Foot' with c.13.4% of journeys undertaken by this mode. Sustainable modes of transport i.e. Walking, Bus, Train etc. cumulatively accounted for c.19.8% of all journeys made.

The subject site is situated within close proximity to the town centre with the closest bus stops located on the Cavan Town Main Street c. 220m west of the subject site, serviced routes no. C2 and C3.

There is good pedestrian and cycle infrastructure on roads adjoining the subject site with either shared dedicated footpaths, off-road shared paths, on-road cycle lanes or shared paths in place. A large proportion of the town is within 20 minutes walking distance of the subject site.

**Table 5.8 Means of Travel to Work, School or College 2016 (CSO.ie)**

Means of Travel	Catchment Population	Cavan County	State
On foot	948 (13.4%)	4,201 (8.8%)	426,221 (13.9%)
Bicycle	59 (0.8%)	239 (0.5%)	82,123 (2.7%)
Bus, minibus or coach	380 (5.4%)	5,576 (11.6%)	313,097 (10.2%)
Train, DART or Luas	13 (0.2%)	92 (0.25)	82,627 (2.7%)
Motorcycle or scooter	5 (0.1%)	30 (0.1%)	8,565 (0.3%)
Car Driver	2,909 (41.1%)	19,919 (41.6%)	1,202,441 (39.3%)
Car passenger	2,017 (28.5%)	10,243 (21.4%)	570,254 (18.6%)
Van	232 (3.3%)	3,355 (7%)	128,310 (4.2%)
Other (incl. lorry)	11 (0.2%)	359 (0.8%)	11,917 (0.4%)
Work mainly at or from home	110 (1.6%)	1,961 (4.1%)	96,057 (3.1%)

Not stated	399 (5.6%)	1,889 (3.9%)	136,995 (4.5%)
Total	7,083 (100%)	47,864 (100%)	3,058,607 (100%)

## 5.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to Chapter 2 for the full description of development.

## 5.6 Predicted Effects of the Proposed Development

This section describes the likely direct and indirect effects that the proposed development may have during the construction and operation stages in the absence of mitigation. Section 5.7 outlines the recommended mitigation measures to minimize such effects and an assessment of the effects post mitigation is provided in the 'Residual Impact' section below.

In accordance with Guidance documents issued by the EPA and the Department of Housing, Planning and Local Government, the assessment of the potential impacts on population and Human Health focuses on health issues and environmental hazards as they relate to the other prescribed environmental factors and does not include a wider consideration of Human Health effects that do not relate to the factor outlined in the EIA Directive.

The potential impacts at construction and operation stages are considered under the following headings: Land Use; Demographics; Socio Economic and Employment; Social Infrastructure; and Human Health.

### 5.6.1 Construction Phase

#### 5.6.1.1 Land Use

The construction stage of the proposed development has the potential to result in a temporary minor negative visual impact on the local environment.

The photomontages for viewpoints in the area show that while the composition and character of would change, as is common and anticipated in urban areas, measures taken to reduce their visual intrusion would be effective. The development would change the setting of the character area, reflecting a more

urban context. Given the prime location and national, regional and local planning policy supporting regeneration, this is considered appropriate, the majority of the viewpoints will see either enhanced or imperceptible effects.

The Landscape and Visual Impact Assessment concludes there is considerable screening from existing vegetation and landform around the site, particularly to the west, and in combination with site hoarding, much of the ground-based clutter and activity of construction stage works will be out of view and perceptually contained within the site context. As such, the magnitude of the Short-term construction stage landscape/townscape impacts is deemed to be Medium and of a Negative quality.

The landscape and visual effects that arise as a result of the proposed development are assessed in greater detail in Chapter 16 Landscape and Visual Impact Assessment.

#### **5.6.1.2 Demographics**

The construction stage of the proposed development may result in a marginally increased population in the wider area due to increased construction employment as a result of the proposed development. This effect, however, is likely to be temporary and imperceptible as the construction phase is only projected to last c.12 months.

#### **5.6.1.3 Socio Economic and Employment**

##### **Employment**

The construction phase of the proposed development is anticipated to result in a temporary positive effect in relation to generating economic activity and employment, on a local and regional scale. The construction phase is expected to last c. 12 months.

In addition to the direct employment, there will also be significant indirect economic activity generated during construction stage as construction workers employed at the subject site can be expected to make use of local retail facilities and other services that are in immediate proximity to the Proposed Development Site. Further indirect economic activity will result from the supply of construction materials and services for the proposed development. The increased demand for local goods and services will result in increased revenue generated by local retailers with associated economic benefits.

The effect of the construction stage will extend county wide in relation to the supply of labour, goods and services and the effects will be temporary, positive, and moderate on a regional scale.

#### **5.6.1.4 Social Infrastructure**

The proposed development is unlikely to have any impacts on the availability of the local amenities outlined in Section 5.4.5. Furthermore, it is noted that some of the facilities will likely be strengthened as a result of the increased visiting population during construction with associated benefits in terms of improve viability. It is submitted, therefore, that the effect on the social and community infrastructure in the local catchment during construction stage are considered to be temporary and neutral or slightly positive.

### 5.6.1.5 Human Health

#### Air Quality

The assessment of potential impacts for Air Quality and Climate are presented in Chapter 12, as outlined, dust and particulate matter generated during the construction stage of the proposed development may have the potential for an adverse impact on local air quality. This has a potential impact on Human Health.

As outlined previously, Chapter 12 – Air Quality and Climate states the mitigation measures that will be put in place during the construction phase of the proposed development, which will ensure that the effect of the development complies with all EU ambient air quality legislative limit values which are based on the protection of Human Health, as such, the proposed development will not result in a significant effect on Human Health.

#### Noise

The assessment of potential impacts for Noise and Vibration are presented in Chapter 11, as outlined, the main site activities will include site clearance, ground excavation works and provision of infrastructure, construction of the buildings, road construction and landscaping.

Having regard to the above, the construction stage will result in a potential effect to the surrounding area as a result of noise, dust and construction traffic. No heavy construction equipment/machinery (to include pneumatic drills, construction vehicles, generators, etc.) shall be operated on or adjacent to the construction site before 07:00 or after 19:00 Monday to Friday, and before 08:00 and after 14:00 on Saturdays – in accordance with the working hours permitted in the grant of planning permission. No activities shall take place in site on Sundays or Bank Holidays.

Having regard to the above, the construction stage will result in a potential effect to the surrounding area as a result of noise, vibration and construction traffic. This effect is likely to be short-term in the absence of any mitigation measures.

For further information please refer to Chapter 11 – Noise and Vibration.

### 5.6.2 Operational Phase

#### 5.6.2.1 Land Use

The operational stage of the proposed development will see the introduction of a mixed retail scheme providing a single storey Tesco supermarket (c. 5,197 sq.m), a drive thru café unit (c.174 sq.m) and a petrol filling station to the eastern boundary of the site. Additionally, the proposed development will provide pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site. The subject site has the potential to accommodate a sustainable expansion of the town centre area through the provision of a mixed retail development. It is considered that the appropriate development of this area could significantly enhance the profile of Cavan Town, generate employment and attract people to the town.

Development of the subject site for retail/commercial uses is consistent with the land use zoning objectives of the Development Plan and is in accordance with the objectives of the RSES that seek to improve the physical appearance, vitality and vibrancy of town centres and the regeneration of brownfield lands.

Having regard to the above, it is submitted that the proposed development will have a permanent, significant, and positive effect that will contribute to achieving local, regional and national land use planning objectives.

#### **5.6.2.2 Demographics**

The changing demographic profile arising from the operational stage of the proposed development is likely to facilitate a balanced age profile within the local area. The proposed development will have a slight positive effect in terms of changing profile that will be long term in duration and moderate in significance.

#### **5.6.2.3 Socio economic and Employment**

Employment opportunities will be generated during the operational phase of the proposed development through the supermarket, drive thru café and petrol filling station unit. The potential effect in terms of employment is considered to be moderate, positive and long-term.

The increased population as a result of the proposed scheme will also lead to increased demand for goods and services in the local area, supporting local jobs and increased revenue. The potential effect in terms of economic activity is considered to be moderate, positive and long term.

#### **5.6.2.4 Social Infrastructure**

As referred to previously, the proposed development is unlikely to have any effect on the availability of the local amenities outlined in Section 5.4.5. Furthermore, it is noted that some of these facilities will likely be strengthened as a result of the increased permanent population during operation stage of the proposed development with associated benefits in terms of improved viability. It is submitted, that the potential effects on the social and community infrastructure in the local catchment during the operation stage are considered to be long term, moderate and positive.

#### **5.6.2.5 Human Health**

##### **Noise**

The main potential for altering the noise environment during the operational stage of the development is from road traffic noise associated with increased vehicular movements. During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site which has the potential to alter the noise environment during the operational stage with potential effect on residential receptors.

As shown in Chapter 11 – Noise and Vibration, the potential traffic level increases attributable to the proposed development indicates that the development will not give rise to increases of this magnitude on the surrounding road network.

The predicated increase in traffic flows associated with the development in the short, medium and long term is calculated to be less than 2.5dB which is considered to be not significant.

### **Air Quality**

As set out in Chapter 12 – Air Quality and Climate, an assessment of the operational traffic emissions was undertaken to assess the effect of the development on Human Health. As shown in that assessment, emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant effect on Human Health.

### **Travel and Commuting**

The proposed development will create a modern mixed retailing scheme in close proximity to a wide range of existing amenities and within short and easy commuting distance of the Town Centre and a wide range of major employment centres. The proposed development prioritises walking and cycling and promotes public transport use. This will facilitate active modes of travel which have associated physical and mental health benefits. The potential impacts in relation to Human Health for future residents of the proposed development are considered to be positive, moderate and short to medium term.

As stated in Chapter 6 – Traffic and Transportation, there will be additional traffic on the surrounding road network as a result of the proposed development at operational stage, which is envisaged to be slight, likely in probability and long-term. It is predicated that this will have an insignificant negative effect in terms of Human Health at a local scale in the medium to long term as a result of increased congestion and commuting times.

#### **5.6.3 'Do nothing' Scenario**

This section considered the potential effects arising on the receiving environment should the proposed development not take place. In a 'Do Nothing' scenario, the subject lands would remain undeveloped. The status of the environmental receptors described throughout this EIAR would be likely to remain unchanged while the potential for any likely significant adverse environmental impacts arising from the proposed development would not arise.

Equally, if the proposed development did not take place, the potential for any significant positive impacts from the construction and operation of the proposed development would also not arise.

## **5.7 Mitigation Measures**

### **5.7.1 Construction Phase**

#### **5.7.1.1 Land Use**

ORS have prepared a Construction Environmental Management Plan which accompanies this application under separate cover. The Construction (and Environmental) Management Plan will be further updated by the contractor and agreed with the Local Authority prior to commencement of development.

The CEMP incorporates the construction-related mitigation measures proposed throughout this EIAR in order to ensure that the impacts arising from construction of the proposed development are managed and minimised as appropriate.

#### **5.7.1.2 Demographics**

The potential impacts on the local demographics at construction stage are considered to be temporary, neutral and imperceptible, as the construction phases will last c.12 months and therefore, no mitigation measures are proposed.

#### **5.7.1.3 Socio Economic and Employment**

No potential negative impacts have been identified in relation to socio economic and employment activity at construction stage of the proposed development, and therefore, no mitigation measures are required in this regard.

#### **5.7.1.4 Human Health**

The CEMP incorporates the construction-related mitigation measures proposed throughout this EIAR in order to ensure that the effects arising from construction of the proposed development are managed and minimised as appropriate.

#### **Air Quality**

As outlined in Chapter 12 – Air Quality and Climate, best practice mitigation measures associated with a high level of dust control and proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source.

The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are on the protection of Human Health. Additionally, the sensitivity of the area to Human Health impacts from dust emissions is low. Subject to the implementation of the mitigation measures summarised in the CEMP, the effect of the proposed development during construction stage is therefore, likely to be short term and imperceptible in regard to Human Health.

#### **5.7.2 Operational Phase**

The potential effects on Population and Human Health arising from the operational phase of the proposed development are considered to be positive, arising from the provision of additional retail and commercial units, high quality landscaped space and associated amenities too cater for the associated population increase. No mitigation measures relation to population and Human Health are therefore proposed during the operational phases of the proposed development.

#### **5.7.3 'Do Nothing' Scenario**

As there are no significant negative impacts to population and Human Health envisaged in a 'Do Nothing' scenario, no mitigation measures are proposed in this regard.

## 5.8 Monitoring

Measures to avoid significant negative effects on population and Human Health have been contained into the CEMP which will be implemented by the contractor at construction stage.

In addition to the above, measures to avoid negative impacts on population and Human Health have been incorporated into the design of the proposed scheme at an early stage in the design process. Compliance with the design of the scheme will be a requirement of any permission for development. Further monitoring will be undertaken as part of the compliance with other conditions as well as during the Building Regulations Certification process.

As mentioned previously and set out in Chapter 12 - Air Quality and Climate, the mitigation measures that will be put in place during construction of the proposed development will ensure that the effect of the development complies with all EU ambient air quality legislative limit values which are based on the protection of Human Health.

Monitoring in relation to Health and Safety requirements will be undertaken at construction stage by the Project Supervisor and as part of the Construction Management Plan.

## 5.9 Residual Effects

This section describes the predicted residual effects of the proposed development following the implementation of any mitigation measures, where relevant.

### 5.9.1 Construction Phase

#### 5.9.1.1 Land Use

The Landscape and Visual Impact Assessment found that during the construction stage there will be intense construction-related activity within and around the site. There will be effects on the character of the surrounding area due to the construction stage activities. However, there is considerable screening from existing vegetation and landform around the site, particularly to the west, and in combination with site hoarding, much of the ground-based clutter and activity of construction stage works will be out of view and perceptually contained within the site context.

This effect is deemed to be Medium and of a Negative quality on the landscape/townscape.

Such temporary negative visual effects are unavoidable and not unusual in the urban context where change is continuous. No mitigation measures (additional to the mitigation embedded in the design) have been recommended.

#### 5.9.1.2 Demographic Profile

The predicted effect on the demographic profile of the local catchment during construction stage is considered to be temporary, neutral and imperceptible.



### 5.9.2.3 Socio-economic and Employment Activity

The predicted effect in relation to socio-economic and employment activity during construction stage are considered to be temporary, moderate and positive.

#### 5.9.1.4 Social Infrastructure

The predicted effects of the proposed development during construction stage on the local community and social infrastructure are considered to be imperceptible and positive.

#### 5.9.1.5 Human Health

In terms of Population and Human Health overall, no significant residual effects are expected. There will be a moderate increase in population as a result of the proposed development which will support local services.

During the construction phase, there will be a short-term residual effect on Human Health however the mitigation measures outlined in the CEMP, monitoring practices and other measures such as standard on-site working hours, identification of designated site personnel will assist with minimising the residual effect upon Population and Human Health.

As set out in Chapter 18 Risk Management, the proposed development has been designed in accordance with best practice measures.

### 5.9.2 Operational phase

#### 5.9.2.1 Demographic Profile

The changing demographic profile arising from the operational stage of the proposed development is likely to facilitate a balanced age profile within the local area. The proposed development will have a slight positive effect in terms of changing profile that will be long term in duration and moderate in significance.

### 5.9.2.3 Socio-economic and Employment Activity

Through the generation of direct employment and the increased demand for local goods and services, the predicted effects for the operational phase of the proposed development in relation socio-economic and employment activity at a local scale are considered to be moderate, positive and long-term, through the generation.

#### 5.9.2.4 Social Infrastructure

The predicted effects of the proposed development during construction stage on the local community and social infrastructure are considered to be imperceptible and positive.

#### 5.9.2.5 Human Health

##### Noise

As outlined in further detail in Chapter 11 Noise and Vibration, the potential traffic level increases attributable to the proposed development indicates that effects are not significant in relation to noise at operational stage of the proposed development.

##### Air Quality

As outlined in further detail in Chapter 12 Air Quality and Climate, the magnitudes of all predicted alterations to air quality during the operational phase are negligible. It is therefore concluded that the effects on air quality from traffic arising from the operation of the proposed development are not significant and no mitigation measures are required.

### **Travel and Commuting**

As outlined previously, the proposed development will create a modern mixed retailing scheme in close proximity to a wide range of existing amenities and within short and easy commuting distance if the Town Centre and a wide range of major employment centres. The proposed development prioritises walking and cycling and promotes public transport use. This will facilitate active modes of travel which have associated physical and mental health benefits. The potential impacts in relation to Human Health for future residents of the proposed development are considered to be positive, moderate and short to medium term.

#### **5.9.3 'Do Nothing' Scenario**

A 'Do Nothing' scenario would result in the subject site remaining undeveloped and the proposed development would not proceed. As such, this would result in an underutilisation of a strategic, zoned and serviceable urban land which is inconsistent with local, regional and national planning policy which seeks to regenerate brownfield sites. A 'Do Nothing' scenario would not result in any predicated significant effects on population and Human Health.

### **5.10 Reinstatement**

There are no specific reinstatement works proposed relating to Population and Human Health.

### **5.11 Interactions and Potential Cumulative Effects**

#### **5.11.1 Interactions**

There are several inter-related environmental factors described throughout this EIAR which interact with Population and Human Health. During the construction/operational stages, Air Quality and Climate, Noise and Vibration, Landscape and Visual Impact, Traffic and Transportation and Waste Management are the main environmental factors that may significantly affect Population and Human Health.

##### **5.11.1.1 Air Quality and Climate**

As stated in Chapter 12 – Air Quality and Climate, there will be interactions between Human Health and Air Quality in which the “*main air quality pollutants relevant considered to be NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. These contaminants are regarded as the three most significant air pollutants released by vehicular combustion processes or produced by vehicle emissions. These pollutants are regarded to have the greatest potential result in harmful effects to human health...The dust mitigation measures outlined in the CEMP, should be applied throughout the construction phase of the proposed development. All other possible permitted developments in the region are also expected to agree and follow a site specific CEMP that will adequately control emissions from construction. This will ensure any significant cumulative effects on air quality are prevented.*”

#### 5.11.1.2 Noise and Vibration

There is an interaction with Noise and Vibration in that during construction stage there will be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for generation of high levels of noise during the construction stage of the proposed development.

The effect is predicated to be slight, temporary and localised subject to implementation of the mitigation measures outlined in the CEMP.

#### 5.11.1.3 Landscape and Visual Impact

Population and Human Health interacts with Landscape and Visual Impact as the introduction of the proposed development to Cavan Town would make a positive contribution to an urban setting that is in need of appropriate infill development.

#### 5.11.1.3 Traffic and Transportation

There are interactions with Traffic and Transportation at construction stage due to noise from increased movements of construction and customer vehicles and also the effect on air quality. The measures outlined in the CEMP will alleviate the effects during the construction of the proposed development and it is predicted the effect will be restricted to the local road network. During construction, it is predicted the effect will short term and imperceptible.

#### 5.11.1.4 Waste Management

The construction phase of the project will generate a range of non-hazardous and hazardous waste materials from which there is a risk of potential effect on Population and Human Health. The CEMP provides an outline for the management of waste during the construction phase of the project, and to ensure that there are no significant effects from waste generated throughout the project by methods such as safe and secure storage of waste and raw materials and proper segregation. The predicted effects from waste generation during the construction phase are negative, moderate and temporary.

#### 5.11.2 Potential Cumulative Effects

Several extant permission and line planning applications for development in close proximity to the subject site were identified for the purposes of evaluating the potential cumulative effect in relation to Population and Human Health. These planning applications are set out in Chapter 18, Table 18.2.

In a worst-case scenario, where all, or a significant portion of the developments contained in Table 18.2 undertake construction at the same time, there could be a cumulative effect on Population and Human Health resulting from increased levels of dust, noise and construction traffic. Subject to the implementation of the mitigation's measures in the CEMP, the effects of the proposed development in relation to dust and noise are expected to be slight, neutral and localised in scale.

There are no significant negative effects envisaged in relation to Population and Human Health as a result of the proposed development in combination with other existing or planned projects in the local or wider area.

## 5.12 Conclusion

The proposed development will have a positive and long-term effect on Population and Human Health and will make a positive contribution to a vacant town centre site that is in need of appropriate infill development.

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## 6.0 Traffic and Transportation

### 6.1 Introduction

This chapter of the EIAR has been prepared to assess the potential effect of the proposed development in terms of traffic and transport. This chapter provides an overview of the existing receiving environment, a detailed and robust assessment of the potential effect of the proposed development on the operation of the local road network both during the short-term construction phase and long-term operational phase and outlines mitigation measures to ensure any significant effects are minimised or avoided.

Full details of the Transport Impact Assessment undertaken are provided in the Traffic & Transport Assessment report included under separate cover as part of the planning application for the Proposed Development.

#### Design

Consideration has been given to all modes during the design development including pedestrians, cyclists, cars, service vehicles and construction vehicles travelling to and through the site.

#### Construction

There will be additional traffic generated during construction of the proposed development to facilitate the required works. This is assessed in this chapter.

#### Operation

There will be some additional traffic generated during operation of the proposed development as a result of the inclusion of car parking spaces as well as the requirement to service the site. The effect of this additional traffic is assessed as part of this chapter. Details of traffic inputs required for other assessment are also contained within this chapter.

This Chapter has been prepared by Mr. Alan Connolly, Associate of SYSTRA. Alan is a Chartered Engineer with 15 years of industry experience. He specialises in the field of Traffic & Transportation and Roads Design - assessing the infrastructure needs of development. Alan has been involved in numerous traffic assessments and reviews for retail developments including Tesco Fermoy, Liffey Valley Shopping Centre, Swords Pavilions, Jervis Street Shopping Centre, Wilton Shopping Centre, LIDL Douglas, Williams Landing Shopping Centre and Tesco Swords amongst others.

### 6.2 Consultation

Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

### 6.3 Legislation, Policy and Guidance

#### 6.3.1 Scoping

The scope of the traffic and transport assessment was developed with consideration to the relevant guidance and policies whilst using our experience in assessing the effect of developments of this nature.

The subject site has existing grants of permission on the subject site under Planning Reg. Ref 15/61 and Planning Reg. Ref. No. 11/1992 & An Bord Pleanála Ref. No. PL 48.240097 that permit 485 no. car parking spaces, accessed off an existing priority junction on Cock Hill Road.

### 6.3.2 Detailed Methodology

This chapter has been prepared having regard to the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- Transport Infrastructure Ireland's (TII's) Traffic & Transport Assessment Guidelines (2014)
- Guidelines for the Environmental Assessment of Road Traffic, 2003, Institute of Environmental Management & Assessment (UK Based)
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out EIA – (DoHPLG 2018).

There are also a number of relevant national and regional policies which have guided the assessment and the identification and, where necessary, the design of mitigation measures. These include the following documents:

- Cavan County Development Plan 2022-2028 (CCC, 2022)
- Design Manual for Urban Roads and Streets (DTTAS & DHPLG, 2013)
- National Cycle Policy Framework 2009 – 2020
- Smarter Travel – A Sustainable Transport Future 2009

The methodology adopted for the assessment is outlined below and in line with the guidance set out in TII's Assessment Guidelines:

- **Baseline Assessment:** Site Visits, Data Collection (incl. Surveys), Existing Accessibility, Identification of Opportunities & Constraints, Local Travel Patterns & Policy Review
- **Trip Generation:** Forecast trips to/from development using Trip Rate Information Computer System (TRICS) database. This is the transport industry standard software package used for calculating the trip generation potential of proposed developments. Trip Generation during construction period is based on preliminary construction programme and estimated movements
- **Traffic Growth:** Growth in traffic volumes to be forecast based on TII forecasts
- **Trip Assignment & Distribution:** Vehicular Trip to be assigned based on predicted final destination & distributed across the wider network based on strategic modelling and/or baseline travel patterns
- **Impact Analysis:** Assessment of the resultant impact of development on the traffic network with detailed modelling undertaken

- Conclusion and Recommendations: Identification of potential effects and necessary mitigation and supporting measures.

## 6.4 Receiving Environment

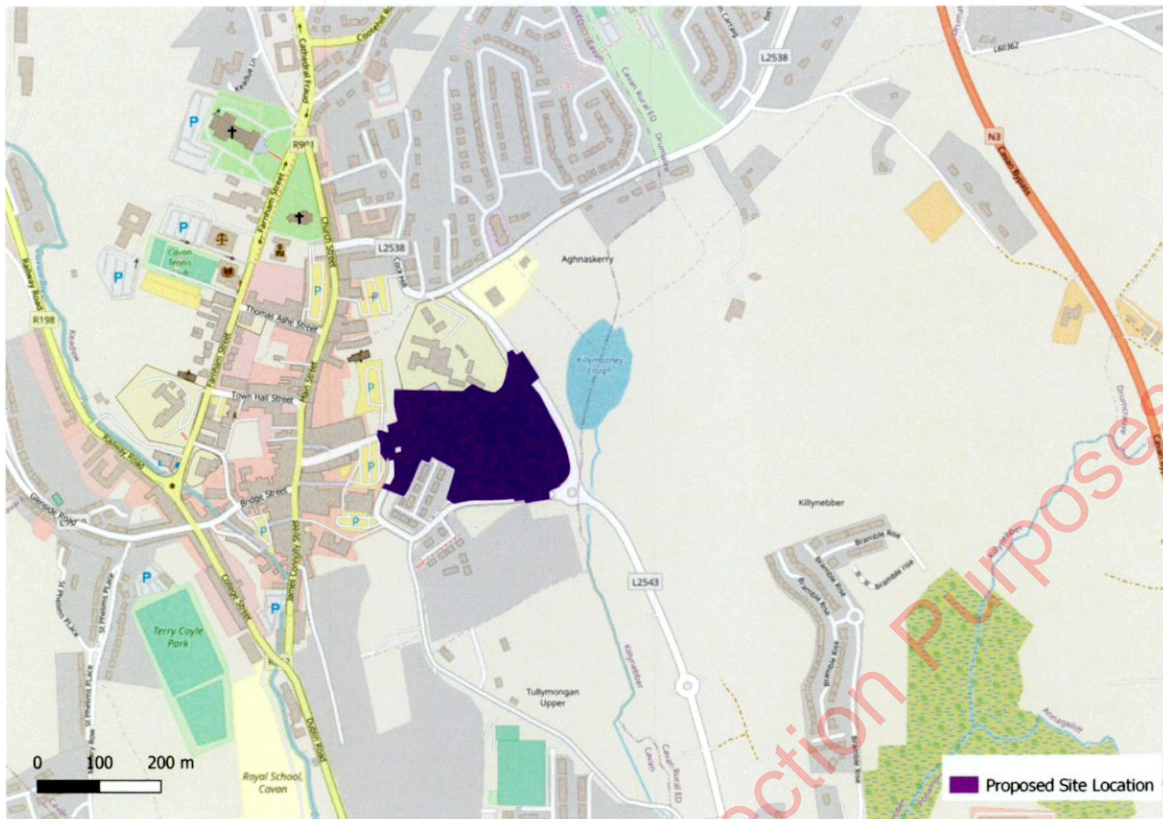
### 6.4.1 Surrounding Land Use

The surrounding land use is mixed-use in nature. It is bound the north by St Clare's Primary School and Gaelscoil Bhréifne, to the east by Killymooney Lough and green fields, to the south by residential development and to the west by Cavan Town Main Street which runs in one-way north-south direction and contains an existing Tesco Superstore. The subject site is bounded by two elements of Cavan Town Eastern Access scheme. The first element runs in a north-south direction between Ardkeen / Harmony Hills Junction and a roundabout on Cock Hill Road. It contains an access to the subject site. The second element runs in an east-west direction between the Cock Hill Road roundabout and St Francis's Housing Estate.

### 6.4.2 Site Location

The site is located within the eastern edge of Cavan Town Centre. The subject site is bounded by two elements of Cavan Town Eastern Access scheme. The first element runs in a north-south direction between Ardkeen / Harmony Hills Junction and a roundabout on Cock Hill Road. It contains an access to the subject site. The second element runs in an east-west direction between the Cock Hill Road roundabout and St Francis's Housing Estate. Both elements include off-road shared paths for active travel and vulnerable road users. The Proposed Development Indicative Site Location is shown on Figure 6.1 below.

Figure 6.1 Proposed Development indicative Site Location



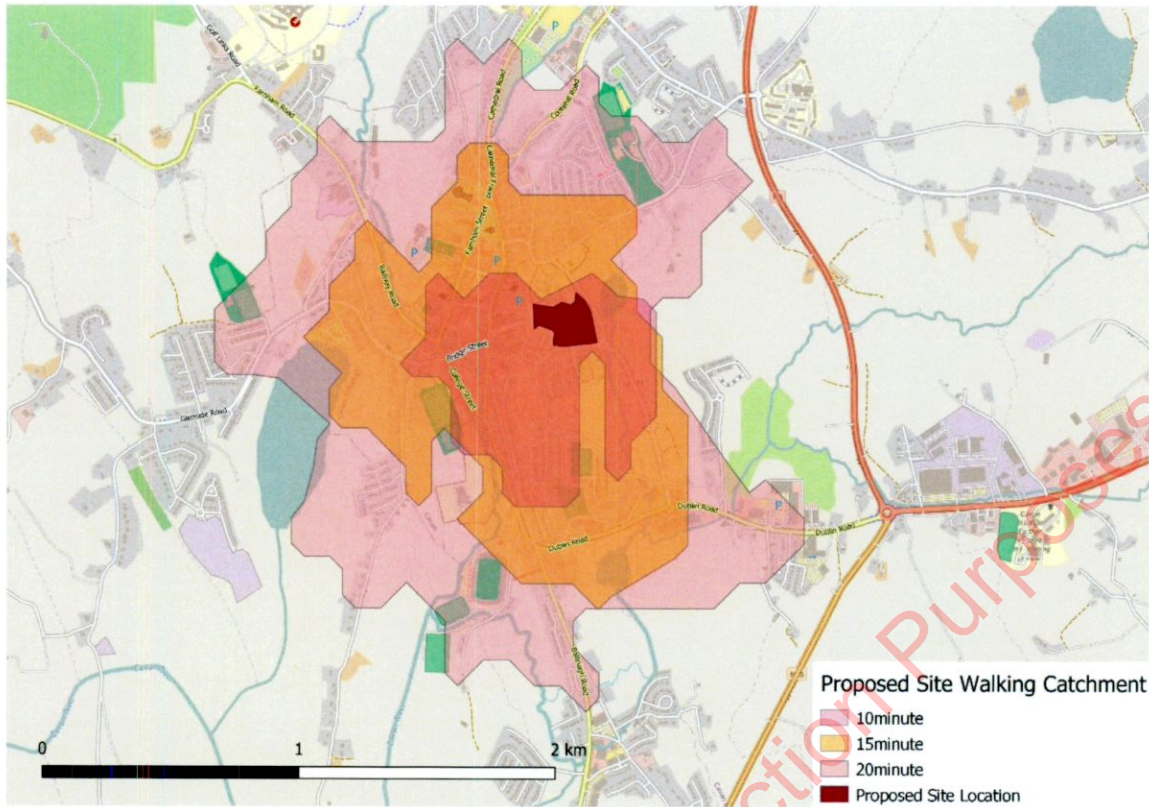
#### 6.4.3 Walking Accessibility & Infrastructure

There is good pedestrian infrastructure on roads adjoining the subject site with either dedicated footpaths or shared paths in place. Signalised or belisha beacon crossings are typically in place to facilitate pedestrian movements along key desire lines. Off-road shared paths connect the subject site to adjoining residential and school developments. There is no direct connectivity between the subject site and Cavan Town Main Street.

A large proportion of the town is within 20 minutes walking distance, however, the town is hilly in nature. Figure 6.2 below outlines the walking catchment in 5-minute intervals.



Figure 6.2 Walking catchment



**6.4.4 Cycle Accessibility & Infrastructure**

There is good cycle infrastructure on roads adjoining subject site with either off-road shared paths or on-road cycle lanes in place. The shared paths are typically 2.75m in width with signalled or belisha beacon crossings in place to facilitate cycle movements along key desire lines. Roads in the vicinity of the subject site have posted speeds of 50kph and good public lighting. Off-road shared paths connect the subject site to adjoining residential and school developments.

There is no direct connectivity between the subject site and Cavan Town Main Street and there are steep hills in either direction along existing roads.

**6.4.5 Public Transport Accessibility & Infrastructure**

The closest bus stops are located on the Cavan Town Main Street approximately 220m west of the subject site as the crow flies. These stops take the form of a simple flag and pole stop. Using existing routes available to pedestrians the walking distance is closer to 1km in length. At present, bus journeys to and from the subject site are a viable mode of travel for end-users but not considered attractive without more direct access for users. Table 6.1 below provides a summary of local bus services.

**Table 6.1 Summary of Local Bus Services**

Service No.	Route	Key Destinations	Average Frequency		
			Mon - Fri	Sat	Sun
C2	Local Link	Ballinagh–Corlurgan Business Park- Moynehall (Lidl)- Cavan Bus Station – Town Centre (White Star) –Swellan (Station Lane) –	60 mins	60 mins	No Service

		Cavan General Hospital			
C3	Local Link	Redhills - Ballyhaise-Breffni College-Rocklands-Drumalee- Castlemanor-Cavan Institute- Town Centre- Bus Station- Hospital – Farnham Estate	8 Services from Monday- Thursday and 11 Services on Friday	11 Services	1 Service

#### 6.4.6 Road Safety

The Road Safety Authority's (RSA's) online collision map is no longer available via the portal to assess any local accidents and safety trends which may affect the subject site and its development. There are no known road safety issues with the existing site access and the adjoining road network was recently completed to a high standard as part of Cavan Town Eastern Access scheme.

#### 6.4.7 Road Network Infrastructure & Traffic Conditions

The road network surrounding the subject site was delivered as part of Cavan Town Eastern Access Scheme. The roads have a posted speed limit of 50kph with existing public lighting and traffic calming measures in place. Carriageways are 7metres in width with single lane in each direction and off-road shared paths for active travel users. There is an existing priority junction providing access to the subject site with a dedicated right turning lane. The local road network provides access to the busier R212 Dublin Road and N3 to the south with perform local, regional and strategic traffic functions.

