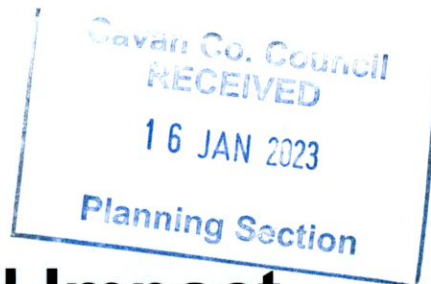


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Planning Consultants



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

Volume I Non-Technical Summary

Prepared by RMLA Limited

On behalf of Tesco Ireland Limited

December 2022

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Prepared By: Robert McLoughlin
Position: Managing Director
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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.

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 these 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 (Volume II) for the full description of development.

1.3 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
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- 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 Effects

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

1.4 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 1.1, 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’).

Table 1.1 EIAR Structure and Competent Experts

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

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

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

			Rachel Lawler , BA (Geography and Psychology), MSc (Urban Design and Planning), MIPI (Assistant Planner)
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1.5 Non-Technical Summary

A copy of this 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.

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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. The chapter outlines the following:

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

2.2 Description of the Site and Surroundings

2.2.1 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 majority of the site is under the ownership of Tesco Ireland Ltd while a small portion of the site to provide upgraded landscaping works and the pedestrian link are 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 majority of the site is covered by grassland and scrub with mixed native hedgerows along the site boundaries. The topography of the site differs as much as 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

2.3 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);

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

2.4 Project Details

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-planning meetings. The key principles on which the design framework was based include the following:

1. Design & Quality
2. Access & Connectivity
3. Public Realm
4. Built Form

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, café and petrol filling station.

Table 2.1 Breakdown of proposed units

Use	SQM
Tesco Supermarket	5,196.88
Drive thru Café unit	173.51
Petrol Filling Station	car wash/jet wash (c. 89 sq.m); forecourt canopy (covers 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.

As set out in the Transport Assessment provided by Systra, 2 no. vehicular access points to the proposed development will be from Cock Hill Road at the northeast and southern boundary of the site.

2.4.3.2 Pedestrian & Cycle Access

A dedicated pedestrian access route and plaza is provided to the west of the application site, linking with the town centre.

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 provides 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 Details

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.

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.

2.5.1 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.

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.

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. 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.¹

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.² Furthermore, the Retail Guidelines state that:

"The planning system should not be used to inhibit competition, preserve existing commercial interests or prevent innovation."³

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

¹ Retail Planning Guidelines for Planning Authorities, 2012, pg. 4

² Retail Planning Guidelines for Planning Authorities, 2012, pg. 15

³ Retail Planning Guidelines for Planning Authorities, 2012, pg. 15

function of the settlement.⁴ 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.⁵

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.⁶ 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.”⁷

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.⁸

⁴ Retail Planning Guidelines for Planning Authorities, 2012, pg. 10

⁵ Retail Planning Guidelines for Planning Authorities, 2012, pg. 28

⁶ Retail Planning Guidelines for Planning Authorities, 2012, pg. 44

⁷ Retail Design Manual – A Good Practice Guide, 2012, Introduction

⁸ Northern Regional Assembly Regional Spatial & Economic Strategy (RSES), 2020-2032, pg. 128

The RSES further states the Retail Planning Guidelines, 2012, set out the framework for planned 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.⁹

- **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.*

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.

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*

⁹ Northern Regional Assembly Regional Spatial & Economic Strategy (RSES), 2020-2032, pg. 186

*improving town/village centre facilities*¹⁰. A range of uses are permitted in principle under this zoning objective including retail comparison, retail shops-major and commercial car park.

In regard to Retail in Cavan Town, 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.”*¹¹

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.

¹⁰ Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 603

¹¹ Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 90

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.

4.2. Consultation

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

4.3 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.

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.”¹

¹ EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, 2022, pg 33

4.4 '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.

4.5 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.**"*²

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**"*³

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.

² Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 603

³ Cavan County Development Plan, incorporating a Local Area Plan for Cavan Town 2022-2028, pg. 603

4.6 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.

4.7 Alternative Layouts and Designs

The layout and design of the proposal undertook an iterative process with a number of different options assessed. Chapter 4 of Volume II of the EIAR provides detailed information regarding each option considered. Table 4.1 provides a summary of the different options assessed.

Table 4.1 Summary of Design Options

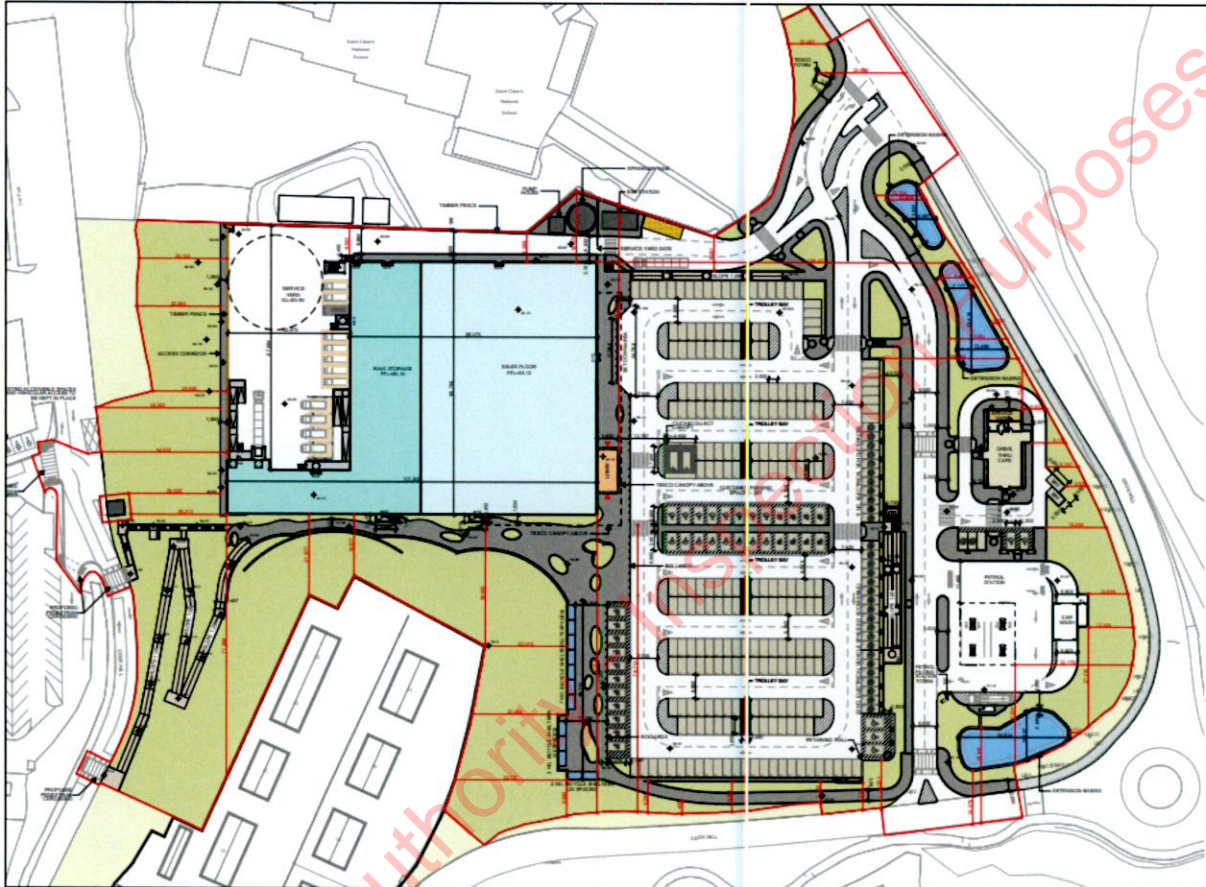
Design Option	Assessment Summary
<p>Option A</p>	<p>Previously approved layout under Cavan County Council Reg. Ref. 11/1992; ABP Ref. No. PL48.240097.</p> <p>The reasons for not proceeding with Option A are as follows:</p> <ul style="list-style-type: none"> • There was no longer a requirement for a store 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.
<p>Option B</p>	<p>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).</p> <p>The reasons for not proceeding with Option B are as follows:</p> <ul style="list-style-type: none"> • 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.
<p>Option C</p>	<p>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.</p>

	<p>The reasons for not proceeding with Option C are as follows:</p> <ul style="list-style-type: none"> • 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.
Option D	<p>The Proposed Site Layout presented to the Local Authority at the second pre-planning meeting on 13th 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 (pilling) 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.</p> <p>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.</p> <p>The reasons for not proceeding with Option D are as follows:</p> <ul style="list-style-type: none"> • 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.
Option E	<p>The proposed layout was a study, following the pre-planning meeting on the 13th 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.</p> <p>The reasons for not proceeding with Option E are as follows:</p> <ul style="list-style-type: none"> • 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.
Option F	<p>The proposed scheme was presented during the pre-planning meeting on 30th September 2021 and included a smaller Format 40/Format 35 store with the service yard proposed to the rear (west) to further reduce its visual impact and to also reduce the need for extensive pilling. Grocery Home Shopping was also included to the building as a result of post-covid-19 learnings.</p> <p>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.</p> <p>As such, the reasons for not proceeding with Option F are as follows:</p> <ul style="list-style-type: none"> • 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.

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 8th November 2022, is shown below in Figure 4.1. 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 4.1 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.

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.

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 provide 120 no. sheltered cycle parking spaces at convenient locations within the proposed development to encourage active travel.

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.

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 Demographic Profile

In order to assess the demographic profile, the primary study area is defined by the 2 no. Electoral Divisions 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, similar statistics for the County and the State were examined. The total population of the catchment area in 2016 was 12,043 persons.