As part of the baseline assessment traffic surveys were undertaken in the local area. These included Junction Turning Counts (JTCs) at the following locations:

- N3 / R212 / N55 / Dublin Rd
- Cock Hill / R212(W) / Retail Centre Entrance / R212(E)
- Cock Hill(N) / Cock Hill(W) / Cock Hill (SE)
- Cock Hill (NW) / Proposed Development Access / Cock Hill (SE) / School Access
- Harmony Heights / Cock Hill(W) / Cock Hill(S) / Ardkeen
- R212 Farnham St(N) / Cathedral Access / R212 Farnham St(S) / Church St
- Cock Hill / Carpark Access / Lakeview
- Owen Roe Terrace / R212(W) / Ballinagh Rd / R212(E)

Traffic data collection was undertaken on Friday 07<sup>th</sup> October 2022 and Saturday 08<sup>th</sup> October 2022.

The full survey results can be found in the Transport Assessment submitted under separate cover as part of the planning application.

### 6.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross

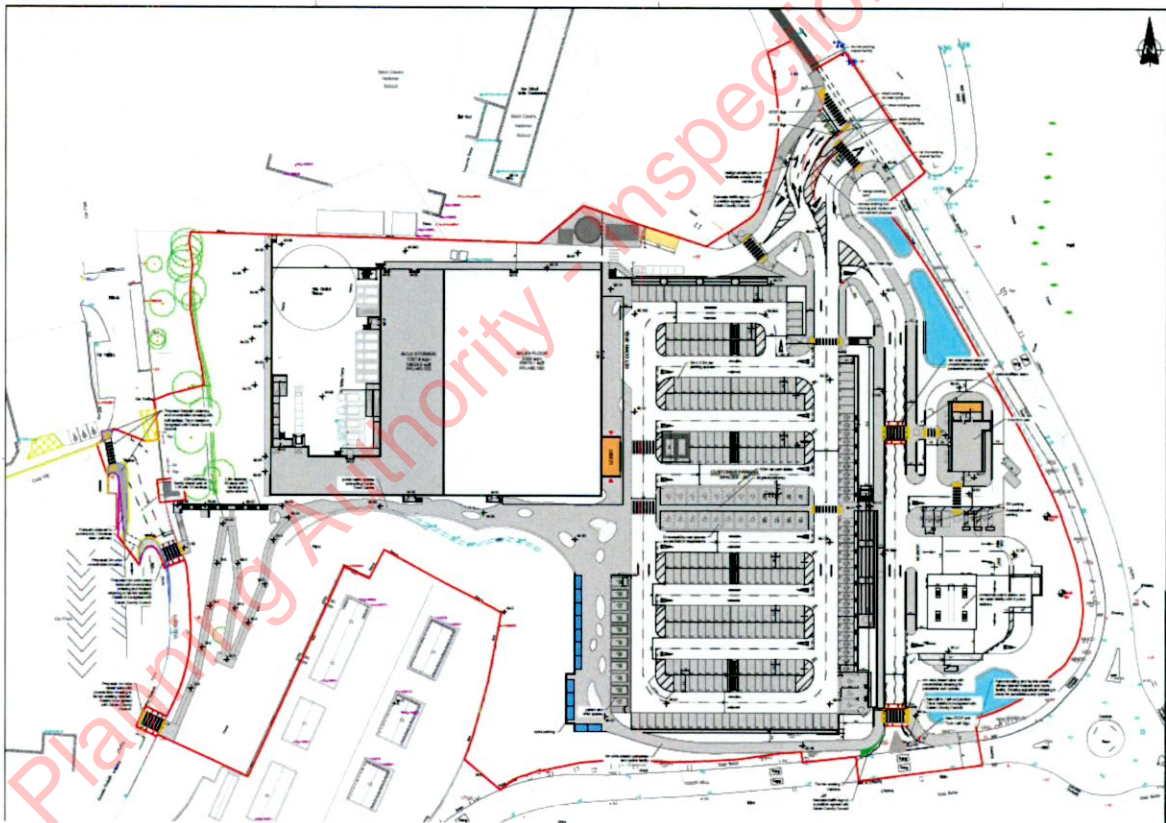
floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to Chapter 2 for the full description of development.

The development of this site contributes to the orderly expansion of Cavan Town Centre. It is envisioned that this development proposal will link seamlessly with the existing town centre, integrating the Town Centre with its eastern environs through improved connectivity through the subject site.

The indicative traffic layout of the proposed development is presented in Figure 6.4.

**Figure 6.3 Indicate Traffic Layout of proposed development**



**6.5.1 Pedestrian Arrangements**

The site will benefit from improved access and permeability in line with the aspiration of Cavan County Council. The proposed development features high-quality public realm consisting of a plaza, sloped walkway, resting areas and steps on the western boundary of the site to connect with Main Street. There are a series of pedestrian crossings and footpath improvements provided along this route to enhance accessibility for vulnerable road users. This includes a raised table crossing on Cock Hill to reduce traffic speeds and help prioritise vulnerable road user movements.

The proposed development contains 2.75-3metre wide shared paths that connect with the external shared path network on Cock Hill to the south and east of the site. They provide strong linkage to the proposed development and accommodate through movements to Cavan Town Centre. There are existing signalised pedestrian crossing points on key desire lines on Cock Hill Road.

A network of footways and shared spaces are provided within the proposed development, providing permeable links through and into / out of the site. The site layout reflects likely desire lines between key external links and key points of access to the building and open public spaces within the development with crossing points on key desire lines. These measures enhance the level of connectivity between the completed development and adjoining town centre uses whilst facilitating movement between the different aspects of the development.

### **6.5.2 Cycling Arrangements**

120 no. sheltered cycle parking spaces are provided at convenient locations within the proposed development site to encourage cycling. Access to the proposed development for cyclists is provided from Cock Hill Road to the south and the east of the site via existing off-road shared path facilities. Connectivity to the Main Street is provided via the walkway and steps which include a cycle channel. The level of cycle parking provision aims to promote and accommodate cycle trips to the proposed development whilst facilitating movements through the development as part of wider network integration.

### **6.5.3 Car Parking Provision**

The proposed development incorporates a total of 297 spaces for the main store including 24 accessible parking bays, 11 'family priority' parking bays and 34 Electric vehicle charging spaces (3 of which are for accessible users). The car park access and circulation plan are consistent with stores which operate satisfactorily. The café with drive thru facilities has 7 no. car parking spaces including 2 accessible parking bays and 2 electric vehicle charging space and 2 no. set down bay areas. The Petrol Filling Station has no store component, and no car parking is proposed.

### **6.5.4 Vehicular Access Arrangements**

The proposed development proposal takes its main access from Cock Hill Road (Cavan Town Eastern Access Link Road 2) via an existing priority junction. The main access road then splits into a Tesco store servicing access, a Tesco car park access, and an internal access road to serve the Drive Thru Café and Petrol Filling Station as well as provide connectivity to a new left in/left out access on Cock Hill Road (Cavan Town Eastern Access Link Road 3 south of the subject site).

### **6.5.5 Site Servicing**

The main service yard is located behind the Tesco Store to the north west of the subject site and allows for the separation of customer and service vehicle traffic while a substation and switch room adjoin the service yard access. This service yard accommodates delivery vehicles, including Grocery Home Shopping, as well as refuse vehicles for the Tesco store.

Rigid trucks deliveries service the drive thru café via the internal access road whilst fuel tankers service the petrol filling station.

Swept path analysis has been undertaken to demonstrate that the site access junction and internal road network can accommodate service vehicles. This is presented 'Transport Assessment' accompanying this planning application.

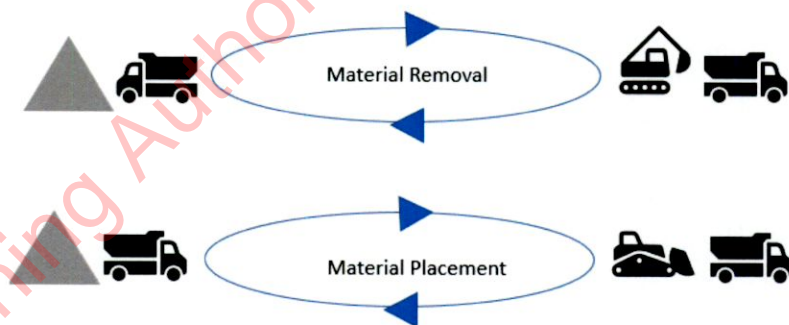
### 6.5.6 Construction Phase Trip Generation

The Construction Phase will be short-term in nature relative to the Operational Phase. In total, it will last approximately 12-18 months.

The traffic generated on site both as a result of construction activity and staff required on site will vary during this time depending on the construction stage and activity though staff will be encouraged to travel to site by sustainable means. The most onerous construction period with respect to the movement of HGV's is expected to be at the earthworks stage which will last approximately 3 weeks. These construction works will generate traffic from delivery and excavation of material, staff personnel and site visitors.

**Earthworks:** The sequencing of construction works plays an important role in assessing the traffic effect on the road network. Due to the sequential nature of earthworks and construction methodology employed, construction traffic movements on the public road network will be of low intensity. During this period, it is estimated that 1,100m<sup>3</sup> of excess material will be removed from site. It is assumed this material would be transferred from site using 20T tipper trucks capable of carrying approximately 9m<sup>3</sup> as follows:

- It is proposed that a small number of 20T standard tipper trucks will undertake return journeys to bring material to and from the proposed development site.
- On each journey, trucks undergo stationary dwell time as material is being unloaded or loaded at either end of each journey:



- This results in arrival and departure times of tipper trucks at the proposed development site being spread out as trucks will be undertaking return journeys between the same destinations.

Allowing for bulking factors, this would result in an estimated 91 truck movements across the 3 three-week period. Assuming a constant rate of extraction over the three-week period, this results in approximately 6 truck movements per day into and out of the site. A single truck movement is expected in and out of the site during the network peak hour over the temporary earthworks period.

**Staff:** During the earthworks phase for the proposed development, it is estimated that up to 20 personnel will be working at the site. To limit the effect of construction traffic on the local network, staff will be instructed to arrive to site by public transport, walking or cycling where possible. However,

to ensure that where driving is required that there is no overspill of traffic onto the surrounding road network a total of 20 on-site parking spaces will be provided for visitors and staff combined. The majority of these trips will occur outside the PM period of 5:00-6:00pm but for the purposes of this assessment it has been robustly assumed that approximately 75% (15 vehicles) are assumed to depart during the PM peak hour.

**Miscellaneous deliveries/visitors:** It is assumed that up to 5 miscellaneous trips occur to site each day during this period.

The total traffic generation for construction activities based on the assumptions set out above is presented in Table 6.2.

**Table 6.2 Construction Peak Traffic Generation**

	Number of vehicles			
	Daily		PM Peak Period	
	Arrivals	Departures	Arrivals	Departures
Earthworks	6	6	1	1
Miscellaneous Deliveries/Visitors	5	5	1	1
Staff	20	20	0	15
<b>Total</b>	31	31	2	17

**6.5.6.1 Construction Phase Trip Distribution**

It is assumed that all construction traffic enters and exits the site via the existing priority junction on Cock Hill Road (Link 2 of Cavan Town Eastern Access), to and from R212 Dublin Road. This includes staff/visitor trips and HGVs. There is an estimated AADT is 5,488 vehicles per day along Cock Hill Road route meaning generated construction traffic represents an increase of 1.1% of daily traffic. This is below the Transport Infrastructure Ireland assessment threshold of 5% in traffic sensitive or congested areas and is assessed to have a not imperceptible effect on the immediate local road network.

**6.5.7 Operational Phase Trip Generation**

The effect of the proposed development on the local road network has been assessed by modelling the projected traffic flows with and without the proposed development in place. An opening year of 2025 for the development has been assumed.

A 'Transport Assessment' has also been submitted as part of the planning application. This assessment outlines the effects of the development in terms of pedestrian access, cyclist access, vehicular access, and the effect on the surrounding road network.

**6.5.7.1 Operational Trip Distribution**

The distribution of vehicular traffic to and from the development is based on turning count proportions at surveyed junctions. The distribution of car trips was extracted for the Weekday and Weekend peak periods and applied to the vehicular numbers.

**6.5.7.2 Projected Trip Generation without the Current Proposals**

The proposed development site is currently vacant and therefore generates no traffic. In the absence of the project and if no development is undertaken at the site, the baseline conditions are anticipated to evolve in accordance with regional forecasts for Cavan County. These forecasts are produced by TII and have been developed in line with the National Planning Framework (NPF) Population and Employment Projections. The growth rates are set out in ‘PAG Unit 5.3: Travel Demand Projections’. The predicted growth in background traffic for each year has been established using the link based regional forecasts for the Cavan County Area. The resulting figures represent a substantial growth in background traffic over the design period with 14% growth in light vehicle traffic and 45% in heavy vehicle traffic over the design year period. This level of background traffic is likely to represent an overestimation of traffic given the location of Cock Hill Road in the context of Cavan Town Centre.

Given that the proposed development site is zoned for development, it is very unlikely that the site will remain vacant in future. The Cavan County Development 2022-2028 identifies the site development objective under ‘Town Core’; therefore, it is likely that development will be brought forward at the site in accordance with the relevant zoning objective. As a result, the projected increases in traffic are likely to be similar with or without the current proposals.

**6.5.7.3 Traffic Input for EIAR**

The AADT volumes have been developed using traffic data for the surrounding junctions. This report presents peak hour traffic volumes on selected road links for the AM and PM peak periods for the following scenarios:

- 2025 Peak Hours (Base and Base plus development)
- 2030 Peak Hours (Base and Base plus development)
- 2040 Peak Hours (Base and Base plus development)

An AADT expansion factor was calculated by interrogating available ATC data and 12-hour traffic counts on the nearby road network. The AADT values for each scenario, along with the %HGV value and the speed limit for each link in the network are presented in Table 6.4.

**Table 6.4 Traffic input data for EIAR**

Link No	Link Name	Speed Limit (kph)	%HGV	Base AADT				Base + Development AADT		
				2022	2025	2030	2040	2025	2030	2040
1	Cock Hill (north)	50	1.9%	5488	5685	6030	6301	7662	8007	8279
2	Cock Hill (west)	50	1%	3080	3191	3384	3537	3350	3544	3696
3	Ardkeen East	50	1%	5962	6176	6551	6845	7420	7794	8089
4	Ardkeen West	50	.04%	3962	4104	4353	4549	4264	4513	4709
5	Cock Hill (south)	50	.08%	6523	6757	7167	7489	7809	8219	8542
6	R212 East	50	1.5%	15114	15656	16606	17353	16357	17308	18055
7	R212 West	50	.02%	12072	12505	13264	13861	12760	13519	14116

**6.5.8 ‘Do Nothing’ Scenario**

The 'Do Nothing' scenario for the construction stage would mean that no construction traffic would be added to the network, and thus the slight effects outlined in section 6.6.1.1 above would not be felt. The 'Do Nothing' scenario for the operational stage is represented by the 'Base' scenarios in section 6.6.2.5 above.

These scenarios, when compared to the 'Base + Development' scenarios, show a slightly lower level of overall traffic, resulting in slightly smaller average degrees of saturation and queueing at junctions.

## 6.6 Predicted Effects of the Proposed Development

### 6.6.1 Identification and Scale of effects

Traffic modelling is being used to determine traffic effects associated with the proposed development (which is the main focus of this chapter). It considers the time periods when traffic congestion is at its most critical in the Cavan Town area. A Key Performance Indicator (KPI) has been identified to assist in the assessment and evaluation of the proposed development on peak period traffic:

- Ratio of Flow (of Traffic) to Capacity ratio at Key Junctions (i.e. a measure of congestion levels)

RFC is quantifiable to allow the scenarios tested to be easily compared against one another to determine traffic related effects. It is being supported by queue length analysis to provide a robust assessment of potential traffic effects.

The effects of the proposed development, are rated as positive, imperceptible, slight, moderate or significant, as appropriate and these categories are described as follows:

- Positive: Effects improve conditions
- Imperceptible: Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation
- Slight: A shift away from baseline conditions. Change arising from the loss / alteration would be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition would be similar to the pre-development circumstances/situation.
- Moderate: Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of the baseline would be materially changed.
- Significant: Total loss of or major/substantial alteration to key elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes would be fundamentally changed.

The likelihood (likely or unlikely) and duration (short, medium or long term) of the predicted effects is also assessed and noted. As per EPA guidelines, short-term equates to 1-7 years, medium term is between 7 and 15 years and long term is between 15 and 60 years. This method of rating effects allows the traffic modelling scenarios to be compared in a clear, concise and measurable way.

The effects of the proposed development under each scenario are rated using the assessment KPI approach detailed above as follows:



- Step 1: The relative changes between the 'Do-Minimum' and 'Do-Something' scenarios are categorised as positive, imperceptible, slight, moderate or significant (as above)
- Step 2: The likelihood of the negative effects occurring are rated as either likely or unlikely
- Step 3: The duration of negative effects is rated as short, medium or long term. As per EPA guidelines, short-term equates to 1-7 years, medium term is between 7 and 15 years and long term is between 15 and 60 years

This method of rating effects allows the 'Do-Minimum' and 'Do-Something' scenarios to be compared in a clear, concise and measurable way. The 'Do Nothing' and 'Do Something' scenarios are compared for the same year, i.e. 2025 or 2040, and therefore, other than the proposed road development, the same infrastructure is assumed for the scenarios which are being compared.

**Ratio of Flow to Capacity (RFC) / Degree of Saturation**

To understand the potential effects on junction operations of the proposed development, the Ratio (of traffic flow) over capacity (RFC) at key junctions on the network have been analysed and compared across scenarios.

RFC is a standard reference for measuring traffic congestion at a junction. It is standard practice to consider that a junction is congested when traffic flows are at 85% of the estimated capacity of a priority junction or roundabout junction. At traffic flows above 85% of capacity the delays at a junction become erratic and are difficult to control. A value of 100% means that demand and capacity are equal and no further traffic can progress through the junction without experiencing delays. A Ratio of Flow to Capacity analysis has been undertaken using information from the proposed road development Highway Network models for each modelling scenario.

The scale of the effect is based on the threshold values described above and it is the change in these values arising from the effect of the proposed road development (Do Something) which indicates the extent of localised effect at the junctions assessed. Table 6.7 refers to priority/stop junctions and summarises how the change in the value of these parameters indicates the performance effect.

**Table 6.7 Effect on RFC at Key Junctions (Priority/Stop/Roundabout junctions)**

RFC	Do- Something			
Do Minimum	<75%	75-85%	85-90%	>90%
<75%	Imperceptible	Moderate	Significant	Significant
75-85%	Positive	Slight	Moderate	Significant
85-90%	Positive	Positive	Slight	Significant

It is assumed that if a priority/stop or roundabout junction is currently operating well within capacity (e.g. <75%) and the additional traffic associated with the proposed road development causes the junction to be congested (i.e. over 85%) there is a traffic effect of significance. Conversely if the junction currently has congestion issues (e.g. 85- 90%) and the traffic from the proposed road development causes an increase in congestion, but within the same parameter value band (i.e. 85-90%) the effect of the proposed road development is considered to be slight.

## 6.6.2 Construction Phase

The Construction will be short-term in nature relative to the Operational Phase. In total, it will last approximately 12-18 months. The traffic generated on site both as a result of construction activity and staff required on site will vary during this time depending on the construction stage and activity though staff will generally be encouraged to travel to site by sustainable means.

The measures outlined in the Construction Stage Mitigations Measures (Section 6.7.1) were considered as part of the 'Potential Effects' analysis, and thus the predicted effects should be reduced/prevented following implementation of the mitigation measures, giving the predicted residual/ effects outlined in section 6.9.1.

The combined additional light and heavy construction traffic is below the Transport Infrastructure Ireland assessment threshold of 5% in traffic sensitive or congested areas and as a result is assessed to have an imperceptible effect on the immediate local road network. The effects outlined represent the 'worst case' effects.

## 6.6.3 Operational Phase

An assessment of the effect of the proposed development was undertaken using modelling as part of the 'Transport Impact Assessment' submitted as part of the planning application. This assessment outlines the effects of the development in terms of pedestrian access, cyclist access, vehicular access, and the effect on the surrounding road network.

Full details of the assessment can be found in the 'Transport Impact Assessment' submitted as part of the planning application.

### 6.6.3.1 Assessment Hours and Years

The predicted traffic effect associated with the proposed development has been determined by comparing traffic conditions between two scenarios, the "base" and "base plus development" conditions. "Base" conditions assume that the proposed development does not take place, with the operational performance assessment of the local road network based upon existing traffic levels factored to the relevant assessment year. "Base plus development" assessments assume that the project is operational in addition to the "base" conditions.

The network has been assessed for the following scenarios:

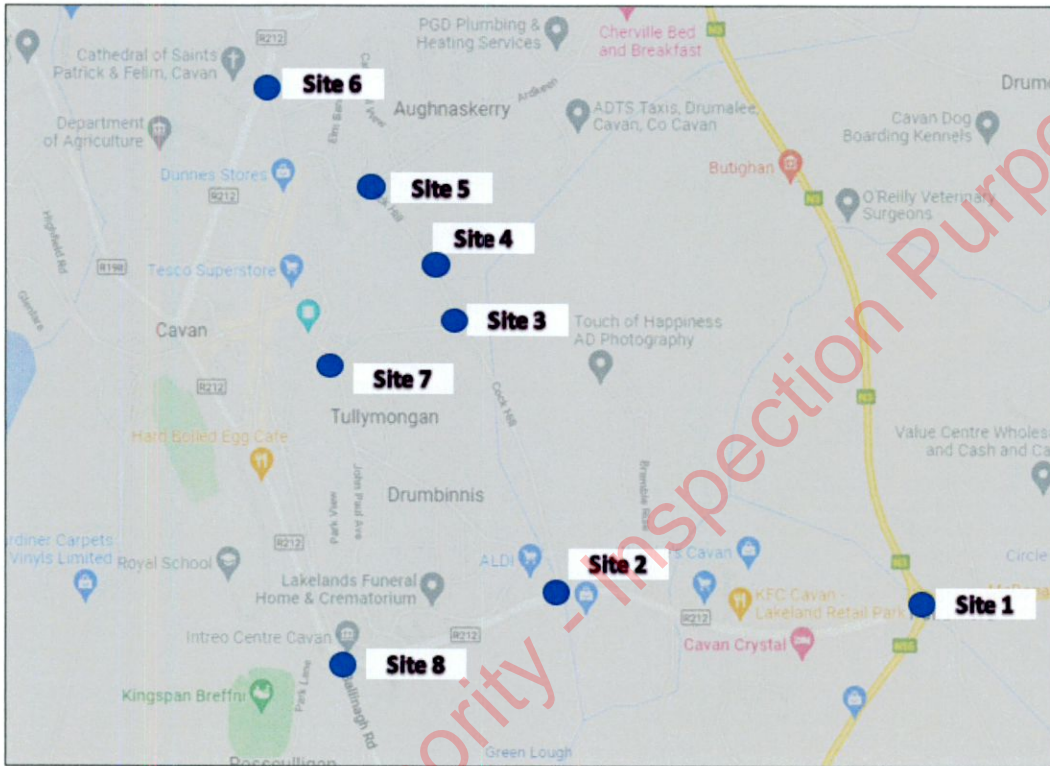
- 2022 PM Peak
- 2022 SAT Peak
- 2025 PM Peak (Base and Base plus development)
- 2025 SAT Peak (Base and Base plus development)
- 2030 PM Peak (Base and Base plus development)
- 2030 SAT Peak (Base and Base plus development)
- 2040 AM Peak (Base and Base plus development)
- 2040 PM Peak (Base and Base plus development).

Based on the traffic surveys presented previously in the baseline assessment the peak hours of 17:00-18:00pm on Friday and 13:00-14:00pm on Saturday have been identified for assessment as they represent the busiest case in terms of background traffic conditions and traffic from the proposed development.

**6.6.3.2 Development Contribution at Junctions**

The contribution of the development to traffic flows at each junction has been estimated for the locations indicated on the map shown in Figure 6.5.

**Figure 6.4 Development Contribution Locations**



The contribution to each main junction close to the development for the Friday and Saturday peaks is provided in Table 6.8.

**Table 6.8 Peak Period Development Contribution at Junctions**

Location	PM Peak Development Contributions			SAT Peak Development Contributions		
	2025	2030	2040	2025	2030	2040
	1	2.5%	2.37%	2.27%	4.98%	4.71%
2	6.37%	6.02%	5.78%	10.10%	9.55 %	9.17%
3	13.13%	12.42%	11.92%	32.56%	30.79%	29.56%
4	39.06%	36.91%	35.41%	91.67%	86.62%	83.08%
5	22.76%	21.53%	20.66%	49.54%	46.86%	44.98%
6	2.8%	2.65%	2.54%	4.6%	4.35%	4.18%
7	3.65%	3.45%	3.32%	5%	4.75%	4.56%

8	1.83%	1.73%	1.67%	2%	1.9%	1.82%
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Based on Transport Infrastructure Ireland thresholds for transport assessment, further junction analysis is undertaken where Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists, or the location is sensitive. This is the case for the following junctions:

2. Cock Hill / R212(W) / Retail Centre Entrance / R212(E)
3. Cock Hill(N) / Cock Hill(W) / Cock Hill (SE)
4. Cock Hill (NW) / Proposed Development Access / Cock Hill (SE) / School Access
5. Harmony Heights / Cock Hill(W) / Cock Hill(S) / Ardkeen

A full junction assessment has therefore been undertaken at these junctions for each forecast year using the Junctions 9 PICADY and ARCADY modules developed.

A new left in / left out junction is proposed on Cock Hill (Link 3 of Cavan Town Eastern Access). 148 and 89 vehicles pass by this junction in an eastward direction during Friday Peak Period 17:00-18:00 and Saturday Peak Period 13:00-14:00 respectively. Proposed development trips associated with the junction include 12 in, 34 out in the Weekday Peak and 27 in, 67 out in the Weekend Peak. This junction has not been assessed further as it is evident from low traffic volumes on this section of the network that junction capacity issues would not arise, and effects would be imperceptible.

#### 6.6.3.3 Model Development

A combination of models and data sources have been used to determine the development trip generation, assignment and distribution of demand from the proposed development. Trip Generation and modal share were established using the TRICS database.

In order to assess the effect of the development proposals on the local road network, industry standard junction assessment software Junctions 9 PICADY and ARCADY modules were used.

Necessary geometric parameters required in each junction model were extracted from GoogleEarth, Topographical surveys, OSMasterMap tiles and on-site measurements as required. Traffic flows from each junction were collected using telescopic mounted camera at each study junction. There were no notable incidences of operational delay or incidents that would have affected local traffic flows.

#### 6.6.3.4 Modelling Results

The 'Junctions 9' traffic modelling analysis is associated with priority / stop and roundabout junctions. The analysis reports on the Ratio of Flow Capacity (RFC) and the maximum forecast queue for each movement within the junction. The RFC of an arm of a junction is one of the principal factors in influencing queues and delays. General engineering design principles, as set out in DMRB, suggest that when assessing a priority junction or roundabout, RFC levels should not exceed 0.85 in order for the arm of a junction to operate within 'practical' capacity. Should the RFC level exceed 1.0 then the junction is operating above 'theoretical' capacity.

## Friday Peak - Ratio of Flow to Capacity (RFC) / Degree of Saturation

Table 6.9 outlines the Friday peak network statistics for the Do-Nothing and Do-Something Scenario<sup>1</sup>.

Table 6.9 Development Effect on Friday Peak Network RFC/ DoS

	Junction / Arm	Do-Nothing (without Development)				Do-Something (with Development)		
		2022	2025	2030	2040	2025	2030	2040
2	R212 Dublin Rd (East)	0.83	0.86	0.92	0.96	0.92	0.98	1.02
	Shopping Centre Entry/Exit (Southern Arm)	0.33	0.35	0.39	0.41	0.38	0.42	0.44
	R212 Dublin Rd (West)	0.68	0.71	0.76	0.8	0.75	0.8	0.84
	Cock Hill (Northern Arm)	0.66	0.69	0.75	0.8	0.81	0.87	0.92
3	Cock Hill (Southeast Arm)	0.35	0.36	0.38	0.4	0.41	0.43	0.45
	Cock Hill (Western Arm)	0.18	0.19	0.2	0.21	0.23	0.24	0.25
	Cock Hill (Northern Arm)	0.24	0.25	0.26	0.28	0.28	0.3	0.31
4	Cock Hill (Southern Arm)	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	Site Entrance	0	0	0	0	0.2	0.21	0.21
	Cock Hill (Northern Arm)	0	0	0	0	0.21	0.21	0.21
	School Road	0.02	0.02	0.03	0.03	0.02	0.03	0.03
5	Ardkeen (Eastern Arm)	0	0	0	0	0	0	0
	Cock Hill (Southern Arm)	0.63	0.65	0.7	0.74	0.86	0.92	0.97
	Ardkeen (Western Arm)	0.19	0.19	0.37	0.4	0.27	0.28	0.3
	Harmony Heights	0	0	0	0	0	0	0

In 2025 Opening Year, the proposed development is shown to have a moderate effect at Junction 2 R212 Dublin Road East, Cock Hill Road, and R212 Dublin Road West. A moderate effect is shown at Junction 5 on Cock Hill Road. This is unlikely given the high volume of background traffic predicted for this Town Centre location which is unlikely to occur. In addition, the analysis includes a highly conservative estimate for proposed development traffic by not accounting for linked trips with other town centre destinations.

In 2030 Design Year, the proposed development is shown to have a significant effect at Junction 2 R212 Dublin Road East, a moderate effect at Cock Hill Road and a slight effect at R212 Dublin Road West. A significant effect is shown at Junction 5 on Cock Hill Road. This is unlikely given the high volume of background traffic predicted for this Town Centre location which is unlikely to occur. In

<sup>1</sup> The "Do-Something Scenario" represents the scenario where the proposed development is consented and developed.

addition, the analysis includes a highly conservative estimate for proposed development traffic by not accounting for linked trips with other town centre destinations.

In 2040 Design Year, the proposed development is shown to have a significant effect at Junction 2 R212 Dublin Road East, a significant effect at Cock Hill Road and a slight effect at R212 Dublin Road West. A significant effect is shown at Junction 5 on Cock Hill Road. This is unlikely given the high volume of background traffic predicted for this Town Centre location which is unlikely to occur. In addition, the analysis includes a highly conservative estimate for proposed development traffic by not accounting for linked trips with other town centre destinations.

In all other scenarios, the proposed development has either a positive or imperceptible effect.

**Friday Peak - Queue Lengths**

Queue lengths are being used to support interrogation of the RFC Key Performance Indicator. In this section, Passenger Car Units (PCUs) are described as 'vehicles' to aid easier understanding of results.

The queue lengths are presented in Table 6.10 for each arm of the main junctions assessed 'with' and 'without' the development for the Friday peak period. Notable changes to queue lengths resulting from the proposed development are described below.

**Table 6.10 Development Effect on Friday Peak Queue Lengths (PCU)**

Junction / Arm		Do-Nothing (without Development)				Do-Something (with Development)		
		2022	2025	2030	2040	2025	2030	2040
2	R212 Dublin Rd (East)	4.7	5.8	9	13.8	9	16.1	26
	Shopping Centre Entry/Exit (Southern Arm)	0.5	0.5	0.6	0.7	0.6	0.7	0.8
	R212 Dublin Rd (West)	2.1	2.4	3.1	3.8	2.9	3.8	4.8
	Cock Hill (Northern Arm)	2	2.2	3	3.8	4	5.7	8.2
3	Cock Hill (Southeast Arm)	0.6	0.6	0.6	0.7	0.7	0.8	0.8
	Cock Hill (Western Arm)	0.2	0.2	0.3	0.3	0.3	0.3	0.3
	Cock Hill (Northern Arm)	0.3	0.3	0.4	0.4	0.4	0.4	0.5
	Cock Hill (Southern Arm)	0	0	0	0	0	0	0
4	Site Entrance	0	0	0	0	0.3	0.3	0.3
	Cock Hill (Northern Arm)	0	0	0	0	0.3	0.3	0.3
	School Road	0	0	0	0	0	0	0
5	Ardkeen (Eastern Arm)	0	0	0	0	0	0	0
	Cock Hill (Southern Arm)	1.7	1.9	2.3	2.8	5.2	7.8	11.5
	Ardkeen (Western Arm)	0.2	0.2	0.3	0.3	0.4	0.4	0.4

	Harmony Heights	0	0	0	0	0	0	0
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At Junction 2, queuing eastbound along R212 Dublin Road East increases by approximately 7 vehicles in 2030 and 12 vehicles in 2040 Scenarios. This results in a queue of 16 vehicles and 26 vehicles at the junction respectively. This queuing could be accommodated without effecting upstream junctions, however given the associated RFC of 0.98 for 2030 Scenario and 1.02 for 2040 Scenario, the results have been interrogated further to provide a better understanding of possible effect.

At Junction 2, queuing on Cock Hill Road and R212 Dublin Road West increases by only a few vehicles in all scenarios resulting in queues of 10 vehicles or less at the junction. This queuing could easily be accommodated without effecting upstream junctions, and as a result the associated RFCs above 0.85 are not likely to pose capacity issues.

At Junction 5, queuing on Cock Hill Road shows minimal increase in 2025 and 2030, and increases by approximately 9 vehicles in 2040 Design Year. This results in a queue of 12 vehicles at the junction. This queuing could be accommodated without effecting upstream junctions, and as a result the associated RFCs above 0.85 are not likely to pose capacity issues.

### Interrogation of results

The results for Junction 2 R212 Dublin Road East show RFC levels exceeding 1.0, indicating the junction arms operate above 'theoretical' capacity. Queuing is also shown to increase at both junctions. Whilst it is not uncommon for Town Centre sites to experience congestion during peak periods, it is important to understand the likelihood of effect:

- a high volume of background traffic growth has been applied as part of the assessment - 9-14% growth in light vehicle traffic and 28-45% in heavy vehicle traffic across 2030 and 2040 design years respectively. This level of background traffic is expected to represent an overestimation of traffic given the location of Cock Hill within Cavan Town Centre as well as the Town Centre itself. However, background traffic will contribute to increased queuing and a reduction in capacity at these junctions to a lesser degree
- It is reasonable to assume that a proportion of trips to the proposed development will comprise extensions to existing Cavan Town Centre activities. A reduction in traffic generation associated with potential linked trips was not applied. Therefore, technical capacity assessments reported are expected to overstate demands.