5.4. 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 5.1 below which demonstrates the existing community infrastructure servicing the catchment population of the subject site.

Table 5.1 Social/Community Infrastructure in 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, Breffni 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

5.5 Construction Phase

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

5.5.1 Land Use

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.

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.

5.5.2 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.

5.5.3 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.

5.5.4 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.

5.6 Operational Phase

5.6.1 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.

5.6.2 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.

5.6.3 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.

5.6.4 Human Health

In terms of Population and Human Health overall, no significant residual effects are expected at operational stage as a result of the development.

5.7 '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 predicted significant effects on population and Human Health.

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6.0 Traffic and Transportation

Chapter 6 of Volume 2 of the EIAR assesses the likely significant effects on traffic and transportation waste arisings from the proposed development on the surrounding environment.

6.1 Receiving Environment

The subject site is vacant, and its 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 via an existing priority junction. The second element runs in an east-west direction between the Cock Hill Road roundabout and St Francis's Housing Estate.

There is good pedestrian and cycle 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.

6.2 Predicted Effects of the Proposed Development

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

6.2.1 Do Nothing

The site is currently vacant and generates no traffic. However, it is zoned for development and 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.

It is likely that in the absence of this proposal that a development of a similar nature will be brought forward in the near future given the Cavan County Development 2022-2028 objective to develop the site.

6.2.2 Construction Phase

The earthworks stage of the construction phase is envisaged to be the most onerous for construction vehicle movements. This period is estimated to last three weeks during which a maximum of 31 vehicles are expected to travel to and from the site per working day. During the earthworks stage, it is estimated that up to 20 personnel will be working at the site. 20 on-site parking spaces will be provided for visitors and staff combined to ensure that where driving is required that there is no overspill of traffic onto the surrounding road network, however, staff and visitors will be encouraged to travel to site by sustainable modes. It is assumed that an up to 10 trips for miscellaneous deliveries/visitors will occur each day.

The proposed working for the site is 7am-6pm Monday-Friday & 8am-1pm Saturdays with no work on site on Sundays or Bank Holidays. The access points for HGV construction traffic will be limited to the existing priority access on Cock Hill Road and a dedicated HGV route towards N3 National Road.

The combined increase in traffic resulting from the construction stage activities is 1.1% of the existing traffic on the network.

This effect of this increase is assessed as imperceptible and short-term in nature and well below Transport Infrastructure Ireland's (TII's) Traffic and Transport Assessment Guidelines thresholds for transport impact assessment of 5% on congested networks

6.2.3 Operational Phase

The Operational Phase assessment has been undertaken in line with Transport Infrastructure Ireland's (TII's) Traffic and Transport Assessment Guidelines using outputs from Junctions 9 PICADY and ARCADY models developed. Traffic surveys were undertaken on Friday 7th October and Saturday 8th October 2022 at the following junctions to inform the assessment:

- 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)

In total, it is expected that the development units will generate 170 vehicular arrivals and 167 departures during the Friday PM peak (17:00-18:00) and 299 arrivals and 276 departures during the Saturday peak (13:00-14:00). Trips are distributed in accordance with background traffic patterns recorded during surveys on Friday 7th October and Saturday 8th October 2022.

In terms of effect of the network operation, the additional traffic results in:

- Junction 2 R212 Dublin Road East arm being moderately to significantly affected in the Friday and Saturday Peak Periods.
- Junction 2 Cock Hill Road arm being moderately to significantly affected in the Friday and Saturday Peak Periods.
- Junction 2 R212 Dublin Road West arm being moderately to significantly affected in the Friday and Saturday Peak Periods.
- Junction 5 Cock Hill Road arm being moderately to significantly affected in the Friday Peak Period.

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

Overall, across the eight junctions assessed, 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.

The development also has positive impacts with enhanced connectivity to main street for active travel users.

6.3 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.

6.3.1 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.

6.3.2 Operational Phase

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.

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.

6.4 Monitoring

6.4.1 Construction Phase

The implementation of the CEMP will be monitored by the Contractor and will be included in the Contractor's appointment. The Site Manager will monitor the CEMP and provide progress reports through the construction programme.

6.4.2 Operational Phase

The Travel Plan will be monitored by the appointed Travel Plan Co-ordinator. Post Occupation surveys will be undertaken as part of the Travel Plan to monitor the effectiveness of the measures included.

6.5 Residual Effects

6.5.1 Construction Phase

The CEMP will help alleviate the impact of the development construction traffic particularly during

the peak hours. It will also help ensure that the standard of the surrounding public network is maintained and free from dust and dirt from construction traffic. With the CEMP in place the impact will be imperceptible and short-term in nature.

6.5.2 Operational Phase

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. 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.

6.6 Reinstatement

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

6.7 Interactions and Potential Cumulative Effects

6.7.1 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.

6.7.2 Potential Cumulative Effects

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.

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.

7.0 Land, Soils, Geology

Chapter 7 of Volume 2 of the EiAR assesses the likely significant effects of the proposed development on land, soils and geology, with reference to topography, drift geology, bedrock geology, soils & subsoils.

7.1 Receiving Environment

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

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

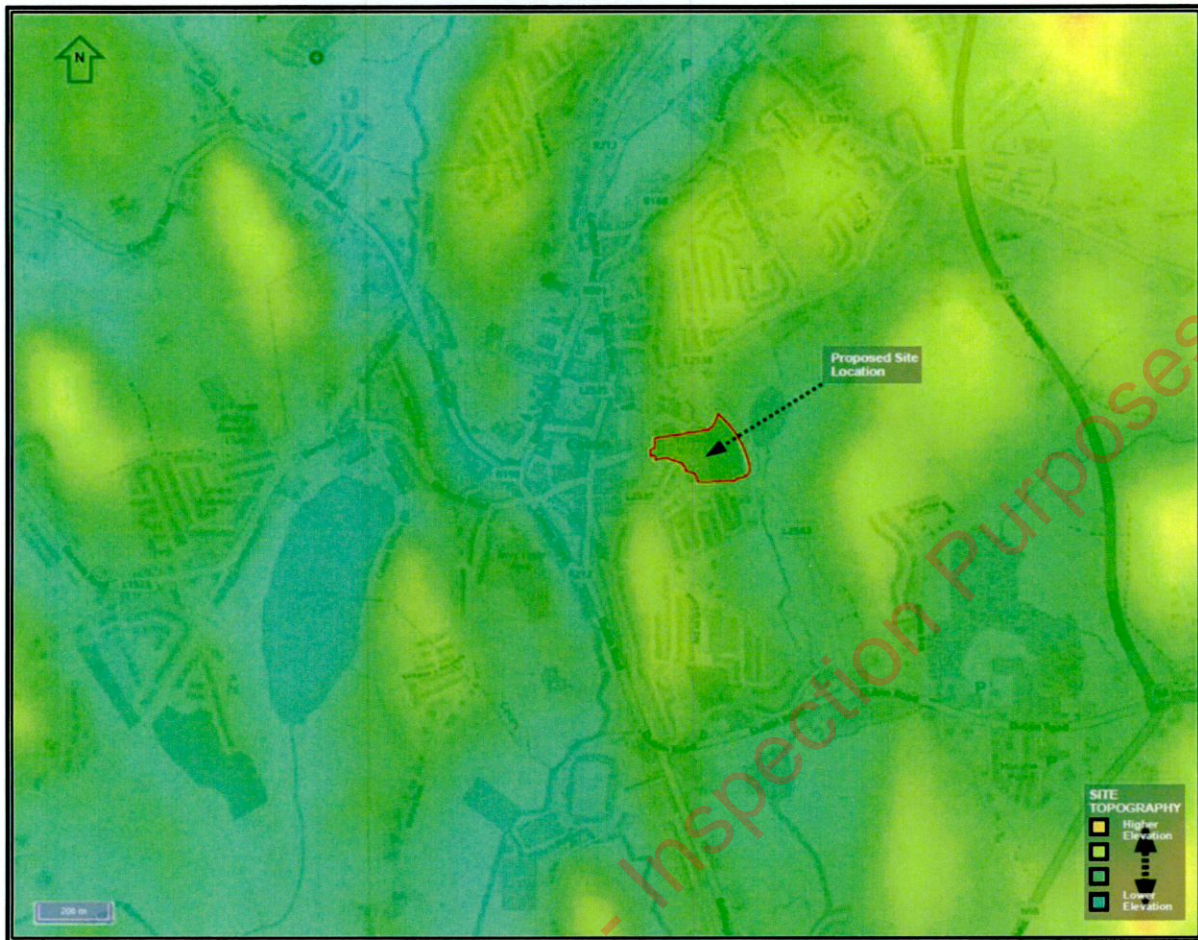
7.1.1 Topography

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 Boleybrack 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.

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



7.1.2 Drift Geology

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.