As a result of the above, Junction 2 is anticipated to operate within satisfactory conditions, where slight to moderate effect may occur for short durations during peak periods, as is typical for junctions where Town Centre sites such as Cavan are connected to the National Road network, namely N3.

### Saturday Peak - Ratio of Flow to Capacity (RFC) / Degree of Saturation

Table 6.11 outlines the Saturday peak network statistics for the Do-Nothing and Do-Something Scenario<sup>2</sup>.

<sup>2</sup> The "Do-Something Scenario" represents the scenario where the proposed development is consented and developed.

Table 6.2 Development Effect on Saturday Peak Network RFC/ DoS

Junction / Arm		Do-Nothing (without Development)				Do-Something (with Development)		
		2022	2025	2030	2040	2025	2030	2040
2	R212 Dublin Rd (East)	0.97	1.01	1.07	1.12	1.11	1.17	1.22
	Shopping Centre Entry/Exit (Southern Arm)	0.42	0.44	0.47	0.49	0.47	0.5	0.52
	R212 Dublin Rd (West)	0.76	0.79	0.84	0.88	0.83	0.88	0.92
	Cock Hill (Northern Arm)	0.7	0.73	0.8	0.86	0.97	1.05	1.11
3	Cock Hill (Southeast Arm)	0.24	0.25	0.26	0.28	0.32	0.34	0.35
	Cock Hill (Western Arm)	0.12	0.12	0.13	0.14	0.19	0.2	0.2
	Cock Hill (Northern Arm)	0.18	0.18	0.19	0.2	0.24	0.25	0.26
4	Cock Hill (Southern Arm)	0	0	0	0	0	0	0
	Site Entrance	0	0	0	0	0.32	0.32	0.32
	Cock Hill (Northern Arm)	0	0	0	0	0.31	0.31	0.31
	School Road	0	0	0	0	0	0	0
5	Ardkeen (Eastern Arm)	0	0.01	0.01	0.01	0.01	0.01	0.01
	Cock Hill (Southern Arm)	0.36	0.38	0.4	0.42	0.65	0.68	0.7
	Ardkeen (Western Arm)	0.13	0.13	0.14	0.15	0.25	0.25	0.26
	Harmony Heights	0.01	0.01	0.01	0.02	0.02	0.02	0.02

In 2025 Opening Year, the proposed development is shown to have a significant effect at Junction 2 R212 Dublin Road East, a significant effect at Cock Hill Road and a slight effect at R212 Dublin Road West. This is unlikely given the high volume of background traffic predicted for this Town Centre location which is unlikely to occur. In addition, the analysis includes a highly conservative estimate for proposed development traffic by not accounting for linked trips with other town centre destinations.

In 2030 Design Year, the proposed development is shown to have a significant effect at Junction 2 R212 Dublin Road East, a significant effect at Cock Hill Road and a moderate effect at R212 Dublin Road West. This is unlikely given the high volume of background traffic predicted for this Town Centre location which is unlikely to occur. In addition, the analysis includes a highly conservative estimate for proposed development traffic by not accounting for linked trips with other town centre destinations.

In 2040 Design Year, the proposed development is shown to have a significant effect at Junction 2 R212 Dublin Road East, a significant effect at Cock Hill Road and a significant effect at R212 Dublin Road West. This is unlikely given the high volume of background traffic predicted for this Town Centre location which is unlikely to occur. In addition, the analysis includes a highly conservative estimate for proposed development traffic by not accounting for linked trips with other town centre destinations.

**Saturday Peak - Queue Lengths**



The queue lengths with and without the development for the Saturday peak period are presented in Table 6.12 below for each modelled forecast year.

**Table 6.12 Development Effect on Saturday Peak Queue Lengths (PCU)**

	Junction / Arm	Do-Nothing (without Development)				Do-Something (with Development)		
		2022	2025	2030	2040	2025	2030	2040
2	R212 Dublin Rd (East)	16	24.2	46.1	67.3	59	87.9	111.5
	Shopping Centre Entry/Exit (Southern Arm)	0.7	0.8	0.9	0.9	0.9	1	1.1
	R212 Dublin Rd (West)	3	3.6	4.8	6.3	4.6	6.7	9.2
	Cock Hill (Northern Arm)	2.3	2.7	3.8	5.3	12.2	22.9	33.9
3	Cock Hill (Southeast Arm)	0.3	0.3	0.4	0.4	0.5	0.5	0.6
	Cock Hill (Western Arm)	0.1	0.1	0.2	0.2	0.2	0.2	0.3
	Cock Hill (Northern Arm)	0.2	0.2	0.2	0.3	0.3	0.4	0.4
4	Cock Hill (Southern Arm)	0	0	0	0	0	0	0
	Site Entrance	0	0	0	0	0.5	0.5	0.5
	Cock Hill (Northern Arm)	0	0	0	0	0.4	0.4	0.4
	School Road	0	0	0	0	0	0	0
5	Ardkeen (Eastern Arm)	0	0	0	0	0	0	0
	Cock Hill (Southern Arm)	0.6	0.6	0.7	0.8	1.8	2.1	2.3
	Ardkeen (Western Arm)	0.2	0.2	0.2	0.2	0.3	0.4	0.4
	Harmony Heights	0	0	0	0	0	0	0

At Junction 2, queuing eastbound along R212 Dublin Road East increases by approximately 35 vehicles in 2025, 42 vehicles in 2030 and 44 vehicles in 2040 Scenarios. This results in a queue of 59, 88 and 112 vehicles at the junction respectively. This queuing could affect the upstream junction and given the associated RFC above 1 for 2025, 2030 and 2040 Scenarios, the results have been interrogated further to provide a better understanding of possible effect.

At Junction 2, queuing on Cock Hill Road increases by approximately 10 vehicles in 2025, 19 vehicles in 2030 and 29 vehicles in 2040 Scenarios. This results in a queue of 12, 23 and 34 vehicles at the junction respectively. This queuing could easily be accommodated without effecting upstream junctions, however given the associated RFC above 1 for 2030 and 2040 Scenarios, the results have been interrogated further to provide a better understanding of possible effect.

At Junction 2, queuing on R212 Dublin Road West increases by only a few vehicles in all scenarios resulting in queues of 10 vehicles or less at the junction. This queuing could easily be accommodated without effecting upstream junctions, and as a result the associated RFCs above 0.85 are not likely to pose capacity issues.

## Interrogation of results

The results for Junction 2 R212 Dublin Road East show RFC levels exceeding 1.0 in the 'do nothing' and 'do something' scenarios, indicating the junction arms operate above 'theoretical' capacity. Results for Junction 2 Cock Hill Road show RFC levels exceeding 0.85 in the 'do nothing' and 1.0 in the 'do something' scenarios. Queuing is also shown to increase at both junction arms.

Whilst it is not uncommon for Town Centre sites to experience congestion during peak periods, it is important to understand the likelihood of effect:

- a high volume of background traffic growth has been applied as part of the assessment - 9-14% growth in light vehicle traffic and 28-45% in heavy vehicle traffic across 2030 and 2040 design years respectively. This level of background traffic is likely to represent an overestimation of traffic given the location of Cock Hill within Cavan Town Centre as well as the Town Centre itself. However, background traffic will contribute to increased queuing and a reduction in capacity at these junctions to a lesser degree
- It is reasonable to assume that a proportion of trips to the proposed development will comprise extensions to existing Cavan Town Centre activities. A reduction in traffic generation associated with potential linked trips was not applied. Therefore, technical capacity assessments reported are expected to overstate demands.

As a result of the above, Junction 2 is anticipated to operate in congested conditions, where slight to moderate effect may occur for short durations during peak periods at an already congested site. This is typical for junctions where Town Centre sites such as Cavan are connected to the National Road network, namely N3.

Overall, the effect of the proposed development is envisaged to be slight to moderate, likely and long-term. The following key considerations are recognised:

- High volumes of background growth in traffic have been assumed for a Town Centre location which are unlikely to occur. This affects modelled junction performance.
- It is reasonable to assume that a proportion of trips to the proposed development will comprise extensions to existing Cavan Town Centre activities. A reduction in traffic generation associated with potential linked trips was not applied. Therefore, technical capacity assessments reported are expected to overstate demands. This is particularly the case for Saturday trips which are more likely to account for leisure and retail linked trips with greater flexibility for time of travel.

The results are pre-mitigation and represent the 'worst case' effects.

### 6.6.4 'Do Nothing' Scenario

The predicted 'Do Nothing' scenario would not result in any increase in construction or operational traffic as outlined in section 6.6.3.

## 6.7 Mitigation Measures

**6.7.1 Construction Phase**

A planning phase Construction Environmental Management Plan (CEMP) submitted under separate cover has been developed as part of the planning process. As part of this a number of mitigation measures have been identified for the construction stage to limit the potential effects. This includes provision for the completion of CEMP and Traffic Management Plan prior to construction commencement which is to include the following measures:

- Site entrance will be manned by a banksman at all times who will direct traffic safely into the construction site and facilitate the safe navigation of larger construction vehicles as required
- Managed parking on site with staff encourage to travel by sustainable means
- Parking provided to prevent overspill onto surrounding network
- Close communication with Cavan County Council and emergency services shall be maintained throughout the construction phase
- Agreed haulage routes along designated HGV routes
- Wheel wash facilities on-site
- Road cleaning and sweeping along routes used for haulage
- Construction signage at all entrances and exits
- HGVs inspected for dirt and mud before exiting onto public road network
- Control and timing of deliveries, with deliveries generally between the hours of 08:00 and 18:00 Monday to Friday, and 08:00 to 14:00 on Saturdays. No deliveries will be scheduled for Sundays or Bank Holidays.

The implementation and monitoring of the CEMP will be managed by the appointed Construction manager.

**Table 6.5 Construction Phase Mitigation Measures**

Mitigation Measures
Construction Environmental Management Plan including Traffic Management Plan

**6.7.2 Operational Phase**

**6.7.2.1 Incorporated Design Mitigation**

There are several measures which have been included from the outset in the design of the development to reduce any potential negative effects on the local transport network arising from additional traffic generated by the development.

The provision of high-quality walking and cycling access infrastructure, and its integration with the surrounding street network, has the potential to encourage sustainable trip making to the site and its surrounding environs. In particular, access to Cock Hill Road to the south and the east of the site via existing off-road shared path facilities whilst connectivity to the Main Street is provided via high quality

public realm including a plaza, walkway and steps which include a cycle channel. Dedicated crossing facilities are provided on each route to facilitate safe and convenient access for users.

The inclusion of ‘Grocery Home Delivery’ enables a reduction in demand for travel to the store. Customers can choose not to get groceries delivered as part of a shared delivery service which reduces the number of trips made by customers.

**6.7.2.2 Travel Plan**

The main mitigation measure during the operational phase will be development and implementation of a Travel Plan for the development which is intended to reduce the need for car travel. The measures included in the Travel Plan will be as follows:

- Appointment of Travel Co-ordinator
- Travel Pack for staff with details of local transport network, detail of on-site facilities and incentivises for sustainable travel (bike to work scheme etc.)
- Travel information to be made available by Travel Co-ordinator to customers and visitors
- Walking and Cycling Challenges and promotion events.

**Table 6.6 Operational Phase Mitigation Measures**

Mitigation Measures
Incorporated Design Mitigation with a focus on sustainable modes including ‘grocery home delivery’
Travel Plan

**6.7.3 ‘Do Nothing’ Scenario**

In the ‘Do Nothing’ scenarios, there are no expected effects, so no mitigation measures are required.

**6.8 Monitoring**

**6.8.1 Construction Phase**

The Construction Traffic Management Plan will be developed and monitored by the Construction Manager as part of the contractor’s appointment.

**6.8.2 Operational Phase**

Monitoring is crucial to the successful implementation of any travel plan. An annual review will be carried out on the Travel Plan objectives to assess progress.

A fundamental part of the Plan is monitoring to determine progress, identify problem areas and initiate corrective measures to ensure targets are achieved. This monitoring programme will be carried out on an on-going basis. The basic procedure will consist of:

- Reviewing the implementation of the different Travel Plan measures
- Carrying out a travel survey
- Controlling the achievement of the different targets
- Proposing corrective measures if needed

- Informing Cavan County Council about the implementation and progress.

### Summary of Mitigation & Monitoring

Table 6.13 below summarises the Construction Phase mitigation and monitoring measures.

**Table 6.13 Summary of Construction Phase Mitigation and Monitoring**

Predicted Effect	Mitigation	Monitoring
Additional Construction Traffic	<p>Development and Implementation of a CEMP and Traffic Management Plan including:</p> <ul style="list-style-type: none"> <li>• Construction Staff encouraged to arrive before 8:00am and after 18:00pm to avoid the peak hour periods where feasible;</li> <li>• Managed parking on site with staff encourage to travel by sustainable means;</li> <li>• Parking provided to prevent overspill onto surrounding network;</li> <li>• Appointment of Construction Manager/Community Liaison Officer;</li> <li>• Agreed haulage routes along designated HGV routes;</li> <li>• Wheel wash facilities;</li> <li>• Road cleaning and sweeping along section of Mill Road adjacent to the site;</li> <li>• Construction signage at all entrances and exits;</li> <li>• HGVs inspected for dirt and mud before exiting onto public road network;</li> <li>• Control and timing of deliveries where possible;</li> <li>• Entrances and exits manned by flag men during deliveries.</li> </ul>	CEMP will be reviewed, updated and monitored by the Construction Manager as part of the contractor's appointment.

Table 6.14 below summarises the Operational Phase mitigation and monitoring measures.

**Table 6.14 Summary of Operational Phase Mitigation and Monitoring**

Predicted effect	Mitigation	Monitoring
Additional Development Traffic	<p>Incorporated Design Mitigation with a focus on sustainable modes. Measures include:</p> <ul style="list-style-type: none"> <li>• high level of quality access provision for walking and cycling to and through the proposed development. This includes dedicated off-road shared path facilities connected to existing infrastructure on Cock Hill Road utilising crossings on key desire lines. Connectivity to the Main Street is provided via high quality public realm including a plaza, walkway and steps which include a cycle channel, combined with dedicated crossing facilities on Cock Hill Road along route to Main Street.</li> </ul>	

	<ul style="list-style-type: none"> <li>• Provision of 120 sheltered cycle parking spaces</li> <li>• The inclusion of 'Grocery Home Delivery' enables a reduction in demand for travel to the store. Customers can choose not to get groceries delivered as part of a shared delivery service which reduces the number of trips made by customers.</li> </ul>	
<p>Additional Development Traffic</p>	<p>Implementation of the Travel Plan to further reduce car demand. Measures include:</p> <ul style="list-style-type: none"> <li>• Appointment of Travel Co-ordinator;</li> <li>• Travel Pack for staff with details of local transport network, detail of on-site facilities and incentivises for sustainable travel (bike to work scheme etc.);</li> <li>• Travel information to be made available by Travel Co-ordinator to customers and visitors; and</li> <li>• Walking and Cycling Challenges and promotion events.</li> </ul>	<p>Will be monitored by the Travel Co-ordinator. Annual Travel Surveys to be undertaken to track progress and success of Travel Plan.</p>

## 6.9 Residual Effects

### 6.9.1 Construction Phase

The effect of the construction phase in terms of traffic and transport will be imperceptible and short-term in nature. The measures outlined in the CEMP, as set out in section 6.7.1, will help alleviate the effect of the additional traffic and limit the effect to outside the busier peak hours. The measures, including wheel washing and dust mitigation, will also ensure the standard of the public road network is maintained in terms of dust and dirt from construction traffic.

### 6.9.2 Operational Phase

With the mitigation measures in place, the effect of the proposed development on traffic and transport is envisaged to be slight, likely in probability and long-term. The proposed development is centrally located within Cavan Town with well-integrated walking and cycling infrastructure to encourage sustainable travel choices to and through the proposed development. The inclusion of 'grocery home deliveries' and Travel Plan initiatives are likely to result in lower volumes of car traffic than that assumed in the modelling assessment.

## 6.10 Reinstatement

There are no effects related to any reinstatement regarding Traffic and Transportation.

## 6.11 Interactions and Potential Cumulative Effects

### 6.11.1 Interactions

The proposed levels of traffic affect both Noise and Vibration (Chapter 11) and Air Quality and Climate (Chapter 12).

The significance of impact upon local noise & vibration conditions have been assessed to be slight to moderate, but short term for the construction phase and not significant for the operational phase.

There will be no significant contribution from the proposed development to climate change or greenhouse gas emissions during construction and operational phases. Possible effects from the operation of the development will be long-term in nature and will comprise of emissions from vehicular sources.

The magnitudes of all predicted alterations to air quality are not significant during the construction phase and negligible for the operational phase. It is therefore concluded that the effects on air quality from traffic arising from the operation of the proposed development are not significant.

### 6.11.2 Potential Cumulative Effects

The requirement under the EIA Directive is to assess cumulative effects with other “existing and/or approved projects”.

The subject site has existing grants of permission on the subject site under Planning Reg. Ref 15/61 and Planning Reg. Ref. No. 11/1992 & An Bord Pleanála Ref. No. PL 48.240097 that permit 485 no. car parking spaces, accessed off an existing priority junction on Cock Hill Road. The proposed development will result in reduced traffic generation when compared to existing grants of permission due to the reduced parking quantum and inclusion of ‘grocery home deliveries’. The cumulative effect is assessed as being positive.

There is an existing Tesco Superstore in Cavan Town Centre. For the purpose of this assessment, it is assumed that trip making associated with the existing Tesco site will be retained as their current level following the opening of the new Tesco development, subject to planning permission being granted. The cumulative effect is assessed as being neutral.

Traffic surveys were undertaken in October 2022 meaning trips associated with Gaelscoil Bhrefne are included as part of background traffic and considered under the ‘do nothing’ or without development scenario. The cumulative effect is assessed as being neutral.

There is a residential development to erect 26 no. 3-bed semi-detached dwellings proposed under Cavan County Council Reg. Ref 21528 which is under appeal with An Bord Pleanála ABP-313863-22. The traffic generation associated with the residential development did not meet the thresholds at which the production of Traffic and Transport Assessments is required. No traffic generation information was found in relation to the residential development, but it is widely accepted that peak period trips are in the weekday AM and PM. The AM period does not correspond with proposed development peak periods. For the PM period, arrival rates are 0.45 per dwelling and departure rates are 0.24 per dwelling based off TRICS data for similar residential sites. This would equate to 12 vehicles arriving to and 6 vehicles departing from the Ardkeen Road access during the PM Peak.

This contributes less than 1% of traffic at Junction 5 and the cumulative effect is assessed as being imperceptible.

The cumulative effects associated with existing, planned and proposed developments are assessed as being positive to imperceptible, and long-term.

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## 7.0 Land, Soils, Geology

### 7.1 Introduction

This chapter comprises an assessment of the soils and geology within the vicinity of the site and the surrounding environs. The potential impacts posed by the construction and operational phases of the proposed development are investigated, and suitable mitigation measures are recommended to minimise impacts on the local soil & geological receptors.

The objectives of this chapter are.

- To provide a baseline assessment of the receiving environment in terms of soils and geology.
- To identify any potential negative impacts posed by the construction and operational phases of the proposed development.
- To propose suitable mitigation measures to prevent or reduce the significance of the negative effects identified.
- To consider any significant residual effects of cumulative impacts posed by the proposed development.

### 7.2 Consultation

ORS have been commissioned to assess the potential impacts of the proposed development in terms of land, soils, geology and hydrogeology during the construction and operational phases.

The principal members of the ORS EIA team involved in this assessment include the following persons:

- **Project Scientist & Co-Author:**  
Cathal Tighe – B.Agr.Sc (Agricultural-Environmental Science). Current Role: Environmental Consultant. Experience ca. 4 years
- **Project Manager & Lead Author:**  
Luke Martin - B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 10 years.
- **Project Scientist & Reviewer:**  
Oisín Doherty – B.Sc. (Hons) (Geography with Environmental Science), MSc. (Environmental Management), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 12 years.

Consultation between ORS and other members of the planning/design team was made in order to obtain information required to assess the potential construction and operational phase impacts on local land, soils, and geology. Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

### 7.3 Legislation, Policy and Guidance

The methodology used to produce this chapter included a review of relevant legislation and guidance, a desk study, a site walkover, an intrusive investigation (in the form of trial pits, rotary cores, and laboratory tests), an evaluation of potential effects, an evaluation of significance of the effect and an identification of measures to avoid and mitigate effects.

#### 7.3.1 Legislation, Policy and Guidance

This chapter was carried out in accordance with the following guidance documents:

- EPA, (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EPA, (2004). Land spreading of Organic Waste – Guidance on Groundwater Vulnerability Assessment of Land.
- European Commission, (2017). Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report.
- Institute of Geologists Ireland, (2013). Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements.
- NRA, (2008). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- CIRIA, (2001). C532 - Control of Water Pollution from Construction Sites – Guidance for consultants and contractors.
- IGI, (2002). Geology in Environmental Impact Statements – a Guide (Institute of Geologists of Ireland).
- Groundwater Directives (80/68/EEC) and (2006/118/EC).

#### 7.3.2 Desktop Study

A desk study was undertaken in order to collate and review background information in advance of the site survey. The desk study involved the following;

- Examination of the Geological Survey of Ireland (GSI) datasets pertaining to geological and extractive industry data and the GSI borehole database;
- Examination of Environmental Protection Agency (EPA) data including soil and subsoils;
- Examination of National Parks and Wildlife Service (NPWS) nature conservation designations;
- Review of the Geological Heritage of Cavan (2013) and Soils of Cavan (1983)
- Preparation of site maps and suitable field sheets for the site survey.

#### 7.3.3 Site Investigation

Fieldwork commissioned by Pinnacle Consulting Engineers in July 2022 consisted of the following elements:

- Cable Percussion Borehole Installation
- Trial Pit Excavations

- Plate Load Tests
- Groundwater Monitoring
- Gas Monitoring
- Geotechnical Laboratory Testing
- Environmental Laboratory Testing

### **7.3.4 Impact Assessment Methodology**

The impact assessment rationale outlined in the 2022 EPA Guidelines will be applied to each chapter of the study. This section describes some further criteria applied to the assessment of soil and geological receptors.

#### **Risk Appraisal Methodology**

The Conceptual Site Model (CSM) identifies potential contaminants, receptors and exposure pathways that may be present based on the construction and operational phase of the proposed development.

The identification of potential “contaminant linkages” is a key aspect of the evaluation of potentially contaminated land. An approach based on this methodology has been adopted within this report. For each of the contaminant linkages, an estimate is made of;

- The potential severity of the risk;
- The likelihood of the risk occurring.

As such this assessment has been undertaken in line with the Source - Pathway - Receptor Model as per the “Guidelines on the information to be contained in Environmental Impact Assessment Reports” 2022 and IGI 2013 guidance notes and the. At the impact assessment stage, any potential beneficial or adverse impacts associated with the development are identified and assessed with reference to the baseline environment. This requires consideration of:

- Sensitivity/ value of the receptor;
- Severity/ magnitude of the impact;
- Impact duration;
- Whether impact occurs in isolation, is cumulative or is interactive; and
- Performance against environmental quality standards or other relevant thresholds.

#### **Evaluation of Geological Receptors**

The 13-step approach to impact assessment proposed in the IGI guidelines (2013) is adopted for the evaluation of potential effects. The baseline environment is assessed by characterising the site topographical, geological and geomorphologic regimes from the data acquired. Following on from the identification of the baseline environment, the available data is utilised to identify and categorise potential effects on the soils and geological environment as a result of the proposed development.

These assessments include;

- Undertaking preliminary materials calculations in terms of volumetric soil and subsoil excavation and reuse associated with development design
- Assessing ground stability risks
- Assessing the combined data acquired and evaluating any likely effects on the soils, geology and ground stability
- Identifying effects and considering measures that would mitigate or reduce the identified effect.

The significance of effects of the proposed development has been assessed in accordance with the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2022. The effects associated with the proposed development are described with respect to the EPA guidance in the relevant sections of this chapter.

**Magnitude and Significance of Impact**

An impact rating has been developed for each of the phases of the proposed development based on the Institute for Geologists Ireland (IGI) Guidance for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. In line with the IGI Guidance the receiving environment (Geological Features) was first identified. Using the NRA rating criteria in Appendix C of the IGI Guidance the importance of the geological features is rated in the **Table 7.1** followed by an estimation of the magnitude of the impact (**Table 7.2**). This determines the significance of the impact prior to application of mitigation measures as set out in **Table 7.3**.

**Table 7.1 Sensitivity/ Value of the Site’s Geological Features**

Magnitude	Criteria	Example
<b>Very High</b>	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 the site is significant on a national or regional scale	Geological feature on a regional or national scale (NHA). <ul style="list-style-type: none"> <li>• Large existing quarry or pit.</li> <li>• Proven economically extractable mineral resource</li> </ul>
<b>High</b>	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 the site is significant on a local scale	Contaminated soil on site with previous heavy industrial usage <ul style="list-style-type: none"> <li>• Large recent landfill site for mixed wastes</li> <li>• Geological feature of high value on a local scale (County Geological Site)</li> <li>• Well drained and/or high fertility soils</li> <li>• Moderately sized existing quarry or pit</li> <li>• Marginally economic extractable mineral resource</li> </ul>
<b>Medium</b>	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 the site is moderate on a local scale	Contaminated soil on site with previous light industrial usage <ul style="list-style-type: none"> <li>• Small recent landfill site for mixed wastes</li> <li>• Moderately drained and/or moderate fertility soils</li> <li>• Small existing quarry or pit</li> <li>• Sub- economic extractable mineral resource</li> </ul>

<b>Low</b>	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 the site is small on a local scale	Large historical and/or recent site for construction and demolition wastes <ul style="list-style-type: none"> <li>• Small historical and/or recent landfill site for construction and demolition wastes</li> <li>• Poorly drained and/or low fertility soils</li> <li>• Uneconomic extractable mineral resource</li> </ul>
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The assessment of the severity/ magnitude of an impact incorporates the timing, scale, size and duration of the potential impact. The magnitude criteria for geological impacts are defined in **Table 7.2**.

**Table 7.2 Severity/ Magnitude of Impact on Geological Features (NRA, 2008)**

Magnitude	Criteria	Description & Example
<b>Large Adverse</b>	Results in loss of attribute	<ul style="list-style-type: none"> <li>• Loss of high proportion of future quarry or pit reserves</li> <li>• Irreversible loss of high proportion of local high fertility soils</li> <li>• Removal of entirety of geological heritage feature</li> <li>• Requirement to excavate / remediate entire waste site</li> <li>• Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment</li> </ul>
<b>Moderate Adverse</b>	Results in impact on integrity of attribute or loss of part of attribute	<ul style="list-style-type: none"> <li>• Loss of moderate proportion of future quarry or pit reserves</li> <li>• Removal of part of geological heritage feature</li> <li>• Irreversible loss of moderate proportion of local high fertility soils</li> <li>• Requirement to excavate / remediate significant proportion of waste site</li> <li>• Requirement to excavate and replace moderate proportion of peat, organic soils</li> </ul>
<b>Small Adverse</b>	Results in minor impact on integrity of attribute or loss of small part of attribute	<ul style="list-style-type: none"> <li>• Loss of small proportion of future quarry or pit reserves</li> <li>• Removal of small part of geological heritage feature</li> <li>• Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils</li> <li>• Requirement to excavate / remediate small proportion of waste site</li> <li>• Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment</li> </ul>
<b>Negligible</b>	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
<b>Minor Beneficial</b>	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
<b>Moderate Beneficial</b>	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
<b>Major Beneficial</b>	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

Based on the determination of the findings from the above (**Tables 7.1 and 7.2**) the following matrix is used to establish the significance of the impact.

**Table 7.3: Rating the Significance of the Impact in Geology (NRA, 2008)**

Importance of Attribute	Magnitude of Impact			
	Negligible	Small Adverse	Moderate adverse	Large Adverse
<b>Very High</b>	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
<b>High</b>	Imperceptible	Moderate/ Slight	Significant/ Moderate	Profound/ Significant
<b>Medium</b>	Imperceptible	Slight	Moderate	Significant
<b>Low</b>	Imperceptible	Imperceptible	Slight	Slight/ Moderate

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## 7.4 Receiving Environment

This section of the chapter provides the baseline information in terms of geomorphology (landscape and topography), along with superficial and solid geology. The regional review of geological and hydrogeological conditions covers a zone of 2.5 km from the proposed development site, as suggested in the IGI guideline.

The subject site occupies a total area of approximately 4.126 ha and is situated at Cock Hill, Cavan Town, Co. Cavan.

The underlying geology has a major influence on topographical, hydrogeological and hydrological features within the site vicinity, hence this chapter is closely linked to the next chapter (Chapter 8 – Hydrology and Hydrogeology).

The receiving environment is described below for the proposed development under the following headings:

- Topography
- Drift (Quaternary) Geology
- Bedrock Geology
- Soils

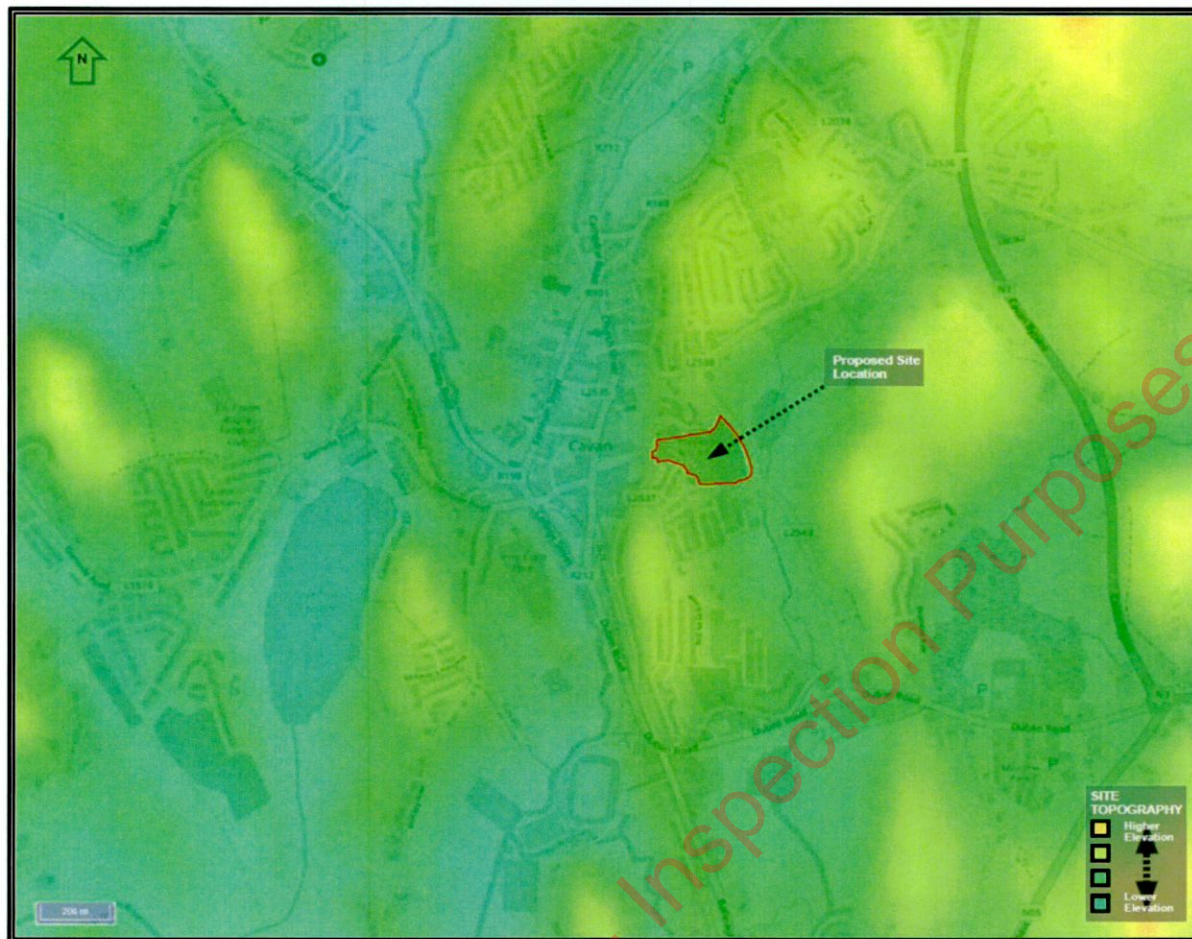
### 7.4.1 Topography

The regional topography of Co. Cavan consists predominantly of mountains and lakes with drumlins being found locally. The elevation ranges from 51m to 667m above sea level. This area is dominated by the Cuilcagh-Anierin Uplands, Slieve Rushen and Bolevbrack Mountains.

The local landscape of Cavan Town Centre consists of an undulating topography with many rises and falls, shaped principally shaped by several drumlins interspersed with the Cavan River which flows from south to north through the town, and Swellan Lough located towards the southeast of the town, as depicted in **Figure 7.1**, overleaf.

A topographical survey of the site from July 2022 indicates a site level variance of between 71.41m OD to 93.07m OD. The lowest elevation on the site is situated to the west where the site connects with the junction between Cock Hill Road, to the west, and Main Street. The highest elevation is situated to the southwest backing on to the existing St. Francis residential development. The ground level here is at the original elevation, 93.07m OD. Extensive excavation and infilling was undertaken in circa late 2010 throughout the proposed site which resulted in a reduction in elevation to the west and an increase in the east. The groundworks resulted in the development of three distinct terraces at the site with an gradual gradient towards the south-east. The highest terrace is situated in the west and is roughly the location of the proposed supermarket with an elevation of ca. 85.25m OD  $\pm$ 0.50m. The largest terrace is located east of this with an elevation of ca. 83.80m OD  $\pm$ 0.50m and will be the location of the proposed carpark. The terrace running along the eastern boundary has an elevation of ca. 79.80  $\pm$ 0.30m and will accommodate the drive through coffee shop and petrol filling station. Refer to **Appendix 8.2** for the topographical survey.