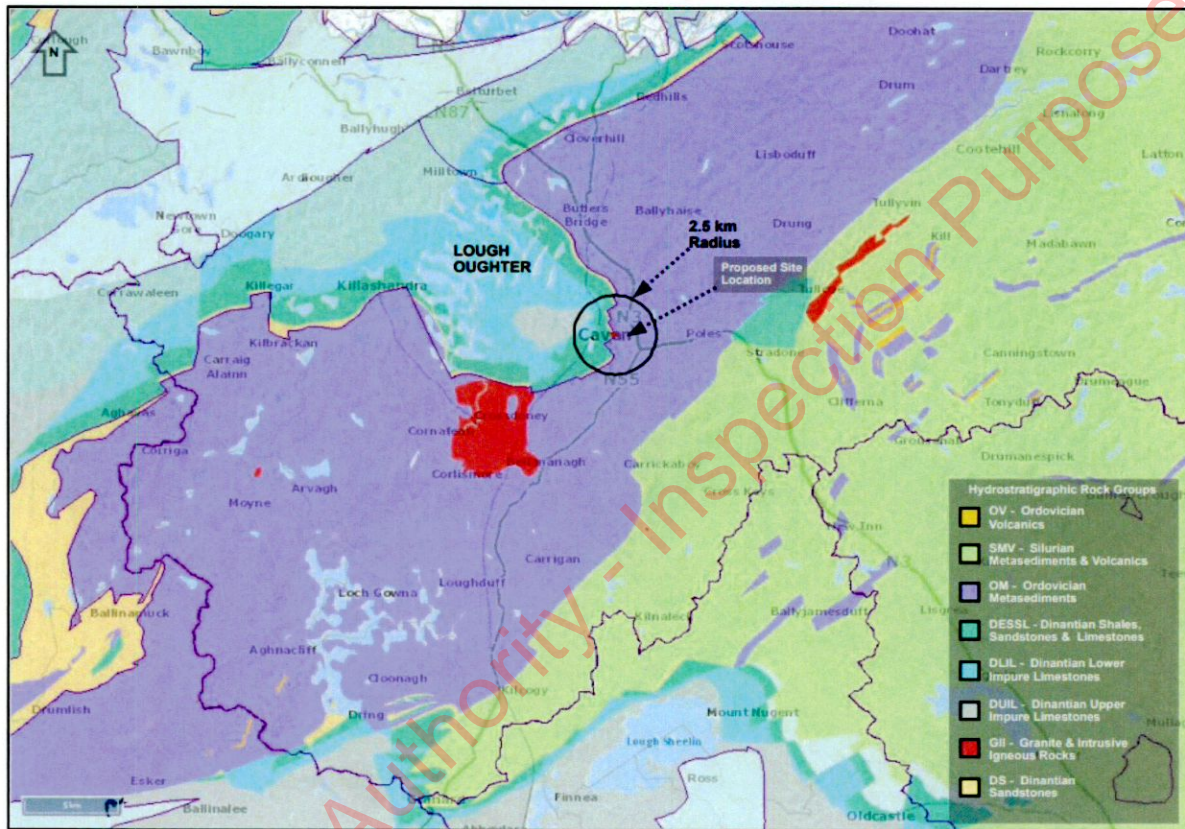
EPA Soils Classification maps identify the subject site as comprising three known soil types. The vast majority of the site consists of a mineral poorly drained (AminPD) classified as Till derived chiefly from Lower Palaeozoic rocks consisting of sandstones and shales. To the east is the town core which 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.

7.1.3 Regional Bedrock Geology

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 lapetus 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.

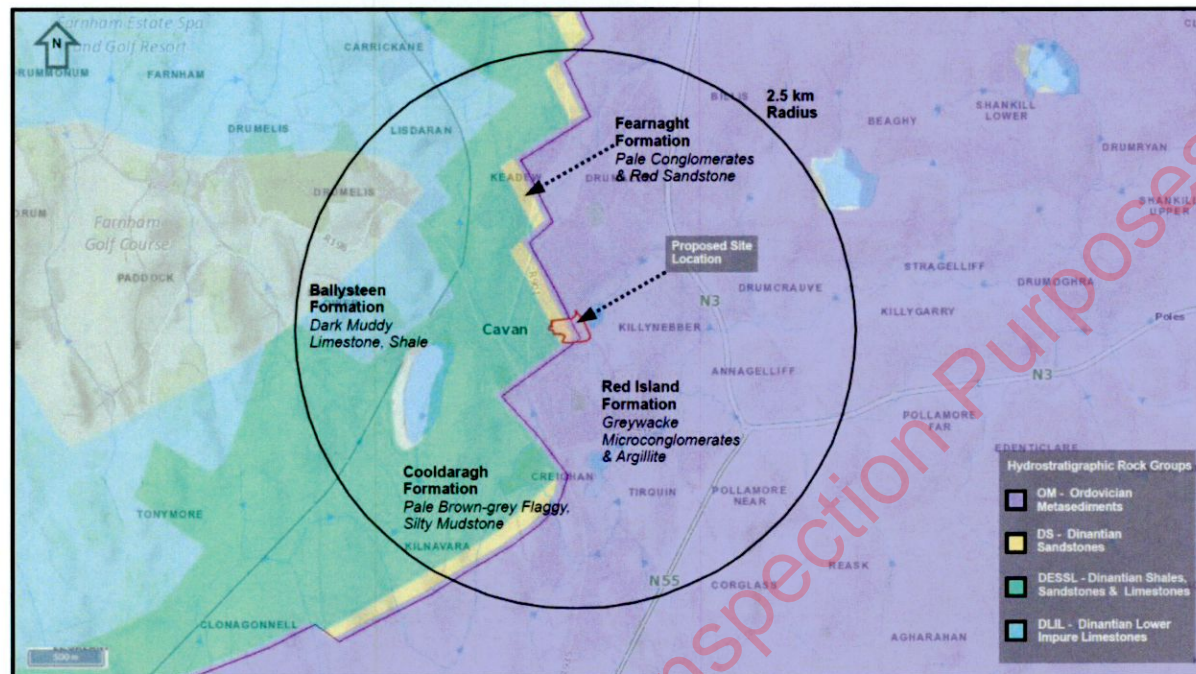
Younger, carboniferous (358.9Mya to 298.9Mya) rocks, of sedimentary origin are located towards the northwest, comprised of Dinantian Shales, Sandstones and Limestones (Green layer), and Dinantian