Figure 7.1: Topographical map of the landscape surrounding the site (topographic-map.com)



#### 7.4.2 Drift Geology

Drift is a general term applied to all mineral material (clay, silt, sand, gravel and boulders) transported by a glacier and deposited directly by or from the ice or as fluvio-glacial deposits deposited by water from the ice. It generally applies to deposits laid down during the Pleistocene (Quaternary) glaciations. Drift can also be included under Holocene (Quaternary) deposits. The drift geology of the area principally reflects the depositional process of the last glaciation. Typically, during the ice advance, boulder clays were deposited sub glacially as lodgement till over the eroded rock head surface, whilst moraine granular deposits were laid down at the glacier margins. Subsequently, with the progressive retreat of the ice sheet from the region, granular fluvio-glacial deposits were laid down in places by melt waters discharging from the front of the glacier.

The proposed site is located within the Lakeland area in central and west County Cavan characterised by its lakes, drumlins and Bruse Hill to the east with elevations from 51m to 200m above ground. The National Soil Survey of Ireland Map indicates the region as comprising of Gleys, Acid Brown Earths and Grey Brown Podzolics with Inter-drumlin Peat/ Peaty Gleys along with some Alluvial soils throughout. Overall, the region has 'heavy' soils which require drainage to improve their agricultural potential. The landscape is rolling consisting of drumlins with lengths of up to 500m, widths of 100-200m and rising 35-50m vertically which has resulted in a steep to undulating landscape. The slopes are generally negotiable by machinery however some areas are too steep for cultivation.



EPA Soils Classification maps identify the subject site as comprising three known soil types. The vast majority of the site consists of a mineral poorly drained (AminPD) classified as Till derived chiefly from Lower Palaeozoic rocks consisting of sandstones and shales. To the east is the town core which is classed as Made Ground, with the a strip of land running along the east of the site consisting of basin or blanket cut Peat. To the south of the site is a mineral poorly drained (AminPD) Till derived chiefly from Namurian rocks.

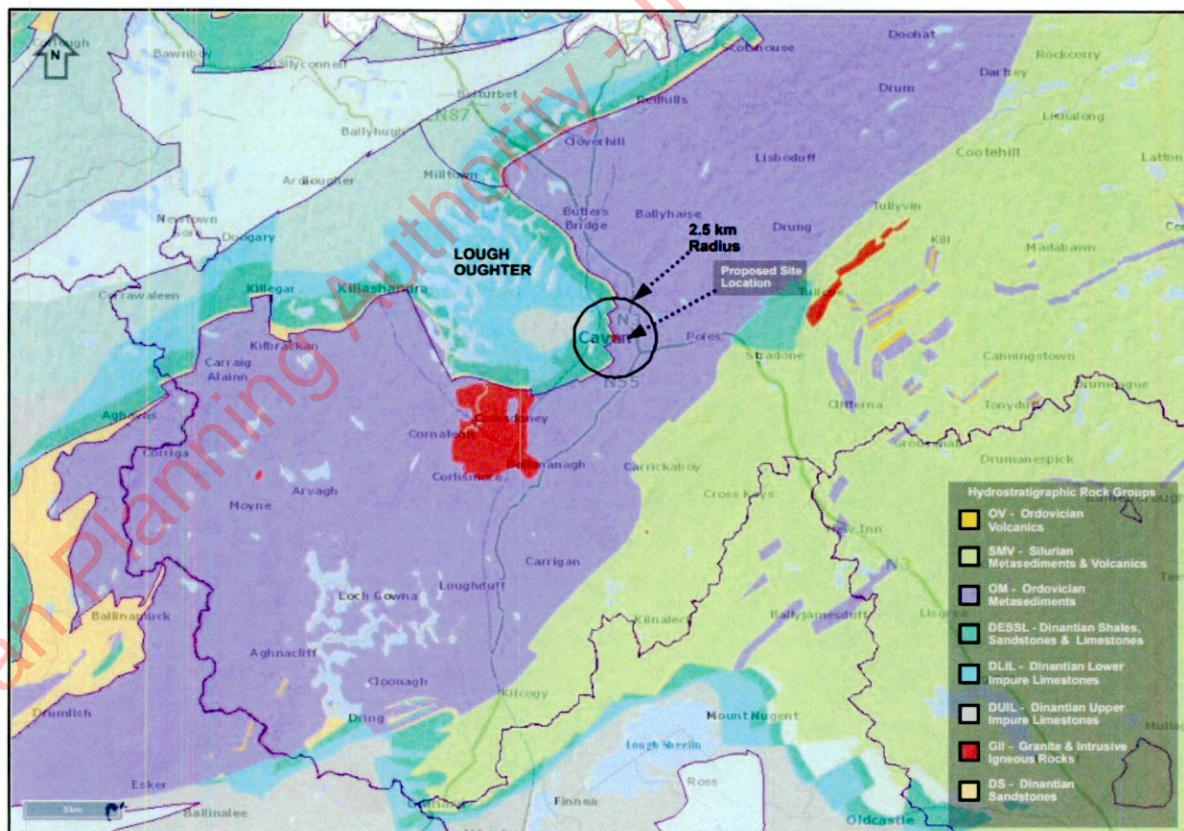
In view of the proposed development, the soils which are likely to be affected by the development represent a less significant resource in a local and regional context as such soils occur in abundance in the area.

**7.4.3 Regional Bedrock Geology**

Bedrock is defined as a consolidated aggregate of minerals underlying the ground surface and any soils present. Above the bedrock is usually an area of broken and weathered unconsolidated rock in the basal subsoil. Sedimentary rock lies in beds which may comprise different rock types and which may be horizontal or inclined, so that the rock encountered at the ground surface may change over a short distance.

Figure 7.2 below presents the regional layout of Hydrostratigraphic rock types within the vicinity of the site. A hydrostratigraphic rock unit can be defined as a part of a body of rock that forms a distinct hydrologic unit with respect to the flow of ground water.

**Figure 7.2: Regional Hydrostratigraphic Rock Unit Groups of South Cavan (GSI)**



As detailed in Figure 7.2, the predominant rock types within the site vicinity (indicated in purple & yellow-

green), on a regional scale consist of metasediments either formed during the Silurian (443.8Mya to 419.2Mya) or Ordovician (485.4Mya to 443.8Mya) geological periods. Metasedimentary rock is a type of metamorphic rock, first formed through the deposition and solidification of sediment, and subsequently buried and subjected to high pressures and temperatures, causing the rock to recrystallize.

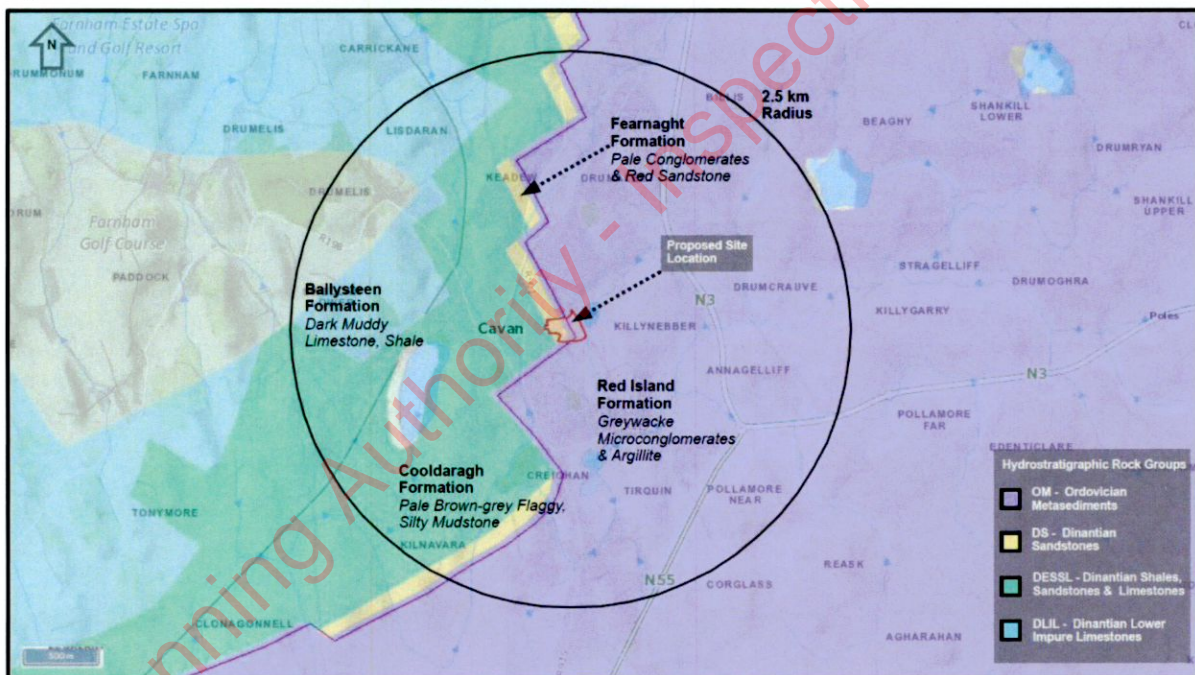
There are several instances of granite intrusions (indicated in red) within the region associated with the Caledonian orogeny (mountain building event) which encompasses the events which caused the closure of the Iapetus Ocean. There are also several incidences of volcanic tuff from around the same time scattered throughout the region, indicated in orange-yellow as Ordovician volcanics.

Younger, carboniferous (358.9Mya to 298.9Mya) rocks, of sedimentary origin are located towards the northwest, comprised of Dinantian Shales, Sandstones and Limestones (Green layer), and Dinantian Limestones (Blue & Grey layers).

**7.4.4 Local Bedrock Geology**

Figure 7.3 provides a closer view of the local bedrock geology within the site vicinity.

**Figure 7.3 Local Bedrock Formations (GSI)**



The site is situated above an unconformity with the underlying and surrounding bedrock consisting of Ordovician Metasediments to the east and Dinantian sedimentary rocks to the west. The Ordovician strata date from the mid Ordovician period known as the Caradoc with the sediments described as greywacke, microconglomerate and argillite and known as the Red Island Formation with the majority of the site situated over this formation. The younger Dinantian series dates from the early Courceyan period with two formations situated at the site, the Fearnaght and Cooldaragh. A small area in the northwest of the site is located above the Fearnaght formation which is described as a pale conglomerate & red sandstone with the Cooldaragh situated to the west of this, a pale brown-grey flaggy, silty mudstone.

The GSI 1:1,000,000 Bedrock Solid Geology Map describes the greywacke, microconglomerate and argillite parent material of the Red Island Formation as green to greenish-grey medium or coarse grained, locally conglomeratic, volcanoclastic greywacke, with subordinate grey to greyish black shales. Greywackes are quartz poor, contain andesitic fragments, lithic detritus and accessory blueschi. The parent material of the Fearnaght formation, pale conglomerate & red sandstone, is described as being composed of cream coloured quartz-pebble conglomerate with a sandy matrix, subarkose and red and purple micaceous flaggy sandstones and purple and brown quartzites.

The site overlies a north-south running unconformity with the younger Fearnaght and Cooldaragh formations overlaying the Red Island formation situated to the east. As well as overlying an unconformity the site is also situated above a northeast-southwest running fault line. The fault line is situated amongst a series of five parallel fault lines situated ca. 0.75km apart.

The bedrock geology on the 1:100,000 scale mapping from the GSI indicates that the region surrounding the site extents is characterised by 7 geological formations, with 4 no. formations located within a 2km radius of the proposed site, as illustrated in **Figure 7.3**

#### 7.4.4 Depth to Bedrock

According to the GSI database, there is a high density of groundwater wells, with complete datasets located within 2 kilometres of the proposed development (**Figure 7.4**). This data is summarised in **Table 7.4** below.

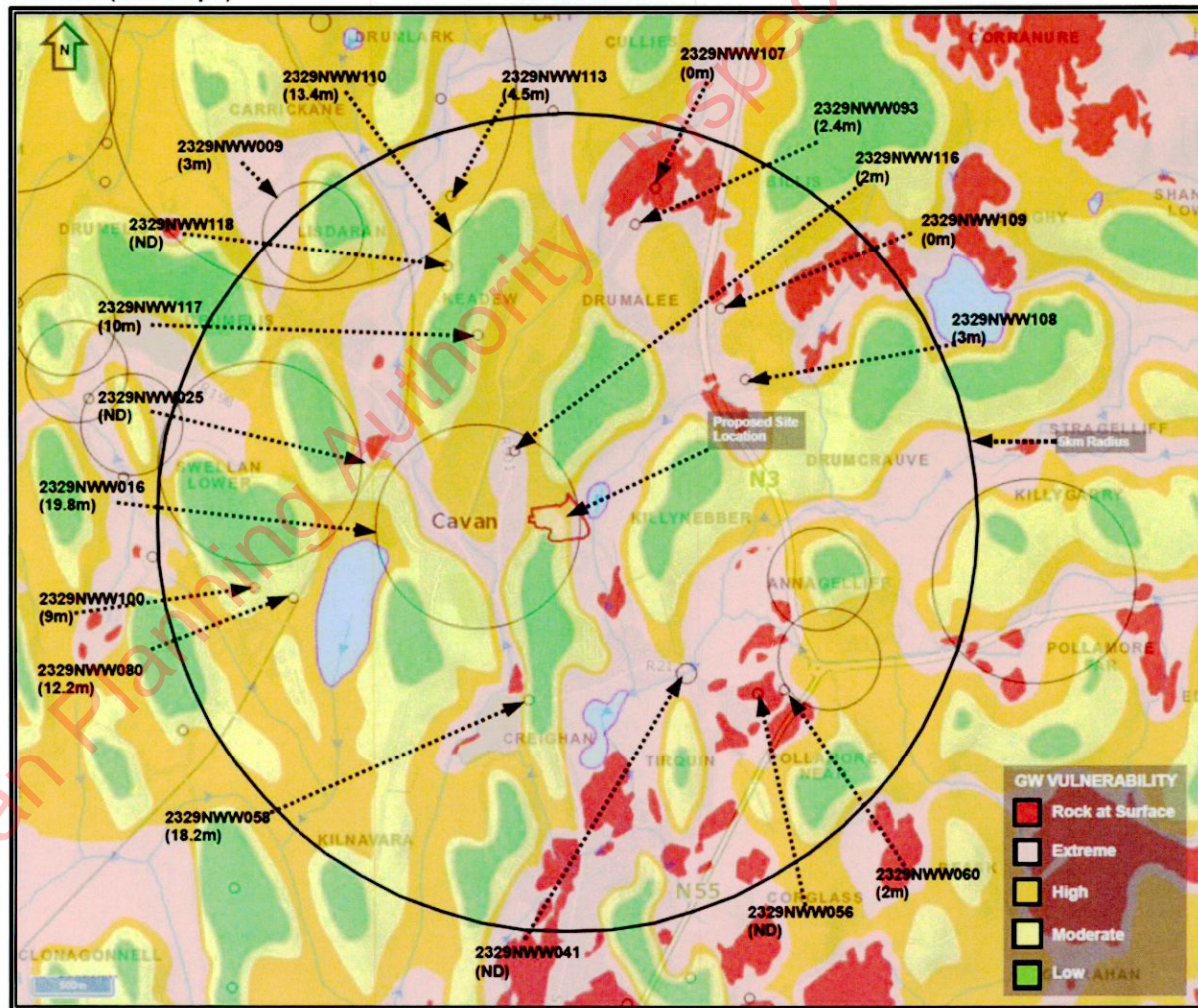
**Table 7.4: Groundwater Wells with 2km of the site (GSI Well Database)**

GSI Reference	Easting Northing	Well Type	Depth (m bgl)	Depth to Rock (m)	Well Use	Yield m <sup>3</sup> /d	Proximity to site
2329NWW110	241090, 306910	Borehole	18	13.4	Unknown	129.6	1.55m NW
2329NWW009	241090, 306200	Borehole	48.7	3	Agri & domestic	21.8	1.69km NW
2329NWW025	240830, 305060	Borehole	22.9	-	Agri & domestic	46.4	1.12km NW
2329NWW118	241750, 306030	Borehole	38	-	Agri & domestic	ND	1.45km NW
2329NWW117	241900, 305690	Borehole	45	10	Agri & domestic	29.4	1.01km NW
2329NWW016	241900, 304750	Borehole	67	19.8	Industrial Use	ND	Within 1km of site
2329NWW100	240800, 304450	Borehole	30	9	Agri & domestic	ND	1.6km W
2329NWW080	267790, 279410	Borehole	15.2	12.2	Agri & domestic	32.7	1.4km W
2329NWW058	242150, 303900	Borehole	80	18.2	Agri & domestic	ND	880m SW
2329NWW041	242920, 304030	Borehole	29	-	Agri & domestic	259.2	872m S
2329NWW056	243270, 303930	Borehole	30	-	Agri & domestic	ND	1.2km SE
2329NWW060	243400, 303950	Dug Well	3	2	Agri & domestic	ND	1.3km SE

2329NWW108	243210, 305470	Borehole	53	3	Agri & domestic	ND	1.07km NE
2329NWW109	243090, 305820	Borehole	50	0	Agri & domestic	ND	1.25km NE
2329NWW093	242670, 306240	Borehole	15.2	2.4	Agri & domestic	14.2	1.45km N
2329NWW107	242770, 306420	Borehole	1	0	Agri & domestic	ND	1.68km NE
2329NWW116	242080, 305120	Borehole	10	2	Agri & domestic	ND	260m NW

Figure 7.4 superimposes the approximate location of the groundwater wells listed in the table above relative to the groundwater vulnerability rating of the area. The site boundary is roughly marked out in red. Groundwater wells in the vicinity of the site are generally moderate to low yielding. The lands on which the site location has been proposed have been assigned a high to extreme vulnerability rating. The recorded depth bedrock is encountered for the corresponding wells in this area is between 0 to 19.8 metres below ground level (mbgl), representative of the drumlin belt landscape. There are several locations where rock outcrops are present at surface in this direction also.

Figure 7.4: Groundwater Vulnerability and location of Groundwater Wells and associated depth to bedrock (GSI Maps)



### 7.4.4 Site-Specific Investigations

An intrusive site investigation was undertaken by IGSL on behalf of Pinnacle Consulting Engineers in July 2022 involving the following scope of works:

- Cable percussive boreholes (9 No.)
- Trial pits (7 No.)
- Plate load tests (15 No.)
- Groundwater & Gas monitoring
- Surveying of exploratory hole locations

Detailed borehole logs and description of the site investigation are presented in **Appendix 8.5** but the general structure of the ground can be described as follows in **Table 7.5**:

**Table 7.5: Summary of ground conditions at the proposed site (IGSL)**

Soil Type/ Geological Unit	Maximum Depth (m bgl)	Description and Interpretation
<b>Made Ground</b>	From surface to 0.4m – 1.1m.	MADE GROUND – (comprising dark grey / black clay and gravel fill).
<b>Overburden (a)</b>	From 0.4 – 1.1m to 1.1 – 2.8m	Stiff brown sandy SILT/CLAY with some gravel.
<b>Overburden (b)</b>	From 1.1 – 2.8m to 3.2 – 10.0m	Stiff and very stiff dark brown sandy gravelly CLAY with medium cobble content.
<b>Overburden (c)</b>	From 1.5m to 2.4 – 10.0m	Stiff to locally very stiff dark brown sandy gravelly CLAY with some cobbles and boulders.

The locations of each borehole & trial pit installed during the site investigation (S.I) are outlined in **Figure 7.5**, below.

**Figure 7.5: Borehole & Trial pit locations installed during intrusive Site Investigation (IGSL)**



It is understood that a significant quantity of fill material was placed towards the eastern and southern portion of the site during the upgrade of the adjacent roadway. The trial pits and boreholes revealed re-worked brown and grey, brown sandy gravelly clay with low and medium cobble content. It is understood that the material was placed and compacted in a systematic manner (i.e., engineered fill as opposed to dozed out in layers without compaction). The re-worked material was found to be most extensive in **BH's 6 and 9** where it was present to depths of 4.8 and 6.0m. In the case of the trial pits, it was most notable in TP's 5, 6 and 7 where it was observed at depths of at least 3.1m (TP 7). In strength terms, the re-worked till is largely firm and stiff in consistency.

Underlying the made ground are glacially derived soils referred to as glacial till. The till comprises heavily over-consolidated grey brown and dark grey, sandy gravelly CLAY with low and medium cobble content.

The site level was measured at 79.95mOD for boreholes 8 and 9 and 85.08mOD for borehole 3. Groundwater was encountered in 3 no. boreholes as follows:

- **BH 8** – 6.22m bgl (73.73mOD)
- **BH 9** – 6.91m bgl (72.99mOD)
- **BH 3** – 1.24m bgl (83.84mOD) – Likely to be overburden and not a true groundwater level.

#### 7.4.5 Mineral Aggregate Resources

There are no active quarries on the site. The nearest active quarry recorded on the GSI's online database is Crossdoney Granite Quarry located ca. 5.8km southwest of the site and Cormeen Shale Quarry located ca. 10.8km east of the site.

#### 7.4.6 Geological Heritage

The Irish Geological Heritage (IGH) Programme identifies and selects a complete range of sites that represent Ireland's geological heritage under sixteen themes ranging from Karst features to Hydrogeology. The IGH Programme is a partnership between the GSI and the National Parks and Wildlife Service (NPWS) and sites identified as important for conservation are conserved as Natural Heritage Areas (NHA).

Reference to the GSI online database confirms the proposed site is not located within a geological heritage site. **Figure 7.6** overleaf indicates the location of several geological heritage areas within the region.

The Crossdoney Granite Quarry & Cormeen Quarry, mentioned above; are both classified as Geological Heritage Sites.

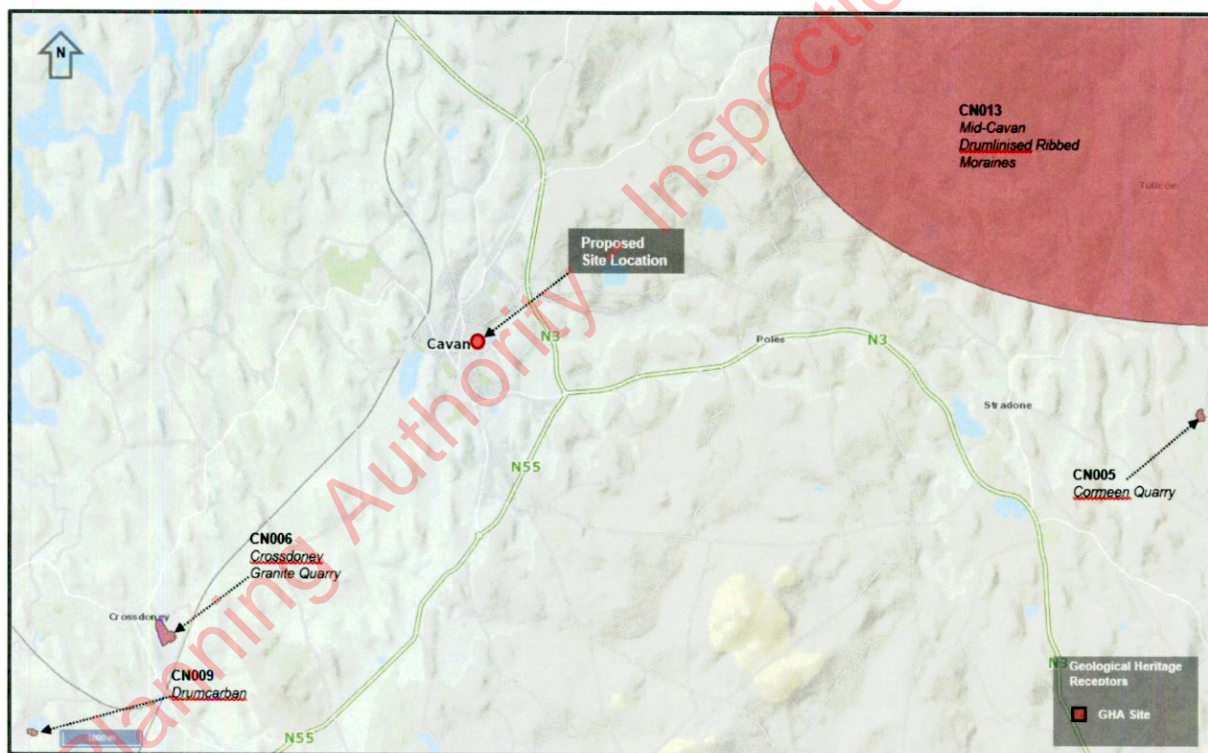
The Crossdoney Granite Quarry (CN006) is one of a limited number of small early-Caledonian granitic intrusions across Ireland and is assigned geological heritage status under the IGH11 category – "Igneous Intrusions".

The Cormeen Quarry (CN005) site is the best-known current representative in Ireland of the ‘Moffat Shale’ graptolitic horizons which are widespread throughout the Longford-Down inlier and is assigned geological heritage status under the IGH2 category – “Precambrian to Devonian Palaeontology”.

The Mid-Cavan Drumlinised Ribbed Moraines (CN013) site contain many superimposed drumlins on their crests, and the area has traditionally been known as the middle portion of the ‘Drumlin Belt’. Owing to their size, the true scale and size of the ribbed moraines can only be seen using digital elevation modelling (DEM) and satellite imagery. This feature was assigned geological heritage status under the IGH7 category – “Quaternary”.

Drumcarban (CN009) consists of a pluton comprised of granodiorite, monzonite and quartz diorite in its northern part and granodiorite and quartz monzonite in the south. At Drumcarban, the medium-grained equigranular hornblende-biotite granodiorite contains thin (few mm – 20mm wide) quartz veins that trend generally north northwest–south southeast. The veins contain scattered grains of chalcopyrite (CuFeS<sub>2</sub>) and molybdenite (MoS<sub>2</sub>). This feature was assigned geological heritage status under the IGH15 category – “Economic Geology”.

**Figure 7.6: Geological Heritage Sites located within the vicinity, on a regional level (GSI)**



**7.4.7 Protected Areas**

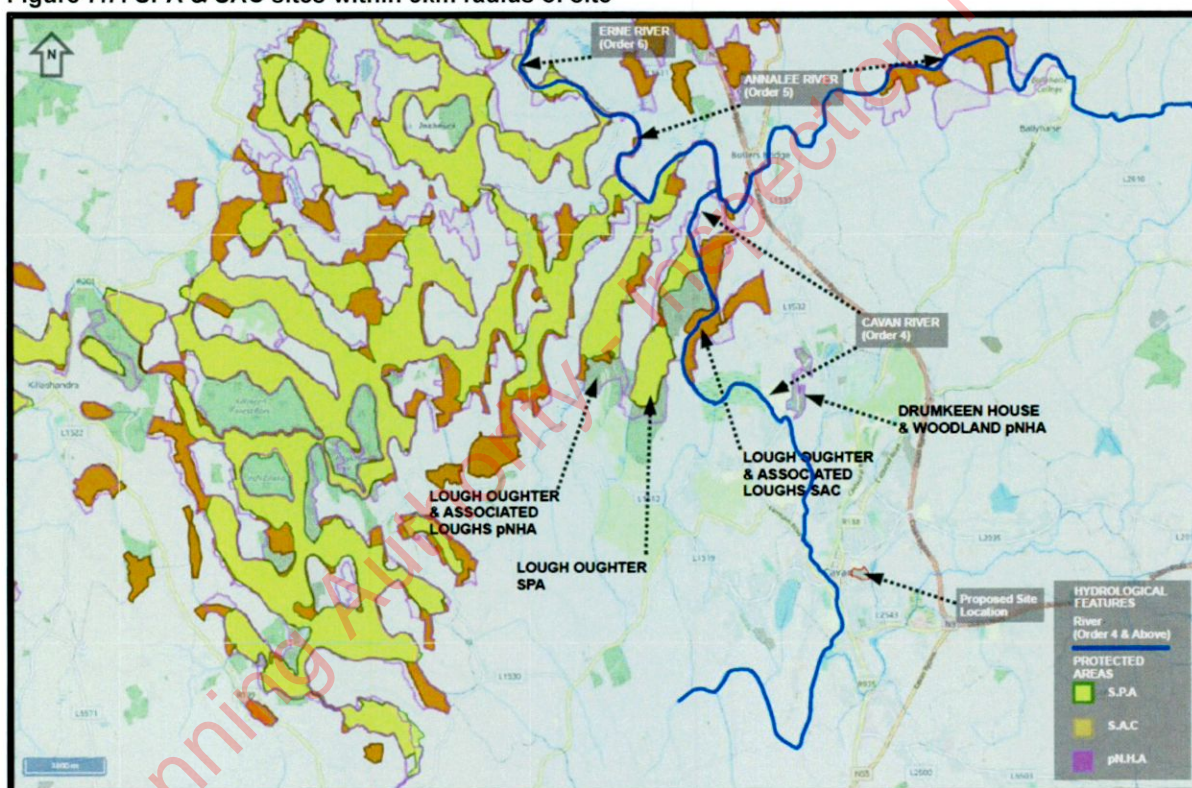
The area surrounding the site contains several protected areas. **Table 7.6** outlines the protected areas within a 5km radius of the proposed site and is accompanied by **Figure 7.7** which displays the spatial distribution of the Special Areas of Conservation (SAC) and Special Protection Areas (SPA). SAC are prime wildlife conservation areas in the country which are considered to be important on a country and European scale. Sites are selected and designated under the EU Habitats Directive and have been transposed into Irish law under EC regulation 2011 (S.I. No. 477 of 2011). Likewise, an SPA is an area

selected for conservation due to its importance in the protection of rare or vulnerable bird species, migratory species, and wetlands. Sites are selected and protected under the EU Birds Directive.

**Table 7.6: Protected Areas**

Name	Site Code	Designation	Reason for Protection
Lough Oughter And Associated Loughs SAC	000007	SAC Habitats	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation Bog woodland Lutra lutra (Otter)
Lough Oughter SPA	004049	SPA Birds	Great Crested Grebe ( <i>Podiceps cristatus</i> ) Whooper Swan ( <i>Cygnus cygnus</i> ) Wigeon ( <i>Anas penelope</i> ) Wetland and Waterbirds
Lough Oughter And Associated Loughs pNHA	000007	Proposed Natural Heritage Area	As above.

**Figure 7.7: SPA & SAC sites within 5km radius of site**



**7.4.8 Soils and Subsoils**

The formation of soil is dependent upon geology, climate, vegetation, altitude, and landform shape. Soil landscapes found in Ireland are a consequence of the changing climatic conditions over the last 100,000 years (the last glacial age was ca. 12,000 years ago) and the management of land by farmers.

Soils can be referred to as topsoil or subsoil. Topsoil is the active layers at ground level where living organisms are found. Changes in soil characteristics are delineated in “horizons”. Topsoil is referred to as horizons ‘A’ and ‘B’. Subsoil is the loose uncemented (unlithified) sediments present between the soil ‘B’ horizon and bedrock. Subsoils are termed the ‘C’ horizon.



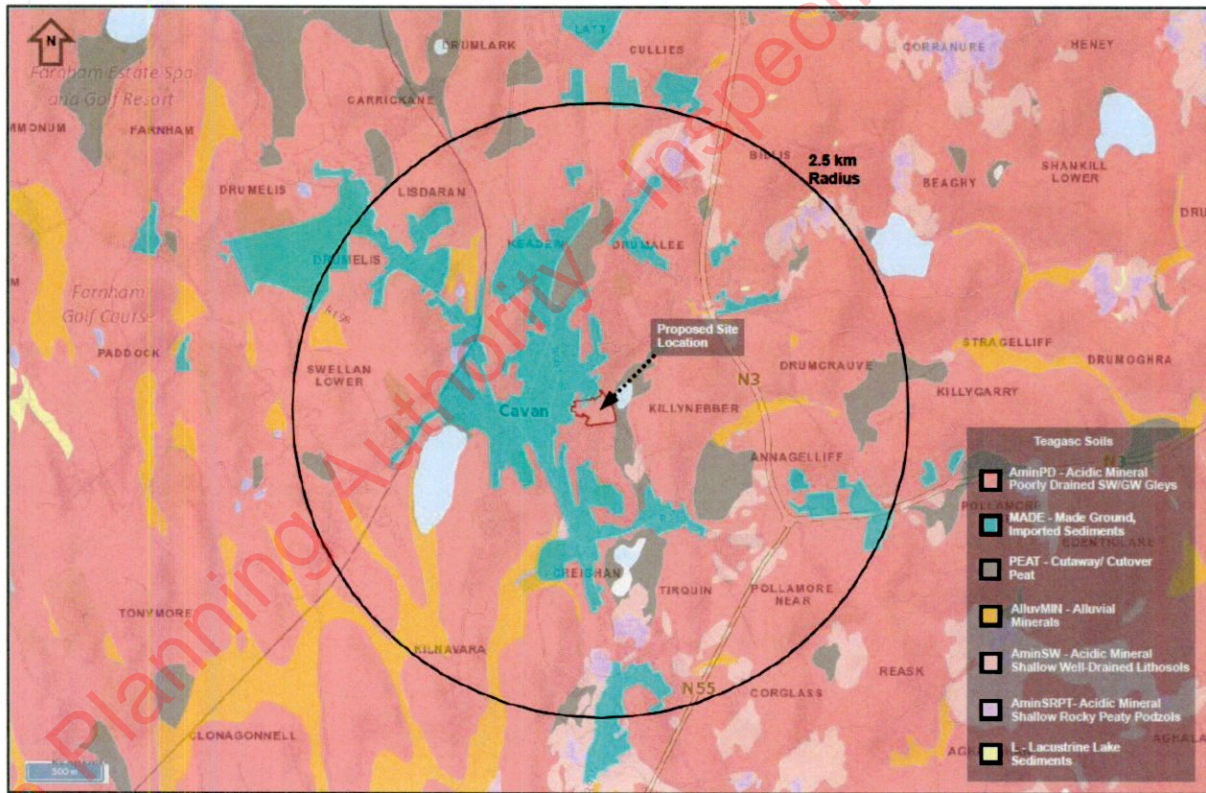
GSI online mapping indicates that the soils underlying the proposed site is classed as deep poorly drained mineral, mainly acidic soils (AminPD) derived from Namurian shales & sandstones. The soil groups associated with this category are Surface water Gleys, Ground water Gleys, both associated with waterlogged soils.

As detailed in **Figure 7.8**, to the south-east of the proposed site a section of cutover peat is noted. The intrusive site investigation revealed that the majority of this peat was removed during the construction of the adjacent road hence this area should probably be reclassified as “imported made ground”. A small portion of the northwest of the site consists of imported made ground also.

The Irish Soil Information System (SIS) project has developed a national association soil map for Ireland at a scale of 1:250,000, together with an associated digital soil information system, providing both spatial and quantitative information on soil types and properties across the country. This resource groups similar soil groups together into 11 soil ‘Great Groups’ and associated ‘Sub-Groups’, allowing for the taxonomical classification of soil types throughout Ireland.

Under the SIS classification system, the soil group assigned to the site is “Urban”.

**Figure 7.8 Irish Soil Information System (SIS) detailing subsoil types underlying the site (Teagasc)**



**7.4.9 Soil Contamination**

A review of the EPA & DCCA website for existing and historic, licensed and illegal waste activities, mines and industries was carried out to identify any potential contamination sources present in the area and to identify any potential contaminating activities near the proposed development. The desk study indicated that no illegal waste activities were present within a 2km radius of the proposed area. The closest IPPC and Waste Licensed Facilities are outlined in **Table 7.7**.

**Table 7.7: Licensed Facilities (EPA Maps)**

Licence Number	Distance from site	Name	Licence Status
P0171-01	1.1 km NW	McCarren & Company Limited	Licensed
P0106-02	1.5 km SE	Kyte Powertech Limited	Licensed
W0207-01	1.6 km W	Cavan Waste Disposal Ltd	Licensed

McCarren & Company Limited operate a meat processing plant. Kyte Powertech Limited manufactures distribution transformers. Cavan Waste Disposal Ltd. Is a waste transfer facility.

Given the distances from the proposed site it is not envisaged that the various licenced and proposed activities will be of detriment to the proposed development.

**Table 7.7: Historical Land Use**

Date	Description
1837-1842	Agricultural Use – No development on-site
1888-1913	Agricultural Use – No development on-site
1995	Agricultural Use – No development on-site – present day road layout not in place.
2000-2003	Agricultural Use – No development on-site – present day road layout not in place.
2013	Hard standing installed – present day road network in place.

The historic maps indicate no obvious sources of contamination based on previous land use within the proposed site.

No previous development has existed previously on the site however a considerable quantity of engineered fill materials were placed along the eastern site boundary during the construction of the L2543 road in the early 2010's. Imported made ground has the potential to introduce contaminated soils into a previously unspoiled greenfield site. As such, 4 no. soil samples were retrieved during the intrusive site investigation within this area of the site:

- **Trial Pit (TP-5)** at 0.6m below ground level; located towards the eastern site boundary.
- **Trial Pit (TP-5)** at 2.6m below ground level; located towards the eastern site boundary.
- **Trial Pit (TP-6)** at 0.9m below ground level; located towards the eastern site boundary.
- **Borehole (BH-8)** at 1.0m below ground level; located towards the eastern site boundary.

These samples were transported to Chemtest, a suitably qualified (UKAS) laboratory in the UK and were scheduled for waste acceptance criteria testing which involves testing the solid sample for contamination and pollutants before disposal in landfills. The full laboratory report for these samples is included in **Appendix 8.5**. The results of these analyses are presented in **Table 7.8**.

All 4 no. samples were classified as inert, and no contaminants with the propensity to cause deterioration to the local environment were identified.

**Table 7.8: Waste Acceptance Criteria (WAC) results for soil samples retrieved during the site investigation.**

Parameter	Rilta Suite, L/S = 10 l/kg, mg/kg				Criteria		
	TP-5 (0.6mbgl)	TP-5 (2.6mbgl)	TP-6 (0.9mbgl)	BH <sup>1</sup> -8 (1.0mbgl)	Inert, mg/kg	Non-Haz, mg/kg	Haz, mg/kg
Arsenic (As)	0.0026	0.0021	<0.0002	<0.0002	0.5	2	25
Barium (Ba)	0.61	0.56	0.46	0.38	20	100	300
Cadmium (Cd)	<0.00011	<0.00011	<0.00011	<0.00011	0.04	1	5
Chromium (Cr)	<0.0005	<0.0005	<0.0005	<0.0005	0.5	10	70
Copper (Cu)	<0.0005	<0.0005	<0.0005	<0.0005	2	50	100
Mercury (Hg)	<0.00005	<0.00005	<0.00005	<0.00005	0.01	0.2	2
Molybdenum (Mo)	0.060	0.031	0.039	0.032	0.5	10	30
Nickel (Ni)	<0.0005	<0.0005	<0.0005	<0.0005	0.4	10	40
Lead (Pb)	<0.0005	<0.0005	<0.0005	<0.0005	0.5	10	50
Antimony (Sb)	0.0070	0.0066	0.0061	0.0061	0.06	0.7	5
Selenium (Se)	0.033	0.023	0.013	0.0096	0.1	0.5	7
Zinc (Zn)	<0.003	<0.003	<0.003	<0.003	4	50	200
Chloride (Cl)	35	13	28	17	800	15000	25000
Fluoride (F)	1.4	1.6	2.7	1.9	10	150	500
Sulphate (SO <sub>4</sub> )	510	460	500	350	1000	20000	50000
Phenol Index	<30	<30	<30	<30	1	-	-
DOC	95	56	<50	50	500	800	1000
TDS	1200	1200	1300	1100	4000	60000	100000
Rilta Suite, mg/kg							
TOC	0.46	0.46	0.44	0.26	30000	50000	60000
Lol	2.1	2.8	2.9	2.4	40000	-	100000
pH	11.3	11.1	11.2	11.2	-	6	-
BTEX	<0.010	<0.010	<0.010	<0.010	6	-	-
PCBs	<0.0010	<0.0010	<0.0010	<0.0010	1	-	-
Mineral Oil	<10	<10	<10	<10	500	-	-
PAHs (17)	<0.20	<0.20	<0.20	<0.20	100	-	-
Inert Non-Compliances	0	0	0	0			
Non-Haz Non-Compliances	0	0	0	0			
Asbestos	Not Detected in sample	Not Detected in sample	Not Detected in sample	Not Detected in sample			
Sample Status	Inert	Inert	Inert	Inert			

**7.4.10 Landslides**

The GSI’s online landslide database indicates there are no historic landslides recorded on the site or within a 2km radius of it.

**7.4.12 Karst Features**

The GSI’s karst database indicates that there are no karst landforms, holy wells or springs recorded in the wider area.

#### 7.4.13 Radon

Radon is a naturally occurring radioactive gas formed by the radioactive decay of uranium and thorium which may be present in varying quantities in rocks, soils and groundwater. Classified by IARC (International agency for research on cancer) as Group 1 - carcinogenic to humans - Radon is second only to smoking as the leading cause of lung cancer. It is estimated that some 250 lung cancer cases each year in Ireland are linked to radon exposure and accounts for more than half of the total radiation dose received by the Irish population (EPA, 2016). The acceptable level, or Reference Level, for homes and schools in Ireland is 200 becquerel per cubic metre (Bq/m<sup>3</sup>). For workplaces the Reference Level is 400 Bq/m<sup>3</sup>

Consultation with the EPA's online Radon Map shows a prediction of the number of homes in a given grid square that exceed the national Reference Level (200 becquerel per cubic metre (Bq/m<sup>3</sup>). Grid squares in which the predicted percentage of homes is 5% or greater are called High Radon Areas.

The EPA's Radon Map shows that the site is located in a Low Radon area, with 5% of houses in the vicinity of the site estimated to have radon levels above the Reference Level.

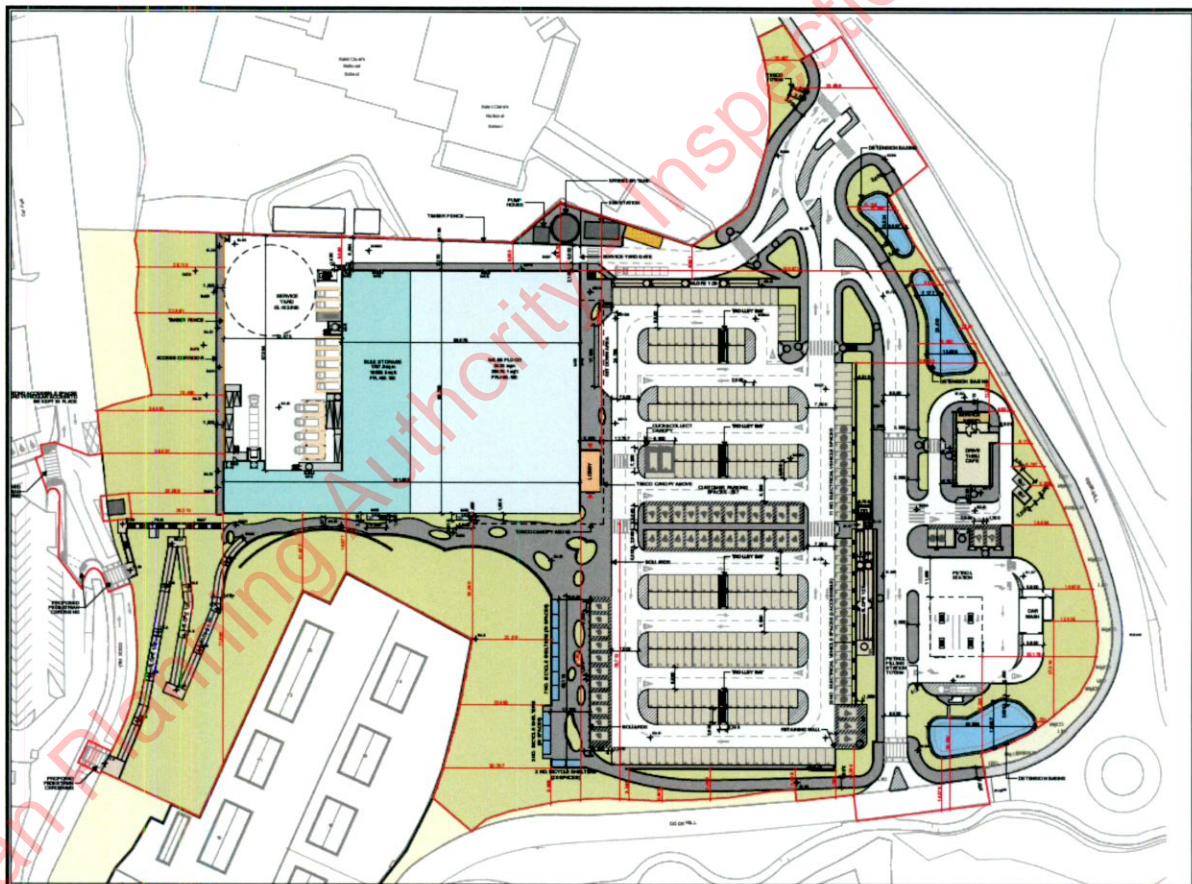
## 7.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to **Chapter 2** for the full description of development.

An extract from the planning drawings can be seen in **Figure 7.9**.

**Figure 7.9 – Extract from Site Plan (Joseph Doyle Architects)**



## 7.6 Predicted Effects of the Proposed Development

The assessment focuses on predicted impacts in relation to soils and geology. The assessment relates to impacts occurring during both the construction and operational phases of the development.

Based on the dataset obtained during the desk study, intrusive site investigation, and anecdotal evidence collected the following risk assessment has been carried out. This identifies the relevant sources, pathways and receptors (pollutant linkages) and assigns a qualitative risk classification of 'Positive, Neutral or Negative/ Adverse' risk to the identified Potential Pollutant Linkages (PPLs).

For a risk from ground contamination to exist, a contaminant source, pathway for migration and viable receptor must exist. The presence of all three of these elements is known as a 'pollutant linkage'.

The likely potential pollutant linkages identified as a result of this assessment and specific for the site have been provided in the initial CSM. The model has been based upon the site setting at the time of the assessment, the land use (current and reasonably foreseen future use) of the surrounding area and the state of what the proposal is (i.e., development, ongoing use, etc.).

As well as identifying the potential pollutant linkages the model includes a preliminary assessment of risk based upon the probability of impact and the likely severity of impact in the context of the site setting and proposed future site use.

The criteria used for the risk assessment classifications as detailed in the EPA guidance notes 2022, and off those presented in *CIRIA Report 552*.

### 7.6.1 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the local soil, geology or geological heritage. The current rate of surface water percolation and run-off would continue to operate in its natural state.

Under the 'Do Nothing' scenario there would be no change to the current land use of the site which would remain as agricultural land.

### 7.6.2 Receptor Sensitivity

The sensitivity of the receptors identified during the study of soil & geological features within the vicinity of the site are summarised in **Table 7.9**.

**Table 7.9 – Receptor Sensitivity**

Receptor	Receptor Importance	Receptor Sensitivity	Rationale
Topsoil	Local Level	Moderate	The local topsoil is deep poorly drained mineral, mainly acidic soils (AminPD) which is in abundance within the vicinity of the development. The soil contains no known pollutants. The soil is of moderate agricultural quality, being a poorly drained 'Gley' subject to waterlogging.
Underlying Deposits	Local Level	Low-Moderate	Given the sites topography the proposed development will involve a considerable amount of civil works to level the site. All drift deposits on site will remain on site and be utilised as infill material.

Bed Rock Geology	County Level	Low	The underlying bedrock consists of Ordovician Metasediments to the east and Dinantian sedimentary rocks to the west. These rock types are in relative abundance within the region and construction activities associated with the proposed development is not envisaged to encounter the bedrock.
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**7.6.3 Sources - Construction Phase**

The construction phase is likely to yield the most potential impacts on the surrounding soil and geology. Potential construction phase impacts are considered in detail below and summarised in **Table 7.10**.

The proposed development requires the process facilities to be constructed at the same site level. Given the sites current topography this will require an extensive volume of earthworks to both cut and fill the site to a level pad upon which the development can be constructed.

**Topsoil Removal**

The initial phase of construction will involve the removal and stockpiling of the topsoil. The pre-construction geotechnical site investigations conducted indicate a topsoil horizon of approximately 0.30m in depth of a deep poorly drained mineral, mainly acidic soils (AminPD). This inert material will be stripped throughout the proposed compound and site access road locations and stockpiled. The method of striping will involve the use of a tracked excavator/ bulldozer along with the use of a wheeled articulated haul truck (Moxy).

Stockpiles in the absence of mitigation measures will be susceptible to erosion by climatic and hydraulic factors. Any excess topsoil will be removed from site and disposed of adequately, for landscaping and infill.

The most significant risk posed by the topsoil excavation is through the migration of silt, clay and other sediment off site through wind and water borne modes of transportation. If incorrectly stockpiled and under specific climatic conditions these sediments can find their way into nearby streams. In significant quantities they can pose a risk to aquatic life and result in a degradation of water quality, as outlined in

**Chapter 8.**

The removal and stockpile of topsoil would result in a **negative, slight and temporary** on soil.

**Site Levelling/ Subsoil Removal**

Given the sites uneven topography a significant layer of subsoil, up to depths of 1.1.5m on current site levels in certain sections, will be excavated to create a level base upon which the proposed development compound will be constructed. A detailed cut and fill rendering of the site is presented in **Appendix 8.2**. During levelling of the site, A total of 9,945.20m<sup>3</sup> of soil material will be cut and infilled into approximately 8,821.73m<sup>3</sup> of void space. This will leave a shortfall of 1,123.47m<sup>3</sup>. Material will be imported to fill this shortfall and mechanical soil compaction will be undertaken to ensure soil stability throughout the site. Excess material will be transported off site for disposal.

The excavation of significant volumes of the subsoil layer will result in an increased risk to the groundwater vulnerability.

The extraction and reduction in the subsoil horizon will have a **negative, slight and temporary effect** on the subsoil horizon.

### **Excavation of Bedrock**

The intrusive site investigation involved the installation of 9 no. Cable percussive boreholes to a maximum depth of 10 mbgl. Bedrock was not encountered in any of the boreholes. Excavation of bedrock is not envisaged during the construction phase of the proposed development hence the risk is described as **not significant**.

### **Contaminated Land**

A wide array of chemicals and materials will be used during the construction of the development. This includes hydrocarbons which can persist in the wider environment for decades.

Hydrocarbon leaks and spills would have a **negative, moderate and short-term** effect on the local soils. Risk mitigated by presence of deep, poorly drained soil.

### **Construction of Built Structures**

The construction of the retail unit will result in the conversion of permeable soils to hard standing surfaces. This sealing/ capping of land has a long-term impact on the underlying soil's structure and function to the wider environment. It reduces the water infiltration to the underlying soil/ bedrock and the alters the structure and functionality of the soil overtime.

The construction of the built structures requires excavations of up to 3m below current ground levels. As is common practice with the construction of foundations a compressed gravel base is required on top of which a concrete blinding is poured. Steel reinforcements will be installed, with shuttering erected around this to facilitate the final concrete pour. Infilling and compaction of excavations around structures is then conducted to ensure structural integrity.

The use of plant and machinery during the construction stage will involve the use of hydrocarbon-based fuels and oils. There is a risk of contamination to soils and eventual percolation to the underlying bedrock. Hydrocarbons should be stored in bunded facilities, and the use of hydrocarbons should be contained to bunded areas with spills cleaned up immediately.

The impact of the construction of built structures would have a **negative, moderate and temporary** effect.

### **Slope Stability**

There is an existing slope declining from the adjacent residential development toward the southwest of the site. The slope will be dressed with excavated topsoil from the site and planted with vegetation to ensure stability and safeguard against erosion.



This will have a **negative, moderate and temporary effect**.

**Impacts on Local Designated Sites**

A hydraulic linkage exists between Lough Oughter and Associated Loughs SAC/SPA AND pNHA, located ca. 3.5km north west of the site. The protection objectives associated with this receptor only 1 no. receptor (bog woodland) is relevant to soils.

A total of 4 no. Geological Heritage Areas are located within the vicinity of the site as follows: Crossdoney Granite Quarry; Cormeen Quarry; Mid-Cavan Drumlinised Ribbed Moraines; and Drumcarban. None of these features are located within 5km of the proposed development.

The potential impact to designated sites and geological heritage sites is deemed to be not significant.

**Table 7.10 – Severity/ Magnitude of Impact during construction phase**

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Topsoil	Topsoil Removal	Negative	Slight/ Moderate	Temporary
	Slope Stability	Neutral	Moderate	Temporary
	Contaminated Land	Negative	Moderate	Short-term
Underlying Deposits/ Subsoil	Construction of Built Structures	Negative	Moderate	Long-term
	Subsoil Removal/ Site Leveling	Negative	Moderate	Permanent
	Impacts on Local Designated Sites	Not Significant		
Bed Rock Geology	Excavation of Bedrock	Not significant		
	Impacts on Local Designated Sites	Not Significant		

**7.6.4 Sources - Operational Phase**

The operational phase effects anticipated and considered throughout the lifetime of the operation of the facility are considered below and summarised in **Table 7.11**.

It is not envisaged that there will be many potential sources of effects to soil, land or geology during the operation of the plant.

**Slope Stability**

There will be a slope of significant gradient declining from the retail unit to the west of the site, entering the public realm, connecting the site to Cavan Town.

This will have a **negative, slight and long-term effect**.

**Table 7.11 – Severity/ Magnitude of Impact during construction phase**

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Topsoil	Slope Stability	Negative	Slight	Long-Term

Cavan Planning Authority - Inspection Purposes Only!

## 7.7 Mitigation Measures

This section highlights the mitigation measures proposed for the operation and construction stages of the proposed development to mitigate potential impacts to the near and wider environment.

### 7.7.1 Construction Phase

#### General Mitigation Measures

A Construction Environmental Management Plan will be prepared and implemented by the main contractor during the construction phase. This is a practical document which will include detailed procedures to address the main potential environmental impacts on site, encompassing soil, geology, noise, dust, air quality, surface and ground water, and highlights the proposed construction methods, activities and procedures.

#### Topsoil Removal

The removal of topsoil is part of the first stage of the construction process. The initial phase will involve the stripping and stockpiling of the topsoil layer. This material will be reused on site as far as possible during the landscaping stage to remediate slopes and soils within the vicinity of the site, including the buffer zone.

Stockpiles in the absence of mitigation measures will be susceptible to erosion by climatic and hydraulic factors. Excavated material will be stockpiled and earthen banks constructed of soil will be erected around stockpiles to contain/ reduce any sediment run-off during times of inclement weather. Compacting of stockpiles with the back of an excavator's bucket will reduce the rate of airborne and hydraulic erosion. Driving machinery on topsoil stockpiles is not advised as it damages the soil structure, reduces porosity, and subsequent percolation rates, and can result in 'smearing' of the soil surface, which prevents water infiltration into the soil. Any excess topsoil will be removed from site and disposed of adequately, by land spreading.

To summarise the mitigation measures:

- Stockpiling and slight compaction of stockpiles to minimise both hydraulic and climatic erosion
- Construction of earthen banks around bunds to contain sediment run-off.
- Minimise the export of topsoil off site by incorporating in the final landscape design.
- Minimise handling of material to maintain optimum soil structure
- Landscaping to take place as soon as possible to reduce weathering.

#### Excavations

As with all greenfield site construction projects, civil earthworks are the first stage of the construction process. Excavation work to set the site levels, foundation, drainage and buried utilities is essential in facilitating the construction of the built structures. Excavation work will be conducted in stages to minimise the exposure of unprotected soil, subsoil and bedrock.

Significant volumes of the subsoil will be excavated on site to achieve a level finished floor level.

Temporary excavations which are required for the installation of building foundations and buried networks will be excavated and backfilled within as short a timeframe as possible to minimise exposure of surfaces to erosion. Excavation stability is important and deep excavations will employ the use of shoring equipment to ensure excavation wall stability.

To summarise the following measures will help mitigate the impacts during excavation:

- Stockpiling material in appropriate locations, away from water sources, with an earthen soil bank surrounding it to retard the rate of erosion from hydraulic conditions.
- Compacting of stockpiles with the back of an excavator's bucket to minimise the rate of erosion from climatic methods.
- Stockpile heights should be kept to a minimum to ensure stockpile stability and minimise wind borne erosion.
- Excavations will be postponed in high rainfall conditions to reduce the risk of excavation collapse and erosion to soil and subsoil profiles.
- If extreme weather conditions are forecast high sediment stockpiles will be covered to minimise erosion.
- Excavations to be backfilled as soon as possible to prevent any infiltration of contaminants to the subsurface and bedrock.

Heavy tracked and wheeled construction vehicles will be in use throughout various stages of the construction process on the site. The subsoil on the site is already noted as being compacted with a crumble structure. To reduce compaction of this layer during construction the following mitigation measures will be undertaken:

- Construction of a hardcore gravel access road on and around the site.
- Confine site traffic to designated routes.
- Minimise traffic flows on site and establish a construction stage parking compound.
- Avoid the use of oversized machinery when and where possible.
- Prevent movement of vehicles on site during and after periods of rainfall.

### **Construction Contaminants**

A wide array of chemicals and materials will be used during the construction of the development. This includes highly environmentally damaging hydrocarbons which persist in the wider environment for decades. To mitigate the exposure of the surrounding soil and geology to these substances it is proposed to undertake the following:

- Fuels, oils and other environmental deleterious chemicals are to be stored in a bunded well ventilated container.
- Use of such chemicals and fuels is to be contained to bunded areas, where possible.
- Any spills or leaks to the soil is to be immediately contained and the soil in question is to be removed and disposed of in a registered facility

- Oil spill containment kits are to be situated near areas of potential spills

### **Slope Stability**

The points identified to optimise the stability of the slope to the west of the proposed compound are outlined as follows:

- Slopes are to be dressed in topsoil recovered during the initial site stripping stage and planted with a vegetative cover to bind the soil and improve slope stability.
- All temporary excavations will be conducted in a safe manner to ensure sidewall stability and prevent collapse of excavations. Mobile shoring equipment will be utilised to this end where required.

### **Excavation of Contaminated Soils**

Rigorous soil testing conducted at the site did not detect the presence of contaminated soils throughout the site. All material was classified as inert with no elevated contaminant levels recorded and no asbestos traces detected following Waste Acceptance Criteria (WAC) testing.

During construction, all excavated materials will be visually assessed for contamination. Any contaminated material detected will be sent for analysis to a suitable environmental laboratory and subsequently quantified, segregated and transported for disposal by a licenced contractor.

## **7.7.2 Operational Phase**

### **General Mitigation Measures**

The aim of the proposed sustainable drainage system is to replicate the natural characteristics of the greenfield runoff minimising the environmental impact. SuDS are designed to manage water quantity, reducing/prevent the likelihood of flooding from the proposed development and to maximise opportunities and benefits from surface water management.

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) in accordance with the guidelines of the GDSDS, and the SuDS Manual Ciria C753.

Based on the above guidance documents, as part of the surface water drainage proposal, several SuDS measures have been provided to treat surface water runoff, to replicate the natural characteristics of the greenfield runoff and minimise the environmental impact. The SuDS measures included within the proposal for the site are as follow.

- Stone media at the location of the underground attenuation tank systems
- Filter drains along road verges
- Tree-pits at Localised tree locations
- Petrol Interceptors to treat the surface water runoff prior discharging to the public sewerage network.

### **Slope Stability**

The slope into the public realm will be built in accordance with Part M of the Building Regulations, providing safe access and egress to all potential users.

This area will be blended into the landscape via planting, landscaping and installation of pathways, thus improving the public realm and connectivity to Cavan Town centre to the West, encouraging active modes of transport and pedestrian access.

This will have a **positive, moderate, long-term effect**.

### **7.8 Monitoring**

Monitoring of ground and soil conditions during the construction or operational phases of the proposed development is not considered necessary as no significant impacts are expected during either phase.

## 7.9 Residual Effects

According to Environmental Protection Agency guidelines, Residual Impact is described as ‘the degree of environmental change that will occur after the proposed mitigation measures have taken place.’ The mitigation strategy above recommends actions which can be taken to reduce or offset the scale, significance, and duration of the impacts on the surrounding hydrological and hydrogeological features.

The purpose of this assessment is to specify mitigation measures where appropriate to minimise the ‘risk factor’ to all aspects of the water environment such as to minimize the potential for hydrocarbons to contaminate the streams or groundwater, reduce the risk of erosion and run-off, etc. This ‘risk factor’ is reduced or offset by recommending the implementation of a mitigation strategy in each area of the study. On the implementation of this mitigation strategy, the potential for impact will be lessened.

A site-specific Construction Environmental Management Plan (CEMP) will be devised and implemented throughout the duration of the construction phase. This document will contain all the necessary procedures required to prevent and minimise any environmental risks posed by the project on the surrounding environment.

### 7.9.1 Construction Phase

A summary of the predicted impacts associated with the construction phase in terms of quality, significance, and duration, along with the proposed mitigation measures and resulting residual impacts are summarised in **Table 7.12**.

The overall impact anticipated by the construction phase of the project following the implementation of suitable mitigation measures is considered to be **neutral to negative, imperceptible to slight, and temporary**.

### 7.9.2 Operational Phase

A summary of the predicted impacts associated with the operational phase in terms of quality, significance, and duration, along with the proposed mitigation measures and resulting residual impacts are summarised in **Table 7.13**.

The overall impact anticipated by the operational phase of the project following the implementation of suitable mitigation measures is considered to be **neutral to positive, slight to moderate and long-term**.

Table 7.12: Summary of predicted construction phase impacts, mitigation measures and residual impact

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
<b>Topsoil Removal</b>	Topsoil Soil structure, soil microorganism population, adjacent waterways	Erosion of stockpiles of exposed soils leading to migration of silt into surface water receptors via dust and run-off. Damage to soil structure	<b>Negative</b>	<b>Slight</b>	<b>Temporary</b>	<ul style="list-style-type: none"> <li>Stockpiling and slight compaction of stockpiles to minimise both hydraulic and climatic erosion</li> <li>Construction of earthen banks around bunds to contain sediment run-off.</li> <li>Minimise the export of topsoil off site by incorporating in the final landscape design.</li> <li>Minimise handling of material to maintain optimum soil structure</li> <li>Landscaping to take place as soon as possible to reduce weathering</li> <li>Running stockpiles in direction of prevailing wind, SW-NE, to reduce windborne erosion</li> <li>Minimise handling of material</li> <li>Keep stockpile heights low to minimise compaction &amp; windborne erosion</li> </ul>	<b>Negative, Slight, Temporary</b>
<b>Excavations/ Subsoil Removal</b>	Subsoil Bedrock	Subsoil, up to depths of 1 - 1.5m on current site levels in certain sections, will be excavated to create a level base upon which the proposed development compound will be constructed	<b>Negative</b>	<b>Moderate</b>	<b>Permanent</b>	<ul style="list-style-type: none"> <li>Stockpiling material in appropriate locations, away from water sources, with an earthen soil bund surrounding it to retard the rate of erosion from hydraulic conditions.</li> <li>Installation of a geotextile, impermeable liner beneath the process area. Early installation of this liner will also protect the underlying groundwater body during the construction phase.</li> <li>Compacting of stockpiles to minimise the rate of erosion from airborne and hydrological methods.</li> <li>Stockpile heights should be kept to a minimum to ensure stockpile stability and minimise wind borne erosion.</li> <li>Excavations will be postponed in high rainfall conditions to reduce the risk of excavation collapse and erosion to soil and subsoil profiles.</li> </ul>	<b>Neutral, Significant, Permanent</b>



Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
<b>Construction of Built Structures</b>	Topsoil, Subsoil & Bedrock	Conversion of permeable soil into hard standing. Compaction of soil & subsoil from plant machinery Contamination of subsoil & bedrock from hydrocarbons, concrete, etc.	<b>Negative</b>	<b>Moderate</b>	<b>Temporary</b>	<ul style="list-style-type: none"> <li>If extreme weather conditions are forecast high sediment stockpiles will be covered to minimise erosion.</li> <li>Excavations to be backfilled as soon as possible to prevent any infiltration of contaminants to the subsurface and bedrock.</li> <li>Excavate and backfill temporary excavations within a short timeframe to minimise exposure to erosion and contamination</li> <li>Installation of silt fencing to capture hydraulic erosion</li> <li>Risk of contaminating underlying exposed material 'naturally' mitigated by the presence of the low permeability subsoil throughout the site</li> <li>Risk 'naturally' mitigated by the presence of a thick layer of low permeability subsoil throughout the site</li> <li>Construction of access roads to confine plant machinery to designated routes</li> <li>Construction of site car park to reduce traffic and compaction on site</li> <li>Chemicals/ hydrocarbons to be stored and used in bunded areas.</li> <li>Spill kits to be located throughout site</li> <li>Scheduling and use of ready mixed concrete on site</li> </ul>	<b>Negative, Slight, Temporary</b>
<b>Slope Stability</b>	Subsoil	Slope failure	<b>Neutral</b>	<b>Moderate</b>	<b>Temporary</b>	<ul style="list-style-type: none"> <li>Excavations to be backfilled as soon as possible to prevent embankment failures</li> <li>Shoring of excavations to be conducted</li> <li>Slopes to be dressed with topsoil and seeded down to increase soil stability</li> <li>Slopes to have a 1:2 ratio</li> </ul>	<b>Neutral, Slight, Permanent</b>

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
<b>Contaminated Land</b>	Topsoil, Subsoil & Bedrock	Excavated materials, intended to be reused on-site for landscaping purposes.  Potential for soils to contain contaminants from accidental spillages or legacy contamination and leach into surface water receptors	<b>Negative</b>	<b>Significant</b>	<b>Short-term</b>	<ul style="list-style-type: none"> <li>Greenfield site with no previous industrial activities noted at the site meaning incidences of contaminated land unlikely</li> <li>Site investigations reinforce this assumption</li> <li>Procedure in place for incidence of contaminated land within CEMP</li> <li>Contaminated soils encountered to be tested, quantified, segregated and transported for disposal by a licenced contractor</li> <li>Risk 'naturally' mitigated by the presence of a thick layer of low permeability subsoil throughout the site</li> </ul>	<b>Negative, Slight to moderate, Short-term</b>

Table 7.13: Summary of predicted construction phase impacts, mitigation measures and residual impact

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Slope Stability	Subsoil	Slope failure	Negative	Slight	Long-Term	<ul style="list-style-type: none"> <li>The slope into the public realm will be built in accordance with Part M of the Building Regulations, providing safe access and egress to all potential users. Shoring of excavations to be conducted.</li> <li>This area will be blended into the landscape via planting, landscaping and installation of pathways, thus improving the public realm and connectivity to Cavan Town centre to the West, encouraging active modes of transport and pedestrian access.</li> <li>Slopes to be dressed with topsoil and seeded down to increase soil stability</li> <li>Slopes to have a 1:2 ratio</li> </ul>	Positive, Moderate, Long-Term

### 7.9.3 Summary of Significant Effects

Impacts to shallow soils, the underlying drift, bedrock geology posed by the proposed development are not anticipated to be significant. Whilst the development proposals have the potential to cause detriment to the sensitive receptors identified, the recommended mitigation measures will ensure that the risk of potential impacts are reduced to **negligible** and in one case **positive** with respect to the upgrade to the public realm.

### 7.9.4 Statement of Significance

The significance of impact upon shallow soils, drift deposits, and bedrock geology have been assessed for both during the construction and operational phases. The results of the assessment are presented on **Table 7.12** and **Table 7.13**.

Where a potential impact has been identified, the significance of impact upon these receptors ranges from **slight** to **moderate**. Where a potential impact has been identified, mitigation measures have been provided which if implemented reduces the impact of significance to **negligible**.

## 7.10 Reinstatement

Not Applicable.

## 7.11 Interactions and Potential Cumulative Effects

### 7.11.1 Interactions

Local soil and geology conditions interact with other environmental attributes as follows:

- Hydrology & Hydrogeology (Chapter 8) - Stockpiling of dry, loose sediments can lead to entrainment of sediments into water bodies.
- Biodiversity (Chapter 9) – Impacts to ecological receptors, similar to that of impacts to rock / soil features. Wind conditions can have an influence of the dispersion of any contaminants or emissions generated as a result of the proposed development.