Limestones (Blue & Grey layers).

7.1.4 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**

7.1.4 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 7.1** below.

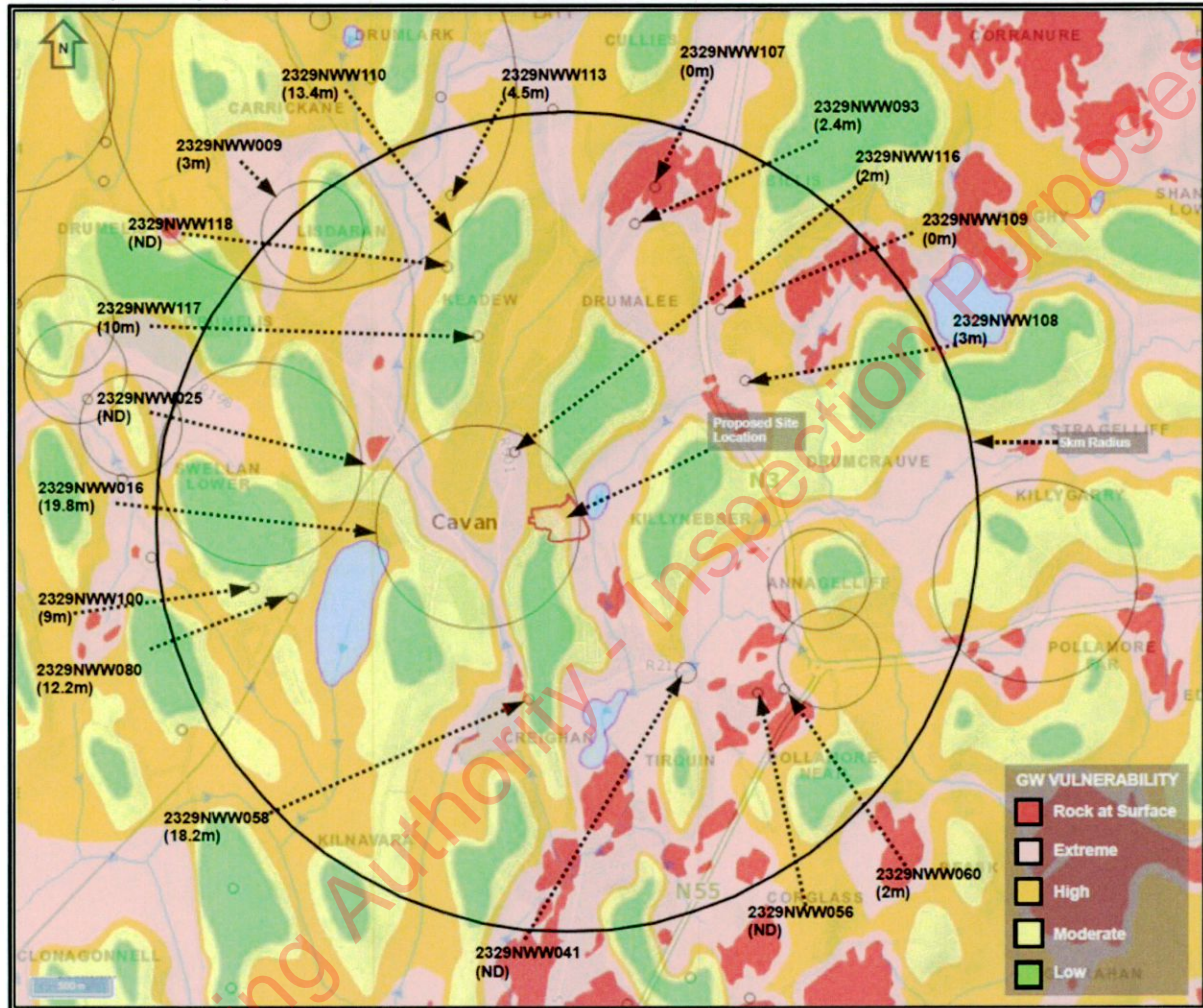
Table 7.1: Groundwater Wells with 2km of the site (GSI Well Database)

GSI Reference	Easting Northing	Well Type	Depth (m bgl)	Depth to Rock (m)	Well Use	Yield m ³ /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)



7.1.4 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

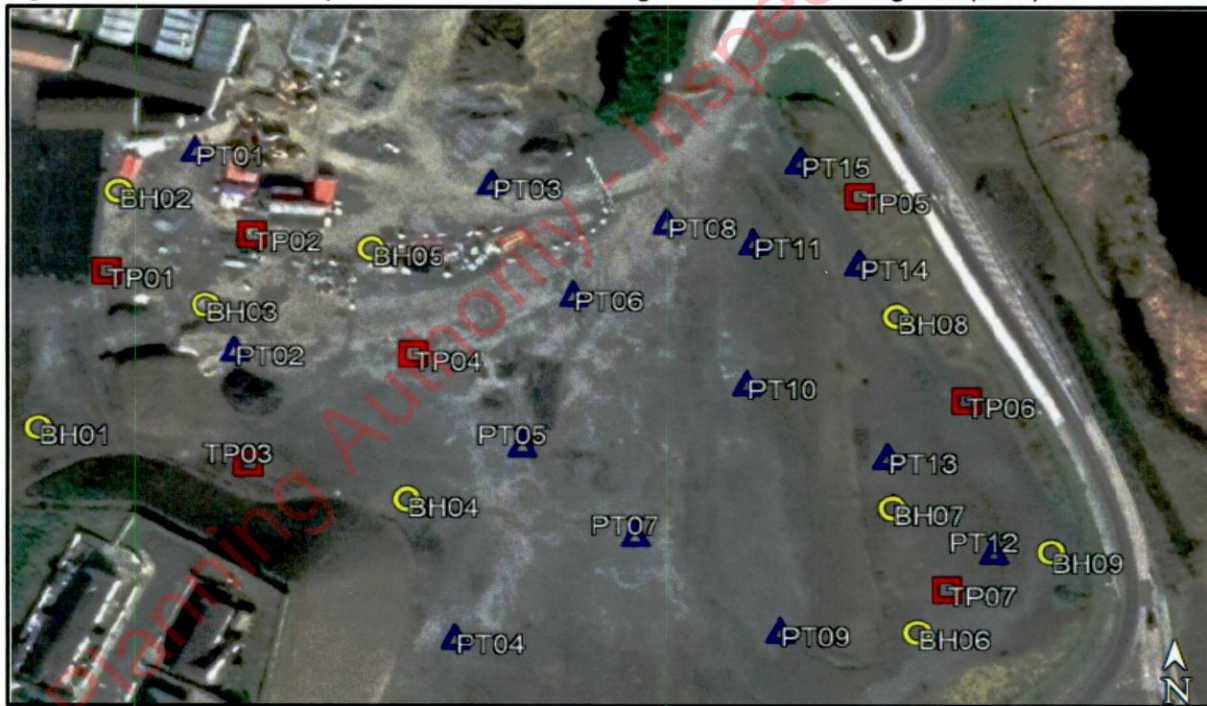
Detailed borehole logs and description of the site investigation are presented in **Appendix 8.5** (See Volume 3 of the EIAR), but the general structure of the ground can be described as follows in **Table 7.2**:

Table 7.2: Summary of ground conditions at the proposed site (IGSL)

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

7.1.5 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.

7.1.6 Geological Heritage

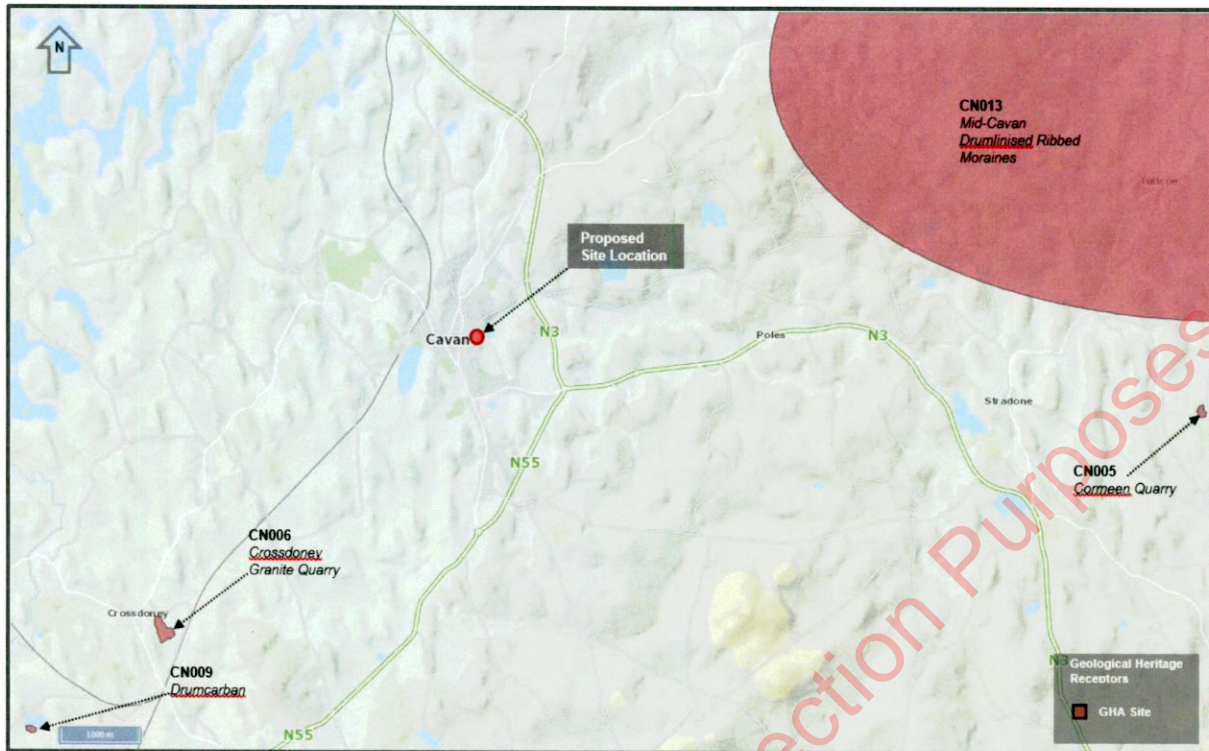
Reference to the GSI online database confirms the proposed site is not located within a geological heritage site. **Figure 7.6** overleaf indicates the location of several geological heritage areas within the region.