### 7.11.2 Cumulative Effects

The cumulative assessment is concerned with the potential effects of the proposed development, in combination with any other projects or plans that are likely to be associated with the receiving environment to the proposed development, or that are likely to occur in the foreseeable future.

In terms of future projected projects, there are 4 no. proposed developments set within the vicinity of the proposed development likely to commence during the project construction phase, as summarised in **Table 7.14**. Given the relatively minor scale of these developments, any cumulative impacts are anticipated to be **Negative, Not Significant, Temporary**.

**Table 7.14. Proposed Developments within the site vicinity**

Reg. Ref.	Location	Description of Development	Decision	Distance	Anticipated Cumulative Effect
CCC Reg. Ref. 21528	Aghnaskerry, Co. Cavan	Demolish existing derelict dwelling house and erect 26 no. 3-bed semi-detached dwellings	Permission Granted by CCC 26/05/2022  Subject of current appeal with ABP	ca. 317m NE	<b>Negative, Not Significant, Temporary</b>
CCC Reg. Ref. 2163	Gaelscoil Bhrefine Tullymongan Lower and Aghnaskerry, Cavan	Single storey extension to existing school, alterations to site layout with a new access via service road	Permission Granted by CCC 21/05/2022  Development commenced 08/07/2021	ca. 180m N	<b>Negative, Not Significant, Temporary</b>
CCC Reg. Ref. 20145	Aghnaskerry, Tullymongan Lower, Cavan	Change of use of existing dwelling to pre/after school care facility with associated alterations to elevations, outdoor play area and pedestrian path access from adjoining Gaelscoil Bhrefine	Permission Granted by CCC 22/10/2021	ca. 180m N	<b>Negative, Not Significant, Temporary</b>
CCC Reg. Ref. 20376	Gaelscoil Bhrefine Tullymongan Lower and Aghnaskerry, Cavan	Construct new roadway and entrance junction along the L2543 Cavan Town Eastern Access Road/ Cock Hill Road, alterations to existing public roadway to include new right turn lane and footpath, safety barrier, public playground area, pathways, public lighting, landscaping, boundary treatments and all ancillary site works	Permission Granted by CCC 03/03/2021	Adjacent to the site boundary to the NE	<b>Negative, Not Significant, Temporary</b>
CCC Reg. Ref. 18141	Tullymongan Lower, Cavan, Co. Cavan	Change of use of existing residential convent building to educational school building	Permission Granted by CCC 18/08/2018  Development commenced 08/07/2021	ca. 180m N	<b>Negative, Not Significant, Temporary</b>

## 8.0 Hydrology & Hydrogeology

### 8.1 Introduction

This chapter comprises an assessment of the hydrological and hydrogeological environment (collectively known as the water environment) within the site and the surrounding environs. The potential effects posed by the construction and operational phases of the proposed development are investigated, and suitable mitigation measures are recommended to minimise effects on the local water receptors.

In terms of Environmental Impact Assessment (EIA):

- “Hydrology” is the study of surface water features.
- “Hydrogeology” is the study of groundwater features.

The objectives of this chapter are.

- To provide a baseline assessment of the receiving water environment in terms of surface water (hydrological) and groundwater (hydrogeological) receptors.
- To identify any potential negative effects posed by the construction and operational phases of the proposed development.
- To propose suitable mitigation measures to prevent or reduce the significance of the negative effects identified.
- To consider any significant residual effects of cumulative effects posed by the proposed development.

### 8.2 Consultation

ORS have been commissioned to assess the potential impacts of the proposed development in terms of hydrology and hydrogeology during the construction and operational phases.

The principal members of the ORS EIA team involved in this assessment include the following persons:

- **Project Scientist & Co-Author:**  
Cathal Tighe – B.Agr.Sc (Agricultural-Environmental Science). Current Role: Environmental Consultant. Experience ca. 4 years
- **Project Manager & Lead Author:**  
Luke Martin - B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 10 years.
- **Project Scientist & Reviewer:**  
Alan Kiernan - BEnvSc, P.G.Dip Env Engineering, MCIWEM. Current Role: Associate Environmental Consultant. Experience ca. 20 years.

Consultation between ORS and other members of the planning/design team was made in order to obtain information required to assess the potential construction and operational phase impacts on local hydrology and hydrogeology. Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

### 8.3 Legislation, Policy and Guidance

The methodology used to produce this chapter included a review of relevant legislation and guidance, a desk study, a site walkover, an evaluation of potential effects, an evaluation of significance of the effect and an identification of measures to avoid and mitigate effects.

#### 8.3.1 Legislation, Policy and Guidance

This chapter was carried out in accordance with the following guidance documents:

- EPA, (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EPA, (2004). Land spreading of Organic Waste – Guidance on Groundwater Vulnerability Assessment of Land.
- European Commission, (2017). Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report.
- Institute of Geologists Ireland, (2013). Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements.
- NRA, (2008). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- CIRIA, (2001). C532 - Control of Water Pollution from Construction Sites – Guidance for consultants and contractors.

#### 8.3.2 Desktop Study

A desk-based assessment method was used to assess baseline water quality for the receiving environment of the proposed site. The baseline information that is detailed in this section of the assessment was obtained from publicly available information.

The following documents and sources were referenced;

- Aquifer classification and vulnerability identification from the Geological Survey of Ireland (GSI web page)
- Search of GSI and Cavan County Council files to determine the location of groundwater wells within a 2km radius
- 1:50,000 Discovery Series Maps and 6" maps
- Water Quality in Ireland 2010-2015 (EPA)
- Water Quality in Ireland 2013-2018 (EPA)
- North western – Neagh Bann CFRAM Study UoM 36 Hydrology Report (OPW)
- Other Maps and plans published by the Ordnance Survey of Ireland (OSI)



- Meteorological data from Met Eireann and hydrometric data from the Office of Public Works (OPW)
- Cavan County Development Plan (2022 – 2028)
- Reports, maps and data published by the Geological Survey of Ireland (GSI) and the National Soil Survey of Ireland
- General Soil Map of Ireland 2nd Edition, (1980), The National Soil Survey, An Fóras Taluntais
- Reports, maps and data published by the Environmental Protection Agency (EPA).
- UK CIRIA report C552 (2001). (Contaminated Land Risk Assessment: A Guide to Good Practice.
- IFI (2016), Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Watercourses;
- OPW and DoEHLG (2009), The Planning System and Flood Risk Management - Guidelines for Planning Authorities.
- EPA (2022), River Quality Surveys: Biological - Hydrometric Area 07
- Irish Water (2021), Annual Environmental Report – Cavan Town – D0020-01
- Engineers Planning Report, Pinnacle Consulting Engineers

### 8.3.3 Site Investigation

Fieldwork commissioned by Pinnacle Consulting Engineers in July 2022 consisted of the following elements:

- Cable Percussion Borehole Installation
- Trial Pit Excavations
- Plate Load Tests
- Groundwater Monitoring
- Gas Monitoring
- Geotechnical Laboratory Testing
- Environmental Laboratory Testing

### 8.3.4 Impact Assessment Methodology

The impact assessment rationale outlined in the 2022 EPA Guidelines will be applied to each chapter of the study. This section describes some further criteria applied to the assessment of soil and geological receptors.

#### Hydrological and Hydrogeological Receptor Criteria

The level of sensitivity of hydrological and hydrogeological receptors are based on a number of factors which are summarised in **Table 8.1**.

**Table 8.1: Criteria for rating importance of hydrological and hydrogeological attributes (NRA, 2008)**

Importance	Criteria	Receptors	
		Hydrological	Hydrogeological
<b>Extreme</b>	Attribute has a high quality or value on an international scale	River, wetland, or surface water body ecosystem protected by EU legislation	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
<b>Very High</b>	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes. Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for wide range of leisure activities.	Regionally Important Aquifer with multiple wellfields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source
<b>High</b>	Attribute has a high quality or value on a local scale	Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities	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
<b>Medium</b>	Attribute has a medium quality or value on a local scale	Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
<b>Low</b>	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding	Poor Bedrock Aquifer Potable water source supplying <50 homes

**River Water Quality Assessment Criteria**

Under the Water Framework Directive and SI 722 of 2003 European Communities (Water Policy) Regulations, the EPA carries out water quality assessments of rivers, transitional and coastal water bodies as part of a nationwide monitoring programme. Data is collected from physico-chemical and biological surveys, sampling both river water and the benthic substrate (sediment). **Table 8.2** summarises the quality classes used to assess the condition of rivers throughout the country.

**Table 8.2: Biotic Indices Classification for River Water Quality**

Biotic Indices	Community Diversity	Quality	Condition	Quality Status	Quality Class
Q5	High	Good	Satisfactory	Unpolluted	Class A
Q4	Reduced	Fair	Satisfactory	Slightly Polluted - Unpolluted	Class B-A
Q3	Low	Doubtful	Unsatisfactory	Moderately – Slightly Polluted	Class C-B
Q2	Very Low	Poor	Unsatisfactory	Seriously – Moderately Polluted	Class C-D
Q1	Little/None	Bad	Unsatisfactory	Seriously Polluted	Class D

'Biotic Indices' or Quality (Q) Values are indicative of specified groups of macro-invertebrates' sensitivity to pollution. Q-Values are assigned to a waterbody based on the presence or absence of particular species with the Q5 biotic index indicating the least polluted waters and the Q1 biotic index indicating the most polluted waters.

'Quality Class' relates to the potential beneficial use of a water body as summarised in **Table 8.3**.

**Table 8.3: Quality Class Descriptions**

Quality Class	Description	BOD (mg/l)	Orthophosphate (mg/l)	Dissolved Oxygen (% Sat)
A	Highest water quality with very high amenity value Suitable for abstraction Suitable for game fisheries	<3	~0.015	~100%
B	Variable water quality with considerable amenity value Potential abstraction issues Game fish 'At Risk'	Occasionally exceeds 3mg/l	~0.045	<80% or >120%
C	Doubtful Water Quality with reduced amenity value Advanced Treatment of abstracted water required Coarse fisheries – Fish kills likely	Regularly Exceeds 3mg/l	~0.070	v. unstable
D	Poor to bad water quality with no amenity value Low grade & limited abstraction Fish absent	Levels regularly far in exceedance of 3mg/l	>0.1	Low, approaching 0%

### **Groundwater Vulnerability Assessment Criteria**

Groundwater Vulnerability is a term used to represent the intrinsic geological and hydro geological characteristics that determine the ease with which groundwater may be contaminated by human activities. It is usually dependent on the nature (sandy, gravelly, clay, etc..) and depth of soil/subsoil overlying an aquifer (i.e., its shallowness). The travel time, attenuation capacity of the subsoils (i.e., ability to filter contaminants) and the nature of the contaminants are also important elements in determining the vulnerability of groundwater.

In the context of groundwater protection, Groundwater Vulnerability is the most important factor in determining control measures in areas where potentially hazardous discharge to groundwater might

take place. This is because the type, permeability and thickness of the soil and subsoil play a critical role in preventing groundwater contamination by acting as a protecting filtering layer over the groundwater.

The extent of site investigation works required to accurately assess the groundwater vulnerability at a site is determined by the sensitivity of hydrogeological receptors within the site vicinity. The extent of sampling requirements as defined by the hydrogeological sensitivity of the site is defined in **Table 8.4**.

**Table 8.4: Summary of Sampling Requirements**

<b>Ground Water Protection Scheme (GWPS) exists</b>	<b>Vulnerability</b>	<b>Sampling Requirements</b>
	LOW	Simple walkover survey to confirm what has been established in the GWPS, i.e., no evidence of outcrop, depth to bedrock information from wells, etc. <sup>1</sup>
	MEDIUM	
	HIGH	If walkover survey indicates that the lands do not have sufficient thickness of subsoil (i.e. rock outcrops) then site specific information may be required.
	EXTREME <sup>2</sup>	Regionally Important Aquifers - Prove that 2m depth of soil/subsoil cover exists. Minimum of 1 data point per hectare is required.
Locally Important and Poor Aquifers – Prove that 1m depth of soil/subsoil cover exists. Minimum of 1 data point per 5 hectares is required.		
<b>Ground Water Protection Scheme (GWPS) does not exist</b>	<b>Aquifer Type</b>	<b>Sampling Requirements</b>
	Locally Important / Poor Aquifers	Prove that 1m depth of soil/subsoil cover exists. Minimum of 1 data point per 5 hectares is required. Site investigation points can be based on existing information. New information only required where existing information is insufficient.
	Regionally Important Aquifers	Prove that 2m depth of soil/subsoil cover exists. Minimum of 1 data point per hectare is required. Site investigation points can be based on existing information. New information only required where existing information is insufficient.
<b>Source Protection Areas<sup>3</sup></b>	<b>Source Protection Zone</b>	<b>Sampling Requirements</b>
	Outer	A minimum thickness of 3m of subsoil should be demonstrated at a minimum depth to rock data point frequency of one point per hectare.
	Inner	It is not generally acceptable to land-spread unless there is no alternative area available and that the area has been defined as having moderate vulnerability (i.e. > 10m of moderate permeability subsoil or > 5m of low permeability subsoil) overlying the aquifer. The depth to rock should be demonstrated at a minimum frequency of one point per hectare.

<sup>1</sup> The classification to Low / Medium / High class as part of GWPS indicates that minimum of 3m soil/subsoil depth can be anticipated

<sup>2</sup> To give a rough picture of "extreme vulnerability" areas we can use: GSI Outcrop data & Teagasc Shallow Rock data

<sup>3</sup> In general land-spreading of organic wastes should not be carried out within the source protection area (SPA) of a water supply. However, there are cases where if the subsoil is sufficiently thick it may be deemed acceptable subject to conditions

## 8.4 Receiving Environment

### 8.4.1 Background

This section of the chapter provides the baseline information in relation to geology, hydrogeology and hydrology that exists in the vicinity of the proposed development. The subject site occupies a total area of approximately 4.126 hectares and is situated at Tullymongan Lower, Cavan Town, Co. Cavan.

The underlying geology has a major influence on topographical, hydrogeological and hydrological features within the site vicinity, hence this chapter is closely linked to the previous chapter (Chapter 7 – Land Soils & Geology).

The receiving environment is described below for the proposed development under the following headings:

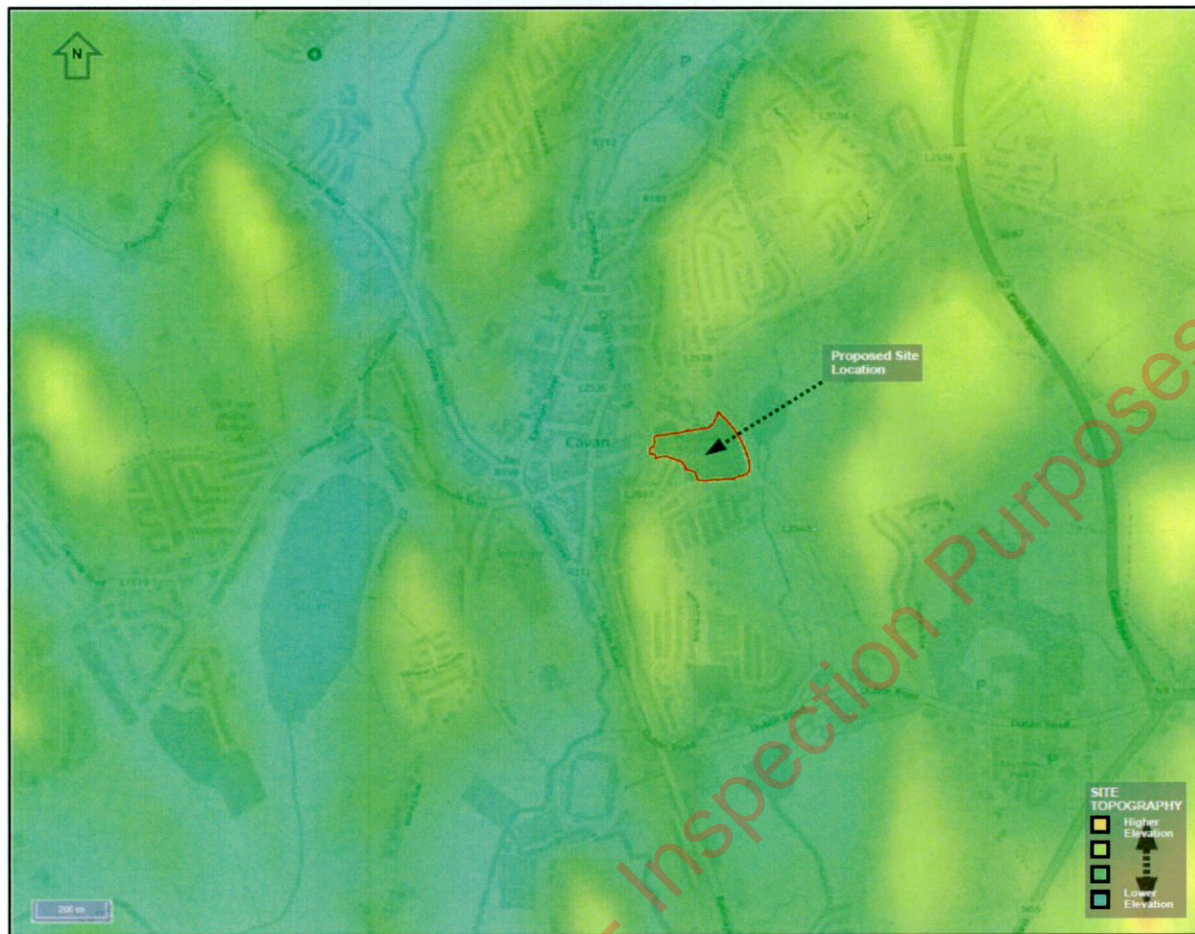
- Topography
- Drift (Quaternary) Geology
- Bedrock Geology
- Hydrology
- Hydrogeology

### 8.4.2 Topography

The regional topography of Co. Cavan consists predominantly of mountains, lakes and large-scale glacial deposition features. The county has been heavily influenced by the movement of glacial ice sheets from the last ice-age. This has resulted in the formation of depositional features including ribbed moraines, crag-and-tails and drumlins throughout the county which has given it its characteristic “basket of eggs” topography. The elevation in the county ranges from 51m to 667m above sea level. The area is dominated by the Cuilcagh-Anierin Uplands, Slieve Rushen and Boleybrack Mountains. The topography in which Cavan Town is set in is unique in that it forms part of the largest field of ribbed moraines found anywhere in the world. The moraines are up to 1-2 km long with widths of up to 500m. Superimposed onto these is Drumlins with lengths of 500m and widths of 100-200m, according to Geological Survey of Ireland (GSI) reports.

The local landscape of Cavan Town Centre consists of an undulating topography with many rises and falls, shaped principally by several drumlins interspersed with the Cavan River which flows from south to north through the town, and Swellan Lough located towards the southwest of the town, as depicted in **Figure 8.1**, overleaf.

Figure 8.1: Topographical map of the landscape surrounding the site (topographic-map.com)



#### 8.4.3 Drift Geology

Drift is a general term applied to all mineral material (clay, silt, sand, gravel and boulders) transported by a glacier and deposited directly by or from the ice or as fluvio-glacial deposits deposited by water from the ice. It generally applies to deposits laid down during the Pleistocene (Quaternary) glaciations. Drift can also be included under Holocene (Quaternary) deposits. The drift geology of the area principally reflects the depositional process of the last glaciation. Typically, during the ice advance, boulder clays were deposited subglacially as lodgement till over the eroded rock head surface, whilst moraine granular deposits were laid down at the glacier margins. Subsequently, with the progressive retreat of the ice sheet from the region, granular fluvio-glacial deposits were laid down in places by melt waters discharging from the front of the glacier.

The proposed site is located within the Lakeland area in central and west County Cavan characterised by its lakes, drumlins and Bruse Hill to the east with elevations from 51m to 200m above ground. The National Soil Survey of Ireland Map indicates the region as comprising of Gleys, Acid Brown Earths and Grey Brown Podzolics with Inter-drumlin Peat/ Peaty Gleys along with some Alluvial soils throughout. Overall, the region has 'heavy' soils which require drainage to improve their agricultural potential. The landscape is rolling consisting of drumlins with lengths of up to 500m, widths of 100-200m and rising

35-50m vertically which has resulted in a steep to undulating landscape. The slopes are generally negotiable by machinery however some areas are too steep for cultivation.

EPA Soils Classification maps identify the subject site as comprising three known soil types. The vast majority of the site consists of a mineral poorly drained (AminPD) classified as till derived chiefly from Lower Palaeozoic rocks consisting of sandstones and shales. To the west is the town-core which is classed as Made Ground, with a strip of land running along the east of the site consisting of basin or blanket cut Peat, according to the online database. To the south of the site is a mineral poorly drained (AminPD) till derived chiefly from Namurian rocks.

In view of the proposed development, the soils which are likely to be affected by the development represent a less significant resource in a local and regional context as such soils occur in abundance in the area.

#### 8.4.4 Bedrock Geology

Bedrock is defined as a consolidated aggregate of minerals underlying the ground surface and any soils present. Above the bedrock is usually an area of broken and weathered unconsolidated rock in the basal subsoil. Sedimentary rock lies in beds which may comprise different rock types and which may be horizontal or inclined, so that the rock encountered at the ground surface may change over a short distance.

According to the Geological Survey of Ireland and the National Draft Generalised Bedrock Map, the site is located on an unconformity with the underlying and surrounding bedrock consisting of Ordovician and Dinantian series. The former strata date from the mid Ordovician period known as the Caradoc with the sediments described as greywacke, microconglomerate and argillite and are known as the Red Island Formation with the majority of the site situated over this formation. The newer Dinantian series dates from the early Courcayan period with two formations situated at the site, the Fearnaght and Cooldaragh. An area in the centre and northwest of the site is located on the Fearnaght formation which is described as a pale conglomerate & red sandstone. The Cooldaragh formation is situated to the west of this, and accounts for a very small area of the site with the proposed access ramp and stairs to the town core to overlay this formation. Its characterised as a pale brown-grey flaggy, silty mudstone.

The GSI 1:1,000,000 Bedrock Solid Geology Map describes the greywacke, microconglomerate and argillite parent material of the Red Island Formation as green to greenish-grey medium or coarse grained, locally conglomeratic, volcanoclastic greywacke, with subordinate grey to greyish black shales. Greywackes are quartz poor, contain andesitic fragments, lithic detritus and accessory blueschi. The parent material of the Fearnaght formation, pale conglomerate & red sandstone, is described as being composed of cream coloured quartz-pebble conglomerate with a sandy matrix, subarkose and red and purple micaceous flaggy sandstones and purple and brown quartzites.

The site overlies a north-south running unconformity with the newer Fearnaght and Cooldaragh formations overlaying the Red Island formation situated to the east.

As well as overlying an unconformity the site is also situated above a northeast-southwest running fault line. The fault line is situated amongst a series of five parallel fault lines situated ca. 0.75km apart.

#### 8.4.5 Hydrology

##### Regional Hydrology

The proposed development lies within the North Western Irish River Basin District (IRBD). The North Western IRBD covers an area of 12,320 km<sup>2</sup> with approximately 7,400 km<sup>2</sup> of that area in the Republic of Ireland. It includes two Units of Management (UoMs), UoM 01 (Donegal) and UoM 36 (Erne). It takes in all of County Donegal as well as parts of Leitrim, Cavan, Monaghan, Longford and Sligo within the Republic of Ireland as well as areas of Fermanagh, Derry and Tyrone from Northern Ireland. There is a high level of flood risk within the North Western IRBD, with significant coastal flooding in County Donegal as well as areas of fluvial flooding throughout the district.

The proposed development is located with the Erne Catchment, hydrometric area 36. The principal river in the catchment (hydrometric area 36) is the Erne (which drains part of County Cavan before crossing the border into Northern Ireland near Belturbet). This catchment is predominantly rural with the largest urban areas being Cavan town and Ballyshannon. The fertile soils of the Erne basin are capable of supporting intensive agriculture.

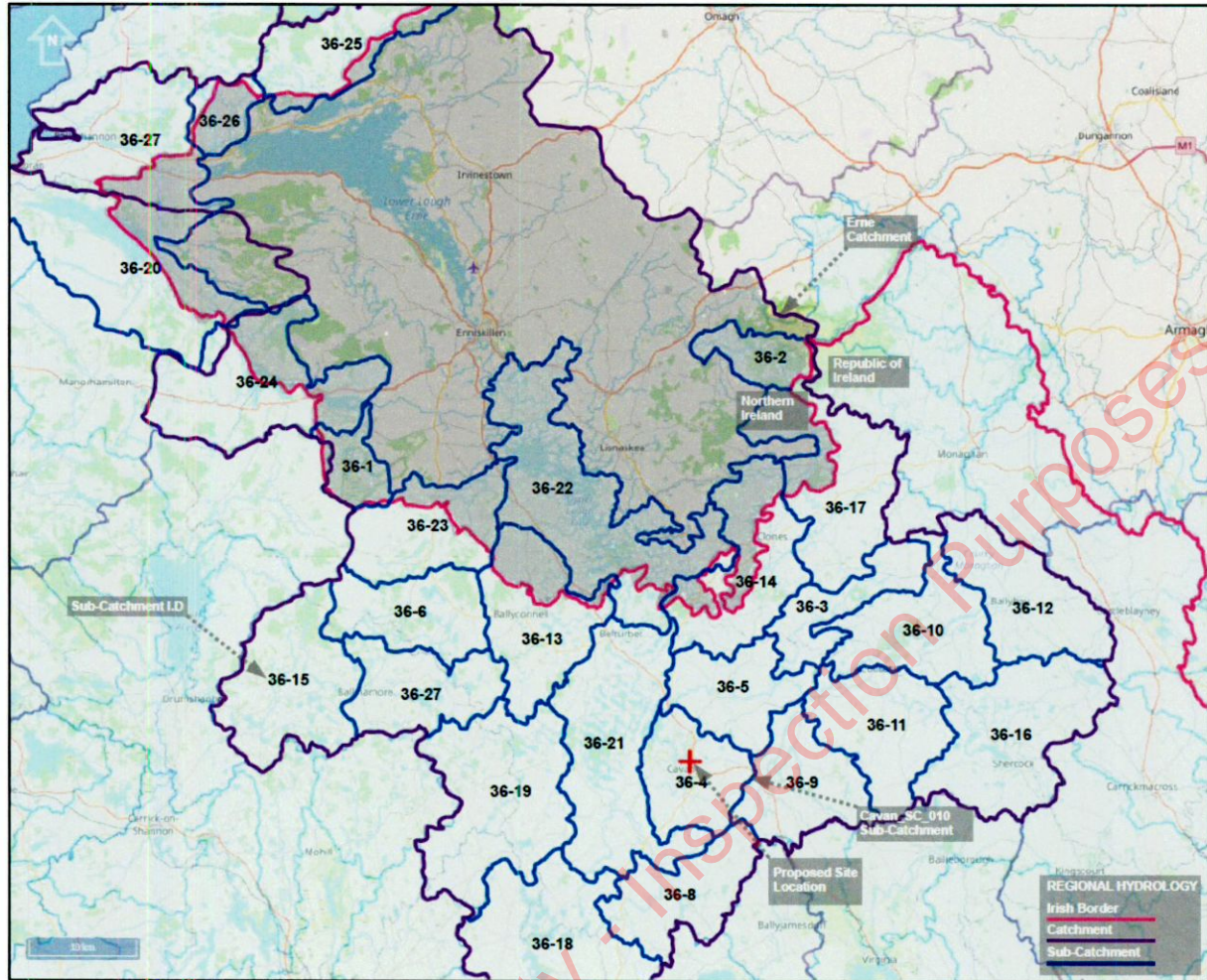
The River Erne rises on the southern slopes of Denmore Hill between Ballyjamesduff and Cavan Town flowing south west into Lough Gowna and Lough Oughter near Killashandra where it is joined by the Cullies River. The Erne then flows northeast where it meets the Annalee River to the west of Butlers Bridge.

The Annalee River drains the south-eastern part of the catchment, and is fed by the Bunnoe, Dromore, Knappagh, Madabawn, Laragh and Cavan Rivers. Past Ballyhaise, the Cavan River flows in from the south, having drained the area surrounding Cavan Town including the proposed site location, before the Annalee flows into the River Erne. The Erne flows north from here, past Belturbet and into Upper Lough Erne and County Fermanagh. From here it meanders north past Enniskillen and into the larger Lower Lough Erne. The River Erne flows out of the north-western end of the lake and passes through the ESB Cliff generating station, and into Assaroe Lake before passing through a second ESB hydroelectric generating station at Cathleen's Falls in Ballyshannon, and out to sea in Donegal Bay at the northern end of Tullan Strand

The Erne catchment comprises 28 sub-catchments with 129 river water bodies, 132 lakes, three transitional, two coastal water bodies, and 39 groundwater bodies, some of which are illustrated in **Figure 8.2 & 8.3.**



Figure 8.2: Erne River Catchment and Sub-Catchments (EPA Maps)

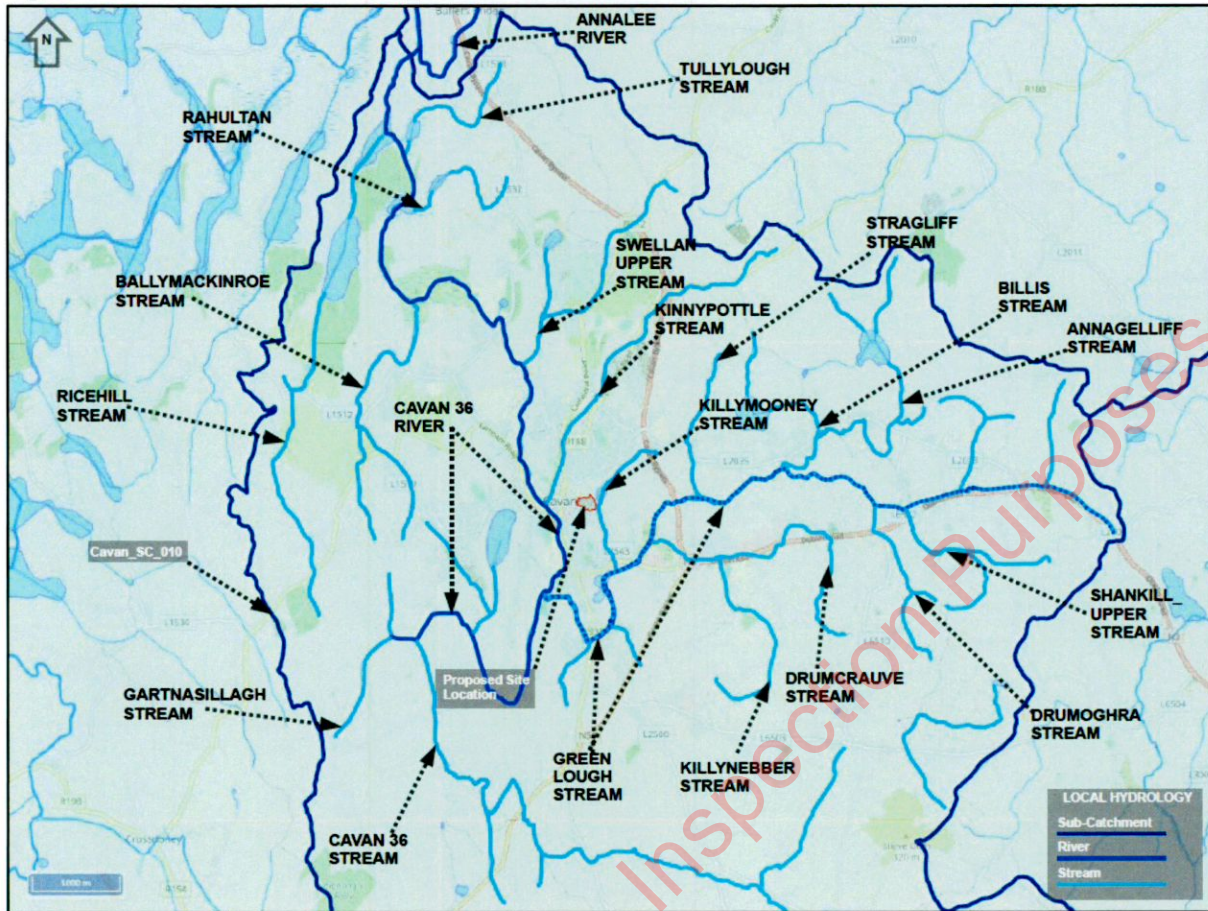


The principal hydrological feature closest to the site is Lough Oughter, ca. 3.8km northwest. Lough Oughter is a lake, or complex of lakes, in County Cavan covering more than 8,900 ha. The complex of lakes lies on the River Erne and forms the southern part of the Lough Erne complex. The lakes are bounded roughly by Belturbet in the north, Cavan Town to the east, Crossdoney to the south and Killeshandra to the west.

Lough Oughter and its associated loughs occupy much of the lowland drumlin belt in north and central Cavan. The site is a maze of waterways, islands, small lakes and peninsulas including some 90 inter-drumlin lakes and 14 basins in the course of the Erne River. The area lies on Silurian and Ordovician strata with Carboniferous limestone immediately surrounding. Drainage within the area is inefficient due to the meandering course of the river and water levels a prone to seasonal fluctuation. The Lough Oughter complex is considered to be a naturally eutrophic system.

The proposed development site in Cavan Town Centre is located in sub-catchment 36-4, known as the Cavan\_SC\_010 sub-catchment. The sub-catchment is drained by the Cavan River (EPA: Cavan 36, WFD: Cavan\_010), which flows north through the town centre before connecting with the Annalee River ca. 5.7km north.

Figure 8.3: Tributaries to the Cavan\_36 River in the Cavan River Sub-Catchment (EPA Maps)



**Local Hydrology**

The nearest hydrological feature to the proposed development is Killymooney Lough which is fed by a first order stream named the Killymooney Stream (EPA code: 36K79) but is referred to as the Aghnaskerry River by the OPW. According to the EPA database the source is ca. 910m to the northeast of the proposed site and flows in the southerly direction. This feeds into Green Lough, ca. 830m south, before outflowing in a westerly direction to the Cavan River where it begins to flow north through Cavan Town, as seen in **Figure 8.3**, passing ca. 340m to the west of the proposed development.

The topography of the site is undulating to the east with the majority of the site draining into the Killymooney Stream/ Aghnaskerry River, with an elevation change from 85.25m OD in the west of the site to 79.80m OD in the east. A small steep vegetated area to the west of the site, along the boundary with the town centre, drains to the west directly into the Cavan River via the towns surface water drainage network.

The construction of the Cavan Town Centre Eastern Access Road, Cock Hill Road, to the east of the proposed development in late 2010 resulted in a significant alteration to the drainage pattern in the locality. The project altered the drainage pattern of the proposed site and resulted in significant alterations to the elevations. The upgraded Cock Hill Road to the sites east has elevations of between 78.33m OD and 83.73m OD.

The drainage network installed during the construction of the road was designed to drain and cater for the entire 4.126 ha site. The network drains via a series of 225mm diameter pipes which run along the length of the Cock Hill road and discharge via a 525mm pipe into a 450mm x 350mm channel which is connected to a detention basin situated to the east of Killymooney Roundabout. The pond discharges via a culvert in to the Killymooney Stream/ Aghnaskerry River, just south of its outflow from Killymooney Lough.

**8.4.6 Protected Areas**

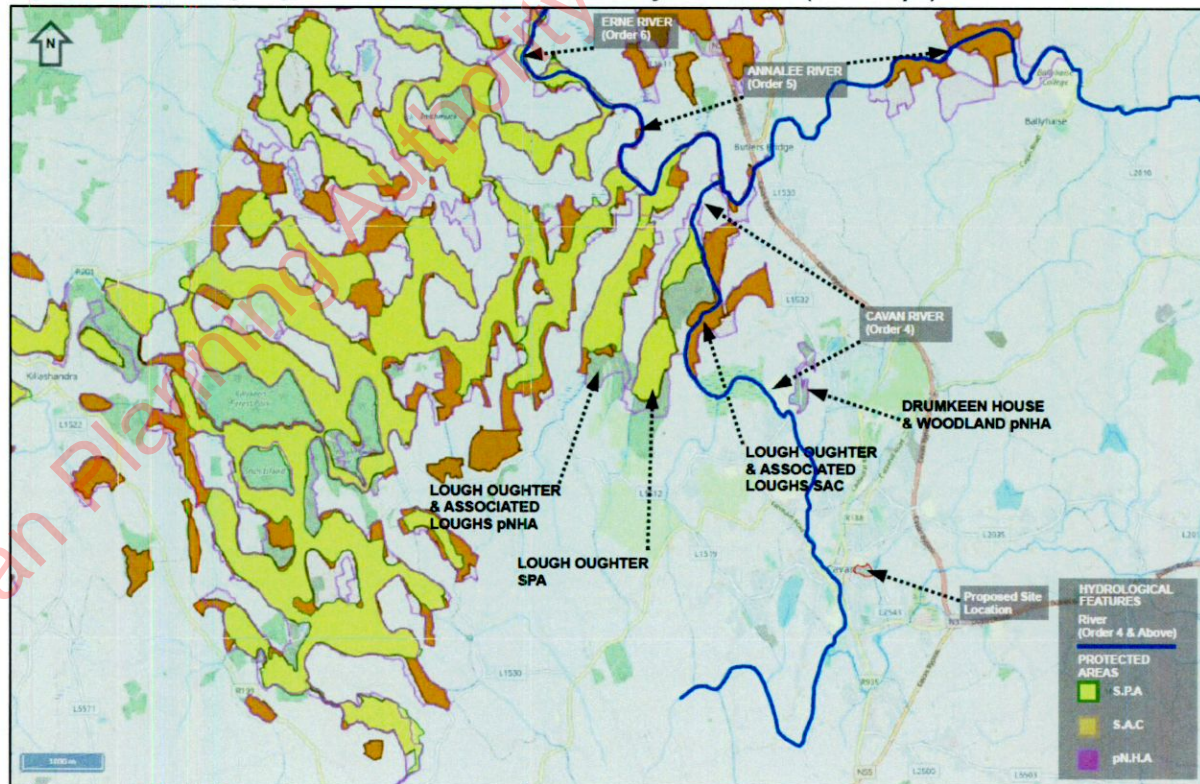
There are four European Designated sites within 10 km of the proposed development, one of which is designated as a Special Areas of Conservation (SACs), one as a Special Protected Areas (SPAs) and two of which are designated as proposed or designated Natural Heritage Areas (NHA's), (Refer to Chapter 9, Biodiversity).

Cavan Town is part of the UNESCO designated Cuilcagh Lakelands Global Geopark and includes Green Lough, Kilmore Cathedral and Killykeen Forest Park outside of the town. Green Lough is situated ca. 800m south of the site with the Killymooney Stream/ Aghnaskerry River hydrologically connected to it.

An appraisal of the potential effects of the proposed development on the constitutive characteristics of European sites identified within 15km of the proposed development is set out in the Natura Impact Statement which accompanies the planning application for this project.

Designated areas located within the vicinity of the site are illustrated in **Figure 8.4**, below.

**Figure 8.4: Summary of protected areas within the vicinity of the site. (EPA Maps)**



Of the four designated areas noted in proximity to the proposed site, two were identified as being hydrologically connected to the proposed development, listed in **Table 8.5** below.

**Table 8.5: Summary designated areas with hydrological connectivity to the proposed site.**

Area Name	Area Code	Hydrological Distance	Protected Area Type	Summary of Hydrological Connectivity
Lough Oughter & Associated Loughs SAC	000007	3.55km	Habitats	Hydrological connectivity to both protected areas is via the Killymooney Stream/ Aghnaskerry River located ca. 40m east of the site boundary. This first order stream flows south and connects to Green Lough before entering Cavan River and flowing north through the town centre to both designated sites
Lough Oughter SPA	004049	3.87km	Birds	

**8.4.7 Site Drainage**

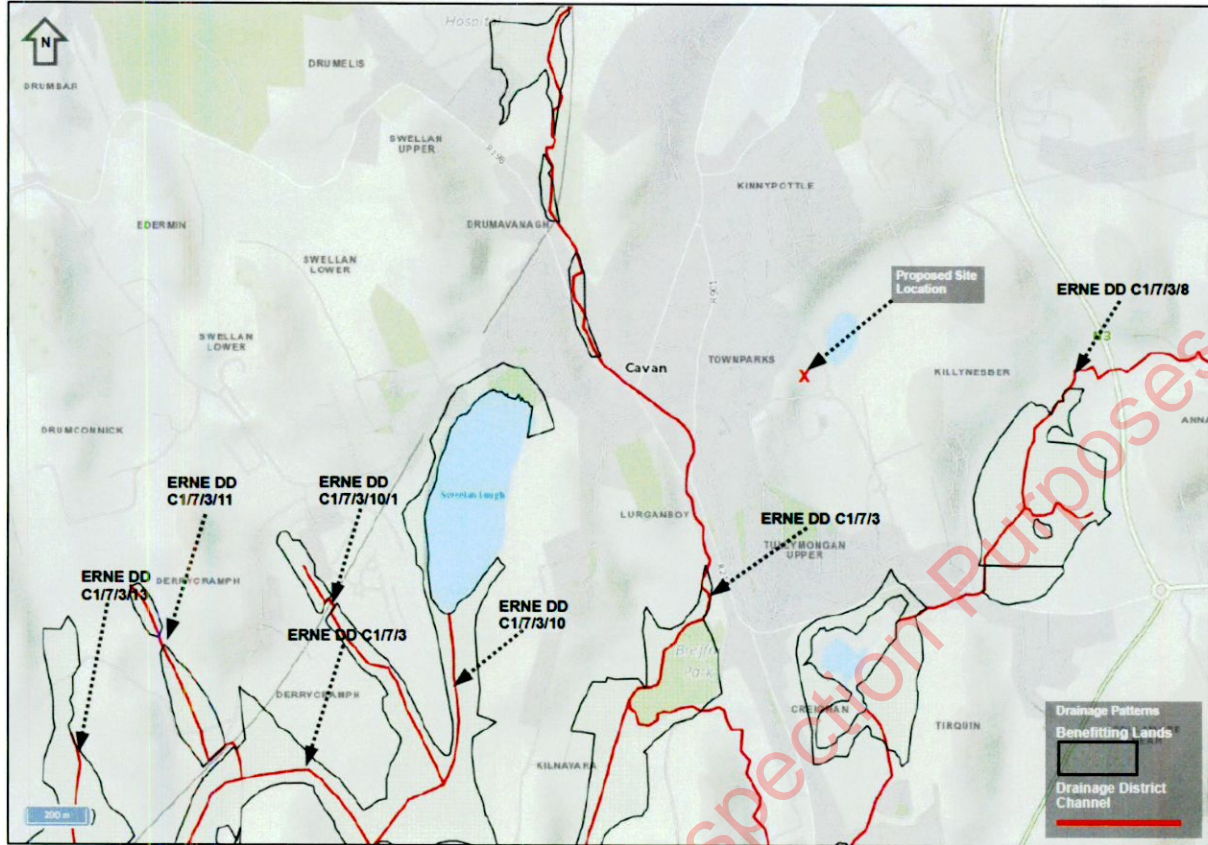
The proposed development site is bounded by the Cock Hill Road to the east and south with an engineered drainage network installed during the construction of the road designed to drain and cater for the entire 4.126 ha site. The network drains via a series of 225mm diameter pipes which run along the length of the Cock Hill road and discharge via a 525mm pipe into a 450mm x 350mm channel which is connected to a detention basin situated to the east of Killymooney Roundabout. The pond discharges via a culvert in to the Killymooney Stream/ Aghnaskerry River, just south of its outflow from Killymooney Lough. Refer to the Engineers Planning Report submitted with this EIAR.

The local drainage network within the locality of Cavan Town has been modified under the Drainage District (DD) scheme. Drainage Districts were carried out by the Commissioners of Public Works under a number of drainage and navigation acts from 1842 to the 1930s to improve land for agriculture and to mitigate flooding. Channels and lakes were deepened and widened, weirs removed, embankments constructed, bridges replaced or modified, and various other work was carried out. The purpose of the schemes was to improve land for agriculture, by lowering water levels during the growing season to reduce waterlogging on the land beside watercourses known as callows.

Local authorities are charged with responsibility to maintain Drainage Districts. The Arterial Drainage Act, 1945 contains a number of provisions for the management of Drainage Districts in Part III and Part VIII of the act.

There is seven rivers or streams which have been modified as part of the DD within 2km of the proposed site, as shown in **Figure 8.5**. Only two of these DD is hydrological connected to the proposed site and that is the Cavan River, DD channel C1/7/3, which is situated ca. 340m west of the proposed site and the Green Lough Stream, C1/7/3/8, situated ca. 800m south. The Killymooney Stream/ Aghnaskerry River situated ca. 40m east of the site drains into the Green Lough which in turn flows into the Cavan River. The adjacent land around Green Lough is regarded as benefitting land from the DD, as seen in **Figure 8.5**.

Figure 8.5: Site drainage catchments (OPW)



**Greenfield Runoff Rates - Qbar**

Greenfield runoff rates for the subject site have been calculated using the HR Wallingford calculation tool which uses the IH 124 Qbar formula as follows.

$$Qbar = 0.00108AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$$

Input data into this calculation tool included:

1. Total AREA of the subject site in hectares, 2.07ha of hard standing.
2. Standard Average Annual Rainfall (SAAR) which according to historic meteorological data downloaded from the Bailieboro Monitoring Station outlined a SAAR value of 980mm for the region.
3. There are two methods of determining the SOIL value:
  - a. Hydrology Of Soil Type (HOST) Classification<sup>3</sup>: HOST Class 12 was selected on the basis of the presence of a slowly permeable gleyed layer between 400mm and 1000mm bgl.
  - b. The pervious Surface Runoff Factor (SPR) using the following formula:

$$SOIL = \frac{(0.15S1 + 0.3S2 + 0.4S3 + 0.45S4 + 0.5S5)}{S1 + S2 + S3 + S4 + S5}$$

Where the soil type S1-S5 is selected based on the descriptions outlined in **Table 8.6**. Type 3, 'Relatively impermeable soils in boulder and sedimentary clays' was selected as the most representative class of soils at the site.

**Table 8.6: Soil indices 1-5 as defined by the Flood Studies Report (NERC, 1975)**

Soil Type	Description
<b>Type 1</b>	Well drained permeable sandy or loamy soils and shallower analogues over highly permeable limestone, chalk, sandstone and related drifts. Earth peat soils drained by dykes and pumps. Less permeable loamy over clayey soils on plateaux adjacent to very permeable soils in valleys.
<b>Type 2</b>	Very permeable soils with shallow ground water. Permeable soils over rock or fragipan, commonly on slopes in western Britain associated with smaller areas of less permeable wet soils. Moderately permeable soils, some with slowly permeable sub-soils.
<b>Type 3</b>	Relatively impermeable soils in boulder and sedimentary clays, and in alluvium. Permeable soils with shallow ground water in low lying areas. Mixed areas of impermeable and permeable soils in approximately equal proportions.
<b>Type 4</b>	Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.
<b>Type 5</b>	Soils of wet uplands with peaty or humose surface horizons and impermeable layers at shallow depth. Deep raw peat associated with gentle upland slopes or basin sites. Bare rock cliffs and screes (iv) shallow, permeable rocky soils on steep slopes.

The model was run using both SOIL classification methods for verification purposes which ultimately assigned identical Qbar values to the site. Based on these inputs the HR Wallingford tool calculated a Qbar value (mean annual flow from the site catchment) for 1 in 1 years is 22.48 l/s. Further detail of these calculations is included in **Appendix 8.1 – Greenfield Runoff Rates**.

#### 8.4.8 Cavan County Development Plan 2022 – 2028 – Flood Risk Management

A review of the Cavan County Development Plan was carried out to determine the policies and objectives relevant to the management of flood risk throughout the region.

##### Objectives:

**FRM 01:** Support, in co-operation with the OPW, the implementation of the EU Flood Risk Directive, the Flood Risk Regulations (S.I. No. 122 of 2010) and the 'The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009) and Department Circular PL2/2014 or any updated / superseding version. This will include the following:

- Avoid, reduce and/or mitigate, as appropriate in accordance with the Guidelines, the risk of flooding within the flood risk areas indicated in the accompanying Strategic Flood Risk Assessment report, including fluvial, pluvial and groundwater flooding, and any other flood risk areas that may be identified during the period of the plan or in relation to a planning application.
- Development proposals in areas where there is an identified or potential risk of flooding or that could give rise to a risk of flooding elsewhere will be required to carry out a site-specific Flood Risk Assessment, and Justification Test where appropriate, in accordance with the provisions of The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009, (or any superseding document) and Circular PL2/2014 (as updated/superseded). Any flood risk assessment should include an assessment of the potential impacts of climate change, such as

an increase in the extent or probability of flooding, and any associated measures necessary to address these impacts.

- Development that would be subject to an inappropriate risk of flooding or that would cause or exacerbate such a risk at other locations shall not normally be permitted.
- Where certain measures proposed to mitigate or manage the risk of flooding associated with new developments are likely to result in significant effects to the environment or European sites downstream, such measures will undergo environmental assessment and Appropriate Assessment, as appropriate.

**FRM 02:** Protect Flood Zone A and Flood Zone B from inappropriate development and direct developments/land uses into the appropriate Flood Zone in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (or any superseding document) and the guidance contained in Development Management Chapter.

**FRM 03:** Site-specific Flood Risk Assessment (FRA) is required for all planning applications in areas at risk of flooding (fluvial, coastal, pluvial or groundwater), even for developments appropriate to the particular Flood Zone. The detail of these site-specific FRAs will depend on the level of risk and scale of development. A detailed site-specific FRA should quantify the risks, the effects of selected mitigation and the management of any residual risks. The assessments shall consider and provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) and available information from the CFRAM Studies shall be consulted with to this effect.

**FRM 04:** Development proposals will need to be accompanied by a Development Management Justification Test when required by the Guidelines in addition to the site-specific Flood Risk Assessment. Where only a small proportion of a site is at risk of flooding, the sequential approach shall be applied in site planning, in order to seek to ensure that no encroachment onto or loss of the flood plain occurs and/or that only water compatible development, such as Open Space, would be permitted for the lands which are identified as being at risk of flooding within that site.

**FRM 05:** In Flood Zone C, where the probability of flooding is low (less than 0.1%, Flood Zone C), site-specific Flood Risk Assessment may be required and the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed. The County Plan SFRA datasets and the most up to date CFRAM Programme climate scenario mapping should be consulted by prospective applicants for developments in this regard and will be made available to lower-tier Development Management processes in the Council.

**FRM 06:** Applications for development in flood vulnerable zones, including those at risk under the OPW's Mid-Range Future Scenario, shall provide details of structural and non-structural risk management measures, such as those relating to floor levels, internal layout, flood-resistant construction, flood-resilient construction, emergency response planning and access and egress during flood events.

**FRM 07:** Protect water bodies and watercourses within the County from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains. This will include buffers in riverine and wetland areas as appropriate. Consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible and retain a strip on either side of such channels where required, to facilitate maintenance access thereto. In addition, promote the sustainable management and uses of water bodies and avoid culverting or realignment of these features.

**FRM 08:** Recognise the important role of peatland and other wetland areas in flooding patterns. Development in these areas shall therefore be subject to a Flood Risk Assessment.

#### 8.4.9 Flood Risk

The principal sources of flooding are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains. The receptors can include people, their property and the environment. All three elements as well as the vulnerability and exposure of receptors must be examined to determine the potential consequences.

The Office of Public Works (OPW) and Department of Environment, Heritage and Local Government (DoHLG) published 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' in 2009 (The Guidelines). The Guidelines define the likelihood of flooding as the probability or a frequency of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as the chance of a particular flood level being exceeded in any one year. This return period is described as the Annual Exceedance Probability (AEP). For example, a 1 in 100 or 1% flood is that which would, on average, be expected to occur once in 100 years, though it could happen at any time.

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types or levels of flood zones defined for the purposes of the Guidelines:

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding).
- **Flood Zone B** – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).
- **Flood 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). Flood Zone C covers all areas of the plan which are not in zones A or B.

In 2018, the Office of Public Works (OPW) launched a new online flood map viewer to provide information on the likelihood of flood risk and the extent of flooding across Ireland. This viewer includes flood risk data derived from several sources including:



### 1. Catchment Flood Risk Assessment and Management (CFRAM) Programme

- 300 communities at potentially significant flood risk, referred to as Areas for Further Assessment (AFA's).

### 2. National Indicative Fluvial Mapping (NIFM)

- Predictive' flood maps showing indicative areas predicted to be inundated during a theoretical fluvial flood event with an estimated probability of occurrence.
- Indicative flood maps have been produced for all watercourses that are on the EPA watercourse layers, have a catchment area greater than 5km<sup>2</sup> and for which flood maps were not produced under the National CFRAM Programme.

### 3. Geological Survey Ireland Groundwater Flooding

- Probabilistic flood extent of groundwater flooding in limestone regions. These maps are focused primarily (but not entirely) on flooding at seasonally flooded wetlands known as turloughs.

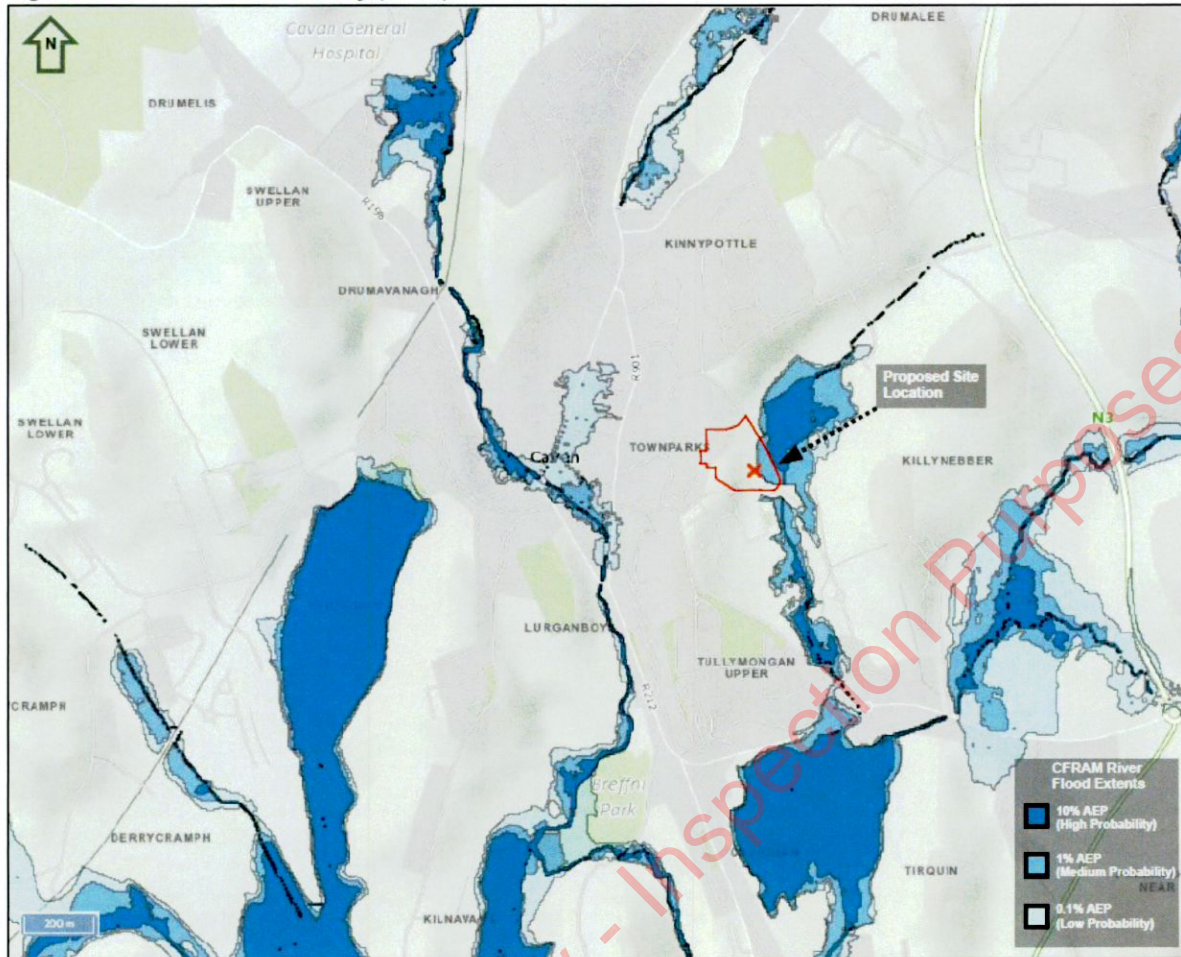
### 4. Past Flood Events

- A Past Flood Event is defined as the occurrence of recorded flooding at a given location on a given date or on a recurring basis. The event is derived from available flood information documentation including flood event reports, news articles, archive information and photos.

A summary of the above-noted flood risk data as derived from the OPW map viewer within the vicinity of the proposed site is presented in **Figure 8.6**.

Cavan Town was identified as an Area for Further Assessment (AFA) and was included in the North Western Neagh Bann (NWNB) CFRAM study. CFRAM flood extent mapping for the town was completed in July 2016, with the proposed site contained in CFRAM drawing no. N36CAV\_EXFCD\_F0\_13. The CFRAM extents for Cavan Town are shown in **Figure 8.6**. The map indicates that a section to the southeast and east of the proposed site is located within a Flood Zone A, in accordance with the OPW flood risk management guidelines (2009). There is a low probability, 1% AEP, of fluvial flooding within this zone. This represents a 1 in 100 year flood event. According to the maps the 10% AEP flood extents are contained to the eastern side of the Cock Hill Road.

Figure 8.6: Flood Risk Summary (OPW)



The CFRAM predicted flood water levels during a high to low probability flood event from an adjacent node, 3615M00103I, ca. 40m east of the proposed site on the Killymooney Stream/ Aghnaskerry River are displayed in **Table 8.7**.

**Table 8.7: Predicted CFRAM flood water levels from node 3615M00103I (NWNB CFRAM)**

Probability	Annual Exceedance Probability (AEP)	Water Level (m OD)
High – 1 in 10 years	10%	73.60 m
Medium – 1 in 100 years	1%	74.94 m
Low – 1 in 1000 year	0.1%	75.45 m

An assessment of the site topographical survey, **Appendix 8.2 – Cut & Fill**, indicates an error in the 1% and 0.1% CFRAM fluvial flood extents in the east and southeast of the site. The topographical survey indicates a ground level of 79.80m OD ± 0.30m to the east of the site. The maximum predicted fluvial flood water level, 0.1% AEP event, of the adjacent node indicates a water level of 75.45m OD. This provides for a minimum freeboard of 4.05m between the current ground level and the predicted highest flood level. It can be assumed that the topographical data used during the development of the CFRAM maps was outdated and hadn't been updated since the construction of the Cavan Town

Eastern Access Road, which commenced in late 2010. The relevant CFRAM map containing the site is attached in **Appendix 8.3**.

The proposed development is classified as 'Less Vulnerable Development' by the Planning System and Flood Risk Management Guidelines and according to the guidelines is 'appropriate' for a Flood Zone B and Flood Zone C. Based on evidence provided from the aforementioned sources the majority of the development site is located within Flood Zone C. An area to the east of the proposed site is designated a Flood Zone A and B by the Cavan CDP & Local Area Plan (LAP) 2022-2028 based off the CFRAM maps. As outlined above it is believed that the flood extents are inaccurate when compared to the existing site elevations in this area.

It should be noted that Cavan Town did not qualify for assessment under the National Indicative Fluvial Mapping (NIFM) programme as it had already been assessed under the National CFRAM programme.

A Stage 2 Flood Risk Assessment was undertaken as part of the planning application along with this EIAR and a copy of the report is included (document number: 221171-ORS-XX-XX-RP-EN-13d-005).

#### **8.4.10 Cavan County Development Plan 2022 – 2028 – Water Quality**

A review of the Cavan County Development Plan was carried out to determine the policies and objectives relevant to the preservation and protection of water quality throughout the region.

##### **Policy:**

**W 01:** In conjunction with Irish Water, have regard to the EPA 2019 publication 'Drinking Water Report for Public Water Supplies 2018' (and any subsequent update) in the establishment and maintenance of water sources in the County.

**W 02:** Ensure that in assessing applications for development, consideration is given to the impact on the quality of surface waters having regard to targets and measures set out in the River Basin Management Plan for Ireland 2018-2021 and any subsequent local or regional plans.

**W 03:** Ensure that development would not have an unacceptable impact on water quality and quantity including surface water, ground water, designated source protection areas, river corridors and associated wetlands.

**W 04:** Support the preparation of Drinking Water Protection Plans and Source Protection Plans to protect sources of public water supply, in accordance with the requirements of the Water Framework Directive.

**W 05:** Support the development of group water supplies and public drinking water supplies throughout the county.

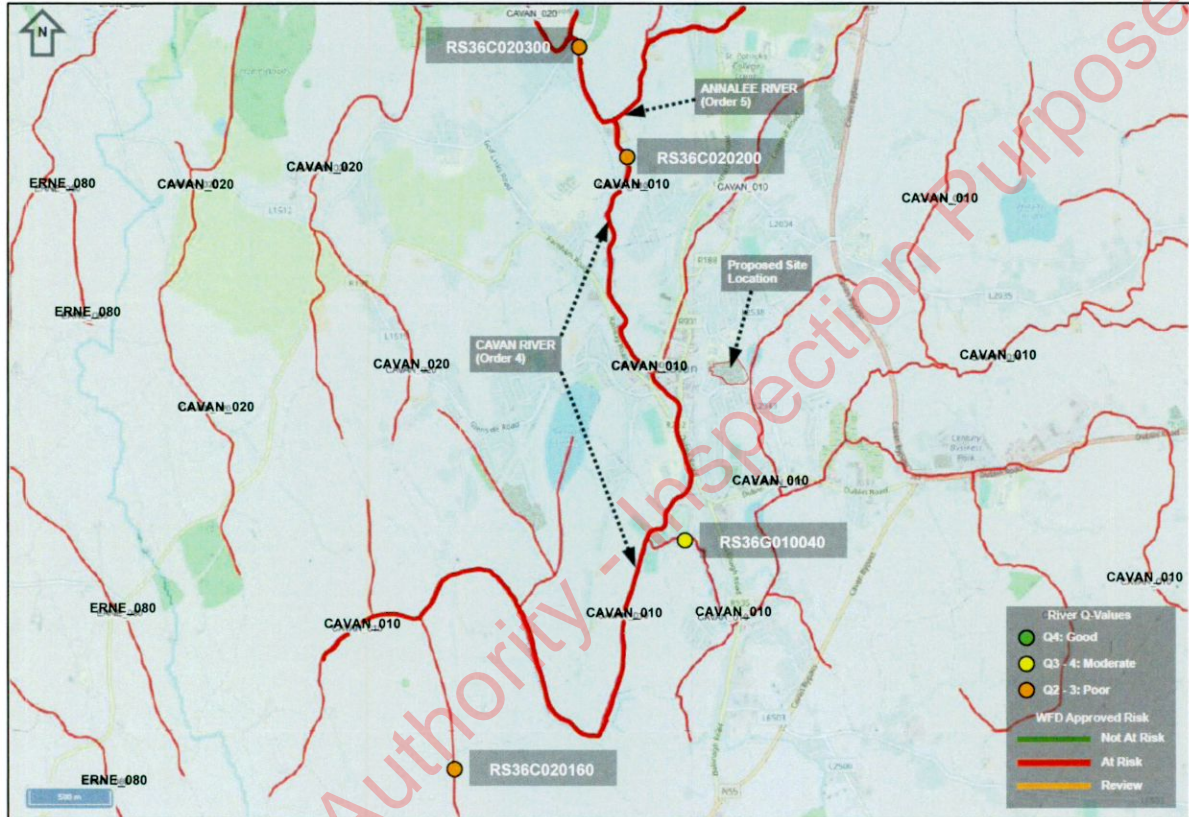
**W 06:** Support the development in the County of green infrastructure, river walkways (in accordance with the principles of Planning for Watercourses in the Urban Environment, A guideline Developed by

Inland Fisheries) and access from amenities, residential areas and community services to the town centre.

**8.4.11 Water Quality**

Physico-chemical and biological water quality assessments are conducted by the EPA at various sections along the Cavan\_SC\_010 sub-catchment. There's a total of four recorded monitoring stations within the Cavan\_010 river, of which three the site is hydrologically connected. The location of the four monitoring stations is noted in **Figure 8.7**.

**Figure 8.7: Water Framework Directive Risk and locations of water quality monitoring stations (EPA maps)**



National surveys of Irish rivers have taken place on a continuous basis since 1971. The National Rivers Monitoring Programme was replaced by the Water Framework Monitoring Programme from 22 December 2006. As part of the Water Framework Directive (WFD) Monitoring Programme approximately one third of our major rivers and their more important tributaries are surveyed and assessed each year by EPA ecologists. A complete survey cycle is completed every three years. The sites are scored on a five-point system developed by the EPA called the Biological Q-Rating system. Macroinvertebrate data is utilised to ascertain the biological quality of a given river or stream as detailed in **Table 8.2** at the beginning of this chapter.

The four monitoring stations within the Cavan\_010 catchment are listed in **Table 8.8**, along with their associated Q-Ratings.

**Table 8.8: Biological Q-Ratings for waterbodies hydraulically connected to the Cavan River (EPA)**

Station ID	Station Name	Year													
		1989	1993	1997	1998	2001	2004	2007	2010	2011	2013	2014	2017	2019	
RS36G010040	Green Lough Stream	3	3-4	3	4	3	3	3	3	-	3	-	3	3-4	
RS36C020300	Cavan – Br. SE Drumkeen House	2-3	3	2-3	2-3	2-3	2-3	2-3	2	2-3	1-2	2-3	2-3	3	
RS36C020200	Cavan – Br. d/s Cavan	2	3	-	-	-	-	-	-	-	-	-	-	-	
RS36C020160	Cavan – Br near Lisduff	-	-	-	3	-	-	-	-	-	-	-	-	-	

The closest monitoring station to the site is the Green Lough Stream station, RS36G010040. This is located downstream of the site of hydrological connectivity with the Killymooney Stream/ Aghnaskerry River. The data from this site has been consistent since 2001 with a Q-rating of 3, indicating a 'Low' status. However, the most recent assessment in 2019 noted that the site had seen an improvement to Q 3-4, meaning a 'Reduced to Low' status. The pre-2000 reading for the site noted a fluctuation between 'Low' to 'Reduced' status.

The outflow from the Green Lough Stream feeds into the "Cavan – Br. SE Drumkeen House" monitoring station, RS36C020300. The Q-rating for this site has fluctuated between Q 2-3 between 2001 and 2017, indicating a 'Low' to 'Very Low' status. In 2013 the site received a Q 1-2 noting a 'Little' to 'Very Low' status. Since then, the river has improved with it achieving a Q 3 in 2019, still a 'Low' status quality, but the best status at the site since 1993.

The RS36C020200 and RS36C020160 are both pre-2000 monitoring stations with Q-ratings of 2-3 with 'Low' to 'Very Low' status.

It should be noted that the Lough Oughter complex of lakes is classed as naturally eutrophic system. These lake systems are characterised by higher nutrient levels and as a result have a higher productivity and are generally more species rich. However, such systems are at a greater risk of anthropogenic induced eutrophication which has resulted in a reduction in species richness.

The Cavan\_010 River, has a Water Framework Directive (WFD) Status of "Poor" under the WFD programme 2013 – 2018. The ecological and chemical status of the Cavan\_010 River is summarised in **Table 8.9**.

**Table 8.9: Description of Receiving Waters – Cavan\_010 River**

Characteristic	Classification	Status	Interpretation
<b>Receiving Waterbody Name</b>	Cavan_010	At Risk	Receiving Water body is the Cavan_020, poor status  Inputting water body is Beaghy Lake, moderate status
<b>Waterbody Type</b>	River		-
<b>WFD Status</b>	SW 2013-2018	Poor	-
<b>Resource</b>	Not Classified		No drinking water abstractions
<b>Biological Status</b>	Invertebrate	Poor	Indicative of anthropogenic disturbance
	Fish Status	N/A	
<b>Supporting Chemistry Conditions</b>	Oxygenation Conditions	Pass	<ul style="list-style-type: none"> <li>• DO status Pass;</li> <li>• Phosphorus (P) conditions indicate moderate eutrophication levels</li> </ul>
	Nitrogen	Good	
	Phosphorus	Moderate	
	Other Nutrients	N/A	
	Specific Pollutant Conditions	N/A	
<b>Chemical SW Status</b>	Low	Low	-

**8.4.12 Hydrogeology**

**Regional & Local Hydrogeology**

Hydrogeology is the study of groundwater, including its origin, occurrence, movement and quality. Rocks which store and transmit groundwater are known as bedrock aquifers. Different bedrock types have differing abilities to store and transmit water, depending on their permeability and fracture intensity. The Geological Survey of Ireland has classified all aquifers in Ireland in three main categories based on potential yield and extent:

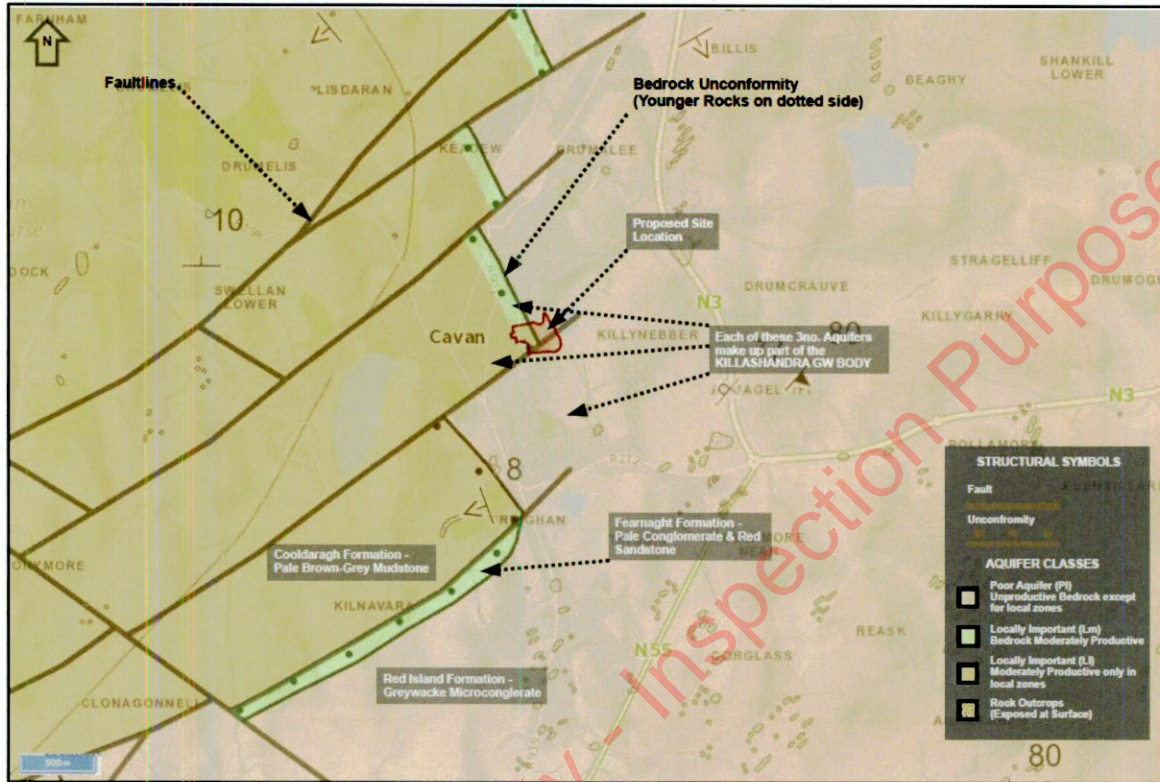
- Regionally Important
- Locally Important
- Poor

County Cavan has been mapped for Aquifer Classification. The subject site is situated above two no. Groundwater Bodies which are designated by the Geological Survey of Ireland (GSI) National Draft Bedrock Aquifer Map as follows:

1. Cavan Groundwater Body – “PP”, Poorly productive bedrock
2. Killashandra Groundwater Body - “PP”, Poorly productive bedrock

Aquifer types within the locality are illustrated in **Figure 8.8** below.

**Figure 8.8: Groundwater Bodies & Aquifer Types in site locality (GSI Maps)**



There are further sub-categories based on the geology of the subsoil, the type of recharge (i.e., either point or diffuse) and the thickness of the unsaturated zone through which potential contaminants can move. The Geological Survey of Ireland uses a matrix comprising four groundwater vulnerability categories - extreme, high, moderate and low - for mapping purposes and in the assessment of risk to groundwater. The categories are based on the thickness of cover (overburden), which provides some attenuation for contaminants migrating toward the groundwater table from the surface or near subsurface, outlined in **Table 8.10**.

**Table 8.10: Vulnerability Mapping Criteria**

Subsoil Thickness	Hydrogeological Requirements				
	Diffuse Recharge			Point Recharge	Unsaturated Zone
	Subsoil Permeability & Type				
	High (Sand & Gravel)	Moderate (Sandy Subsoil)	Low (Clay & Peat)	Swallow Holes	Sand & Gravel Aquifers
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

Where the overburden is less than 3 metres thick, the Matrix Vulnerability Rating of the aquifer is considered extreme, as indicated in **Table 8.10** (i.e., the potential for contamination to reach the aquifer is extremely high). Where the overburden is greater than 10 metres thick and has a low permeability, the vulnerability is considered to be low. According to the GSI Groundwater Vulnerability Map, within a 1km radius of the proposed site, there are areas of low, moderate, high and extreme vulnerability including areas with rocks at the surface. The area underlying the proposed site itself has a mixture of 'Moderate' to 'High' Vulnerability in the centre and west of the site with an area to the east of the site classified as 'Extreme'. A small area to the south of the site has a rating of 'Low' vulnerability. Refer to **Figure 8.9**.

Provisional information on the hydrogeological classification of the bedrock beneath the subject site was obtained from the Geological Survey of Ireland (GSI). The underlying Ordovician rock to the east of the site comprised of greywacke, microconglomerate and argillite is considered a Poor Aquifer-bedrock which is generally unproductive except for local zones, according to the GSI. The newer Dinantian sandstone rock underling the centre and northwest of the site (highlighted in green in **Figure 8.8**), which is comprised of pale conglomerate & red sandstone, is classed as a Locally Important Aquifer - bedrock which is generally moderately productive. Directly to the west of this rock group is a Mudstone from the same period which is characterised by its pale brown-grey flaggy, silty mudstone, which is considered a Locally Important Aquifer - bedrock which is Moderately Productive only in Local Zones.

These aquifer categories have been assigned taking account of the following:

- The overall potential groundwater resources in each rock unit
- The area of each rock unit
- The localised nature of the higher permeability zones (e.g. fractures) in the bedrock unit
- The fact that all bedrock types give enough water for domestic supplies (therefore are called aquifers)



Groundwater abstractions have defined Source Protection Areas around them in order to give an indication of the likelihood of contamination from activities in the area reaching an abstraction point. These have an Inner Protection Area and an Outer Protection Area associated with them.

According to the GSI Source Protection Area map, there are no Source Protection Areas in the vicinity of the site. The nearest Source Protection Area, the Clones Scotshouse Public Water Scheme is located ca. 16 km north of the proposed site and the Ballyconnell Lough Public Water Scheme, situated ca. 16 km northwest.

According to the GSI database, there is a high density of groundwater wells, with complete datasets located within 2 km of the proposed development (**Figure 8.9**). This data is summarised in **Table 8.11** below.

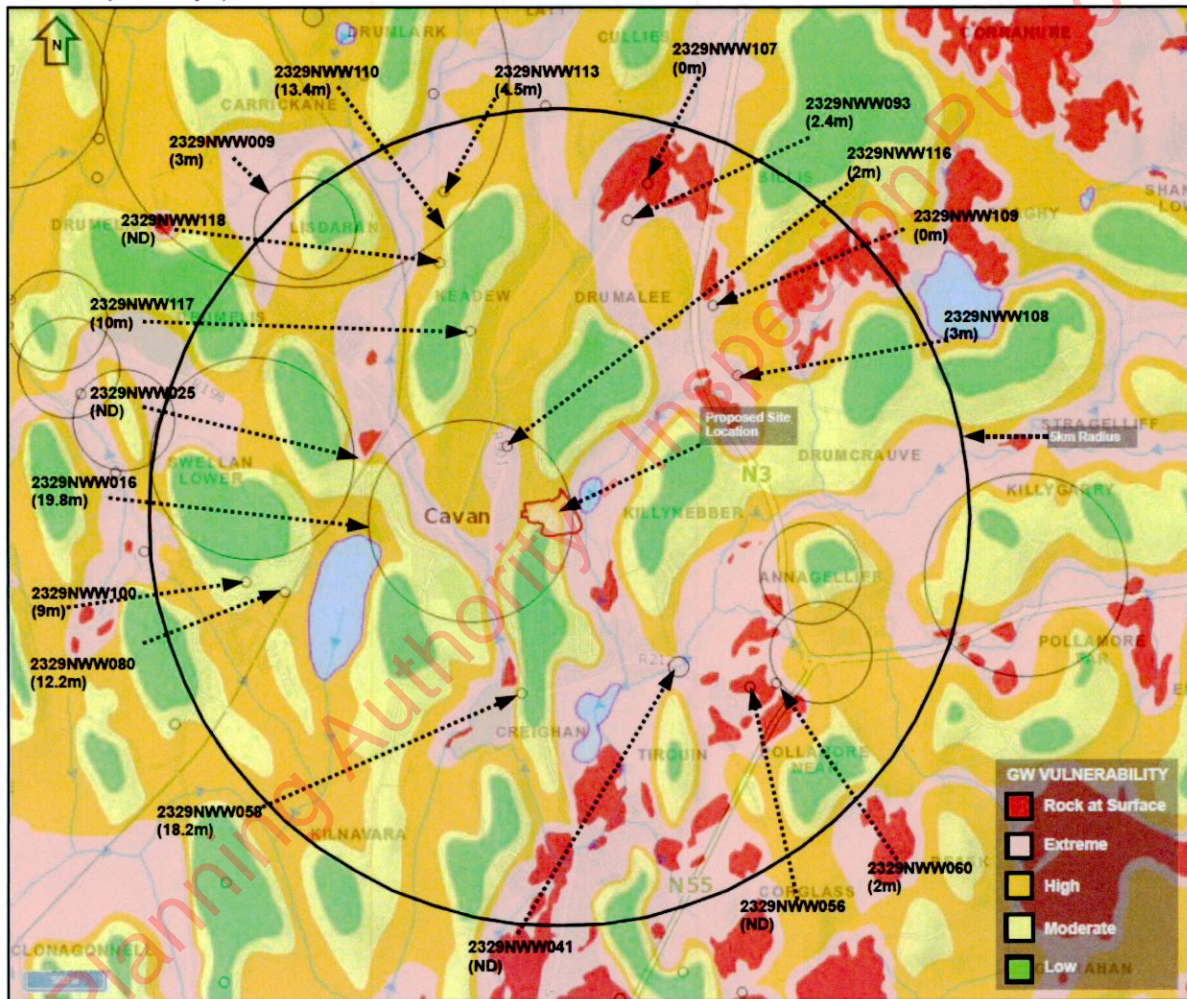
**Table 8.11: Groundwater Wells with 2.5km of the site (GSI Well Database)**

GSI Reference	Easting Northing	Well Type	Depth (m bgl)	Depth to Rock (m)	Well Use	Yield m <sup>3</sup> /d	Proximity to site
2329NWW110	241090, 306910	Borehole	18	13.4	Unknown	129.6	1.55m NW
2329NWW009	241090, 306200	Borehole	48.7	3	Agri & domestic	21.8	1.69km NW
2329NWW025	240830, 305060	Borehole	22.9	-	Agri & domestic	46.4	1.12km NW
2329NWW118	241750, 306030	Borehole	38	-	Agri & domestic	ND	1.45km NW
2329NWW117	241900, 305690	Borehole	45	10	Agri & domestic	29.4	1.01km NW
2329NWW016	241900, 304750	Borehole	67	19.8	Industrial Use	ND	Within 1km of site
2329NWW100	240800, 304450	Borehole	30	9	Agri & domestic	ND	1.6km W
2329NWW080	267790, 279410	Borehole	15.2	12.2	Agri & domestic	32.7	1.4km W
2329NWW058	242150, 303900	Borehole	80	18.2	Agri & domestic	ND	880m SW
2329NWW041	242920, 304030	Borehole	29	-	Agri & domestic	259.2	872m S
2329NWW056	243270, 303930	Borehole	30	-	Agri & domestic	ND	1.2km SE
2329NWW060	243400, 303950	Dug Well	3	2	Agri & domestic	ND	1.3km SE
2329NWW108	243210, 305470	Borehole	53	3	Agri & domestic	ND	1.07km NE
2329NWW109	243090, 305820	Borehole	50	0	Agri & domestic	ND	1.25km NE
2329NWW093	242670, 306240	Borehole	15.2	2.4	Agri & domestic	14.2	1.45km N
2329NWW107	242770, 306420	Borehole	1	0	Agri & domestic	ND	1.68km NE
2329NWW116	242080, 305120	Borehole	10	2	Agri & domestic	ND	260m NW

Figure 8.9 superimposes the approximate location of the groundwater wells listed in the table above relative to the groundwater vulnerability rating of the area. The site boundary is roughly marked out in red. Groundwater wells in the vicinity of the site are generally moderate to low yielding. The lands on which the site location has been proposed have been assigned a high to extreme vulnerability rating. The recorded depth bedrock is encountered for the corresponding wells in this area is between 0 to 19.8 metres below ground level (bgl), representative of the drumlin belt landscape. There are several locations where rock outcrops are present at surface in this direction also.

There are no karst landforms, holy wells or springs recorded in the wider area.

Figure 8.9: Groundwater Vulnerability and location of Groundwater Wells and associated depth to bedrock (GSI Maps)



An intrusive site investigation was undertaken by IGSL on behalf of Pinnacle Consulting Engineers in July 2022 involving the following scope of works:

- Cable percussive boreholes (9 No.)
- Trial pits (7 No.)
- Plate load tests (15 No.)
- Groundwater & Gas monitoring
- Surveying of exploratory hole locations

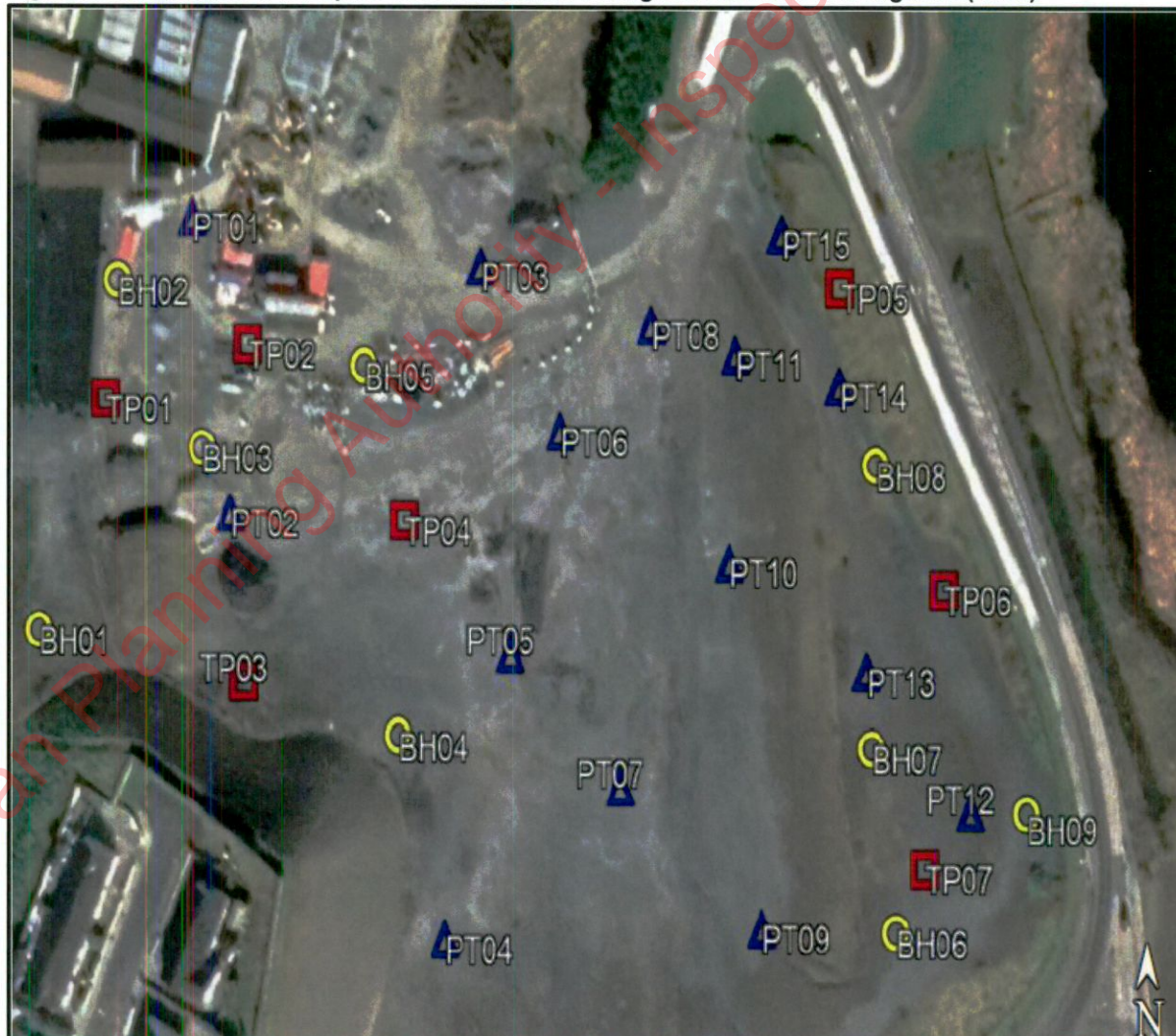
Detailed borehole logs and description of the site investigation are presented in **Appendix 8.4** but the general structure of the ground can be described as follows in **Table 8.12**:

**Table 8.12: Summary of ground conditions at the proposed site (IGSL)**

Soil Type/ Geological Unit	Maximum Depth (m bgl)	Description and Interpretation
<b>Made Ground</b>	From surface to 0.4m – 1.1m.	MADE GROUND – (comprising dark grey / black clay and gravel fill).
<b>Overburden (a)</b>	From 0.4 – 1.1m to 1.1 – 2.8m	Stiff brown sandy SILT/CLAY with some gravel.
<b>Overburden (b)</b>	From 1.1 – 2.8m to 3.2 – 10.0m	Stiff and very stiff dark brown sandy gravelly CLAY with medium cobble content.
<b>Overburden (c)</b>	From 1.5m to 2.4 – 10.0m	Stiff to locally very stiff dark brown sandy gravelly CLAY with some cobbles and boulders.

The locations of each borehole & trial pit installed during the site investigation (S.I) are outlined in **Figure 8.10**, below.

**Figure 8.10: Borehole & Trial pit locations installed during intrusive Site Investigation (IGSL)**



It is understood that a significant quantity of fill material was placed towards the east and southeast of the site during the upgrade of the adjacent roadway. The trial pits and boreholes revealed re-worked brown and grey, brown sandy gravelly clay with low and medium cobble content. It is understood that the material was placed and compacted in a systematic manner (i.e. “engineered fill as opposed to dozed out in layers without compaction”). The re-worked material was found to be most extensive in **BH’s 6 and 9** where it was present to depths of 4.8m and 6.0m bgl. It was noted in the report that the peat material previously present at this location had been removed to ensure adequate soil stability for the construction of the adjacent road. In the case of the trial pits the re-worked material was most notable in **TP’s 5, 6 and 7** where it was observed at depths of at least 3.1m (**TP 7**). In strength terms, the re-worked till is largely firm and stiff in consistency.

Underlying the made ground are glacially derived soils referred to as glacial till. The till comprises heavily over-consolidated grey brown and dark grey, sandy gravelly CLAY with low and medium cobble content.

The site level was measured at 79.95m OD for boreholes 8 and 9 and 85.08mOD for borehole 3. Groundwater was encountered in 3 no. boreholes as follows:

- **BH 8** – 6.22m bgl (73.73mOD)
- **BH 9** – 6.91m bgl (72.99mOD)
- **BH 3** – 1.24m bgl (83.84mOD) – This was likely to be overburden and not a reflection of true groundwater levels.

#### **8.4.13 Cavan County Development Plan 2022 – 2028 – Groundwater Protection**

A review of the Cavan County Development Plan was carried out to determine the policies and objectives relevant to the preservation and protection of groundwater quality throughout the region.

##### **Policy:**

**GW 01:** Ensure that groundwater is protected by ensuring compliance with the following:

- The appropriate control of development in areas of high groundwater vulnerability.
- Implementation of the Programme of Measures as required in the River Basin Management Plans
- Licensing of discharges of effluent to groundwater, having particular regard to the requirements of the EC Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010)
- Implementation of the EC (Good Agricultural Practice for Protection of Waters) Regulations (S.I. No. 610 OF 2010, which give effect to several EU Directives including in relation to protection of waters against pollution from agricultural sources (‘the Nitrates Directive’), dangerous substances in water and protection of groundwater.

**GW 02:** Protect ground water resources and abstraction points, and this ensures such sources and their zones of contribution are protected and safeguarded in the interests of common good and public health.

**GW 03:** Support the implementation of the relevant recommendations and measures outlined in the relevant River Basin Management Plan 2022-2027, and associated Programme of Measures, or any such plan that may supersede same during the lifetime of the plan. Development proposals shall not have an unacceptable impact on water quality, the water environment, including surface waters, groundwater quality and quantity, river corridors and associated woodlands, species and wetlands, in County Cavan and in any areas that are hydrologically or hydro geologically linked, including areas in Northern Ireland.

**GW 04:** Contribute towards, as appropriate, the protection of existing and potential water resources, and their use by humans and wildlife, including rivers, streams, wetlands, groundwater and associated habitat and species in accordance with the requirements and guidance in the EU Water Framework Directive 2000 (2000/60/EC). The European Union (Water policy) Regulations 2003 (as amended), the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended), the Groundwater Directive 2006/118/EC and the European Communities Environmental Objectives (groundwater) Regulations 2010 (as amended) and other relevant EU Directives, including associated national legislation and policy guidance (including any superseding versions of same, to have cognisance of, where relevant, the EUs Common Implementation Strategy Guidance Document No. 20 and No. 36 which provide guidance on exceptions to the environmental objectives of the Water Framework Directive).

**GW 05:** In conjunction with Irish Water, have regard to the EPA 2019 publication 'Drinking Water Report for Public Water Supplies 2018 (and any subsequent update) in the establishment and maintenance of water sources in the County.

**GW 06:** Ensure that in assessing applications for development, that consideration is given to the impact on the quality of surface waters having regard to targets and measures set out in the River Basin Management Plan for Ireland 2018-2021, and any subsequent local or regional plans.

**GW 07:** Discourage the over concentration of individual septic tanks and treatment plans to minimise the risk of groundwater pollution.

**GW 08:** Support the preparation of Drinking Water Protection Plans and Source Protection Plans to protect sources of public water supply, in accordance with the requirements of the Water Framework Directive.

**GW 09:** Protect both ground and surface water resources including taking account of the impacts of climate change, and to support Irish Water in the development and implementation of Drinking Water Safety Plans and the National Water Resources Plan.

**GW 10:** Promote water conservation and demand management measures among all water users and to support Irish Water in implementing water conservation measures such as leakage reduction and network improvements.

**GW 11:** Promote measures to prevent siltation of water courses from developments including planting and clear felling of commercial forests.

**GW 12:** Promote measures to prevent acidification of water courses.

**8.4.14 Groundwater Vulnerability Assessment**

This area of Cavan is not classified as a Source Protection Area, and this vulnerability assessment will be carried out under section 1 of **Table 8.4**, as follows:

**Excerpt of Table 8.4 – Summary of Sampling requirements for groundwater vulnerability assessments**

	<b>Aquifer Type</b>	<b>Sampling Requirements</b>
<b>Ground Water Protection Scheme (GWPS) does not exist</b>	Locally Important / Poor Aquifers	Prove that 1m depth of soil/subsoil cover exists.  Minimum of 1 data point per 5 hectares is required. Site investigation points can be based on existing information. New information only required where existing information is insufficient.
	Regionally Important Aquifers	Prove that 2m depth of soil/subsoil cover exists.  Minimum of 1 data point per hectare is required.  Site investigation points can be based on existing information. New information only required where existing information is insufficient.

The groundwater resources protection zone map is a land-use planning map, and therefore is the most useful map for the decision-making process. Groundwater resources protection zones are determined by combining the aquifer and vulnerability maps. The aquifer map boundaries, in turn, are based on the bedrock map boundaries and the aquifer categories are obtained from an assessment of the available hydrogeological data. The vulnerability map is based on the subsoils map, together with an assessment of relevant hydrogeological data, in particular indications of permeability and karstification.

The location and management of potentially polluting activities in each groundwater protection zone is calculated by means of a groundwater protection response matrix. The level of response depends on the different elements of risk: the vulnerability, the value of the groundwater (with sources being more valuable than resources and regionally important aquifers more valuable than locally important and so on) and the contaminant loading. By consulting the Response Matrix, it can be seen:

- a. whether such a development is likely to be acceptable on that site;
- b. what kind of further investigations may be necessary to reach a final decision; and
- c. what planning or licensing conditions may be necessary for that development. The groundwater protection responses are a means of ensuring that good environmental practices are followed.

The matrix in **Table 8.13** gives the result of integrating the two regional elements of land surface zoning (vulnerability categories and resource protection areas) – a possible total of 24 resource protection zones. In practice this is achieved by superimposing the vulnerability map on the aquifer map. Each zone is represented by a code e.g. Rf/M, which represents areas of regionally important fissured aquifers where the groundwater is moderately vulnerable to contamination. In land surface zoning for groundwater protection purposes, regionally important sand/gravel (Rg) and fissured aquifers (Rf) are zoned together, as are locally important sand/gravel (Lg) and bedrock which is moderately productive

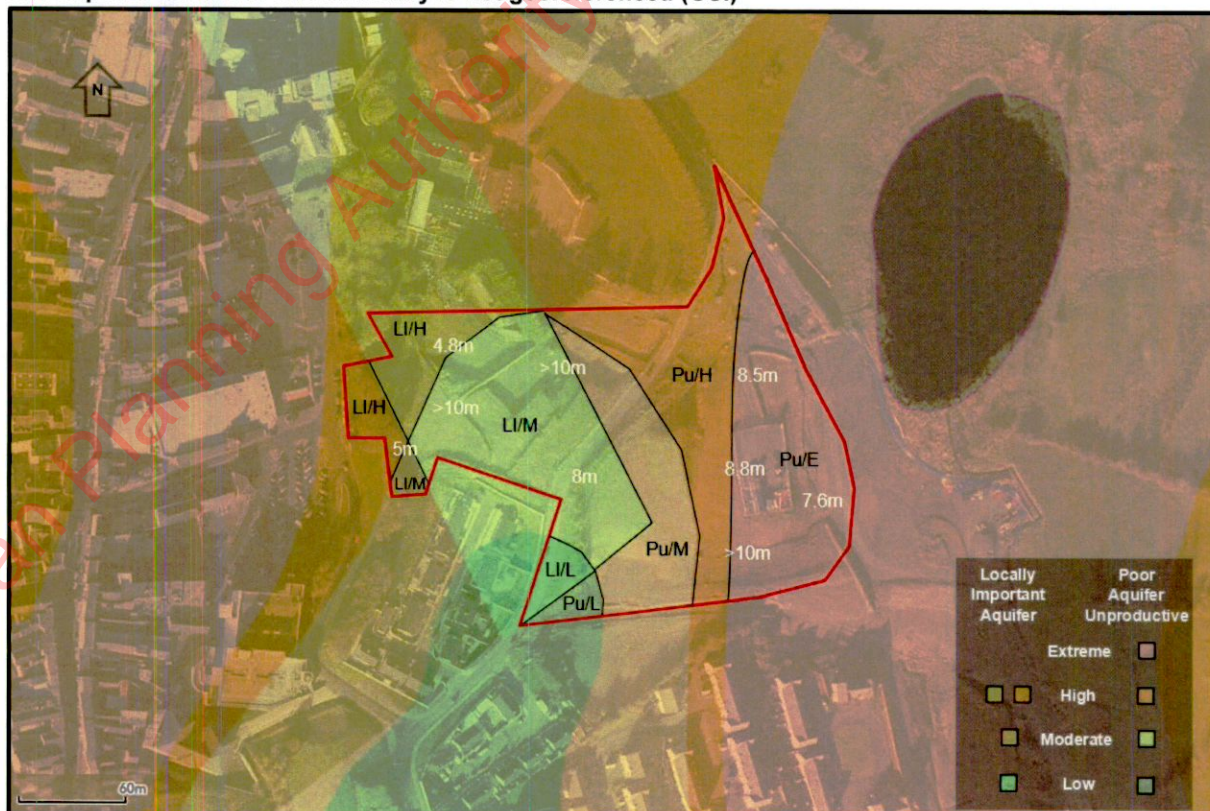
(Lm). All of the hydrogeological settings represented by the zones may not be present in each local authority area.

**Table 8.13: Matrix of Resource Protection Zones from EPA Guidance Notes on Groundwater Protection**

Vulnerability Rating	Resource Protection Zones					
	Regionally Important Aquifers (R)		Locally Important Aquifers (L)		Poor Aquifers (P)	
	Rk	Rf/Rg	Lm/Lg	LI	PI	PU
Extreme (E)	Rk/E	Rf/E	Lm/E	LI/E	PI/E	Pu/E
High (H)	Rk/H	Rf/H	Lm/H	LI/H	PI/H	Pu/H
Moderate (M)	Rk/M	Rf/M	Lm/M	LI/M	PI/M	Pu/M
Low (L)	Rk/L	Rf/L	Lm/L	LI/L	PI/L	Pu/L

As noted in **Section 8.4.12** the site straddles four separate vulnerability ratings from low to extreme. Likewise, the site overlays three aquifers, one poor and two locally important. Around half of the site overlays a ‘generally unproductive’ ‘poor aquifer’ to the east, with the overburden vulnerability defined as ‘extreme’ to ‘low’ here, therefore the eastern area of the site is classed as (Pu/E), (Pu/H), (Pu/M) and (Pu/L). Towards the centre and west of the site the underlying bedrock changes to a ‘locally important’ aquifer with a ‘high’ to ‘low’ overburden vulnerability rating. Combining the rating and classification indicates a vulnerability assessment of (LI/L), (LI/M) and (LI/H). The findings are summarised in **Figure 8.11**.

**Figure 8.11: Groundwater Vulnerability Assessment of Underlying Aquifers. White font indicates location and depth of borehole. Site boundary is not georeferenced (GSI)**



**Groundwater Protection Responses**

The Groundwater Protection Responses (see DoE/GSI/EPA publication, 1999) recommends that a consistent minimum thickness of 1m of soil/subsoil must be demonstrated overlying ‘Locally Important Aquifers’ and ‘Poor Aquifers’ to ensure that EPA Guidelines are being adhered too. This refers to areas where Groundwater Protection Schemes do not exist and encompasses the proposed site location.

**Site Vulnerability**

**Table 8.14: Vulnerability Rating Summary**

Vulnerability Rating	SOURCE PROTECTION AREA		Resource Protection (Aquifer Category)					
			Regionally Important Aquifers (R)		Locally Important (L)		Poor Aquifers(P)	
	Inner	Outer	Rk	Rf/Rg	Lm/Lg	LI	PI	Pu
Extreme (E)	R4	R4	R3 <sup>2</sup>	R3 <sup>2</sup>	R3 <sup>1</sup>	R3 <sup>1</sup>	R3 <sup>1</sup>	R3 <sup>1</sup>
High (H)	R4	R2 <sup>1</sup>	R1	R1	R1	R1	R1	R1
Moderate (M)	R3 <sup>3</sup>	R2 <sup>1</sup>	R1	R1	R1	R1	R1	R1
Low (L)	R3 <sup>3</sup>	R2 <sup>1</sup>	R1	R1	R1	R1	R1	R1

R1 Acceptable, subject to normal good practice.

R2<sup>1</sup> Acceptable subject to a maximum organic nitrogen load (including that deposited by grazing animals) not exceeding 170 kg/hectare/yr.

R3<sup>1</sup> Not generally acceptable, unless a consistent minimum thickness of 1 m of soil and subsoil can be demonstrated.

R3<sup>2</sup> Not generally acceptable, unless a consistent minimum thickness of 2 m of soil and subsoil can be demonstrated.

R3<sup>3</sup> Not generally acceptable, unless no alternative areas are available and detailed evidence is provided to show that contamination will not take place.

R4 Not acceptable

From desktop and field investigations it can be determined that the development site is located on a poor and locally important aquifer of low to extreme vulnerability with the site divided into 7 no. vulnerability zones, including Pu/E, Pu/H, Pu/M, Pu/L, LI/H, LI/M and LI/L, as shown in **Figure 8.11**.

An intrusive site investigation was conducted by IGSL in July 2022. This investigation consisted of a total of 7 no. trial pits excavated to depths of 2.6m to 3.1m bgl and 9 no. cable percussive boreholes to depths of up to 10m bgl. Bedrock was not encountered in any of the trial pits. Obstructions were encountered in 6 no. boreholes with obstructions encountered at depths of 4.8m – 8.8m bgl. A total of 3 no. boreholes reached the maximum 10m test depth. IGSL concluded that the site elevations have been modified throughout the site and the underlying soil / subsoil to the east comprises a re-worked engineered infill of a sandy silt clay substrate that has been mechanically compacted. The approximate location and depth of boreholes is indicated in **Figure 8.11**.

The groundwater protection response recommends that a consistent thickness of 1m of soil / subsoil must be demonstrated overlying poor or locally important aquifers to ensure that EPA guidelines are being adhered to. The ground investigations conducted by IGSL have indicated a minimum of 4.8m soil / subsoil throughout the site.