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 (CuFeS₂) and molybdenite (MoS₂). 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)



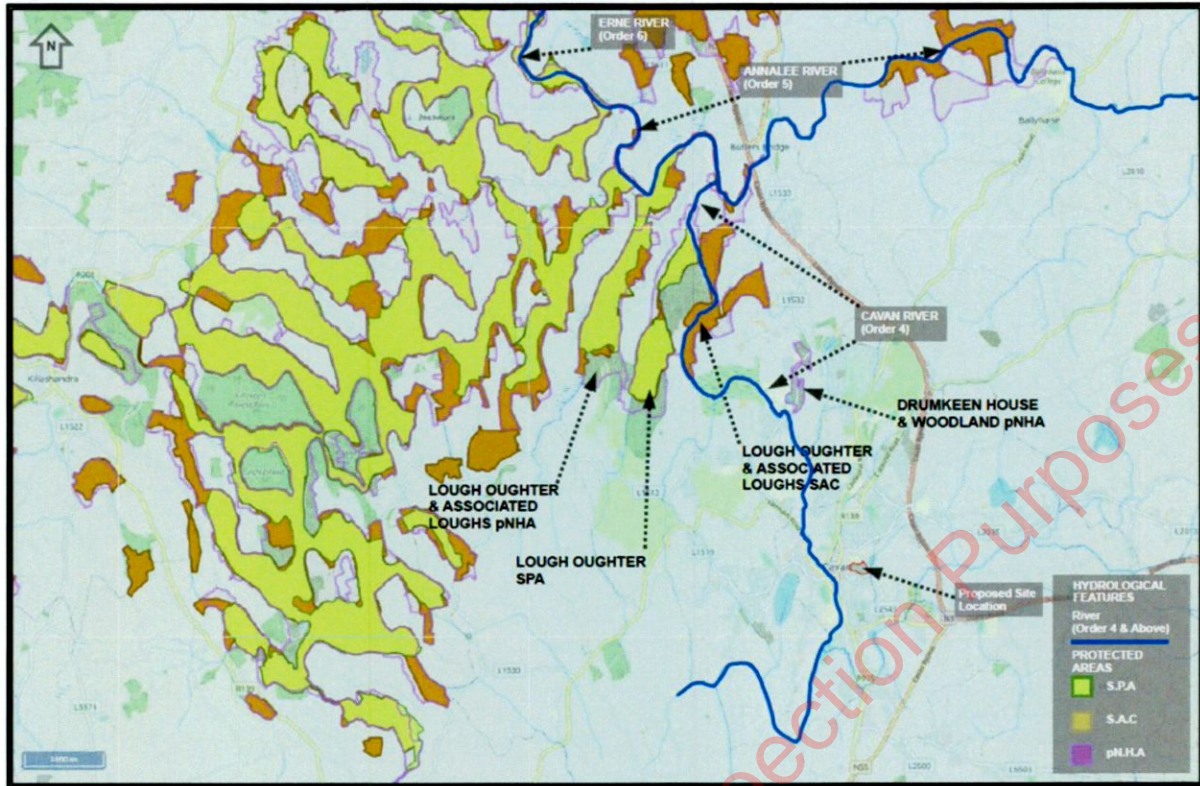
7.1.7 Protected Areas

The area surrounding the site contains several protected areas. **Table 7.3** 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 7.3: 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



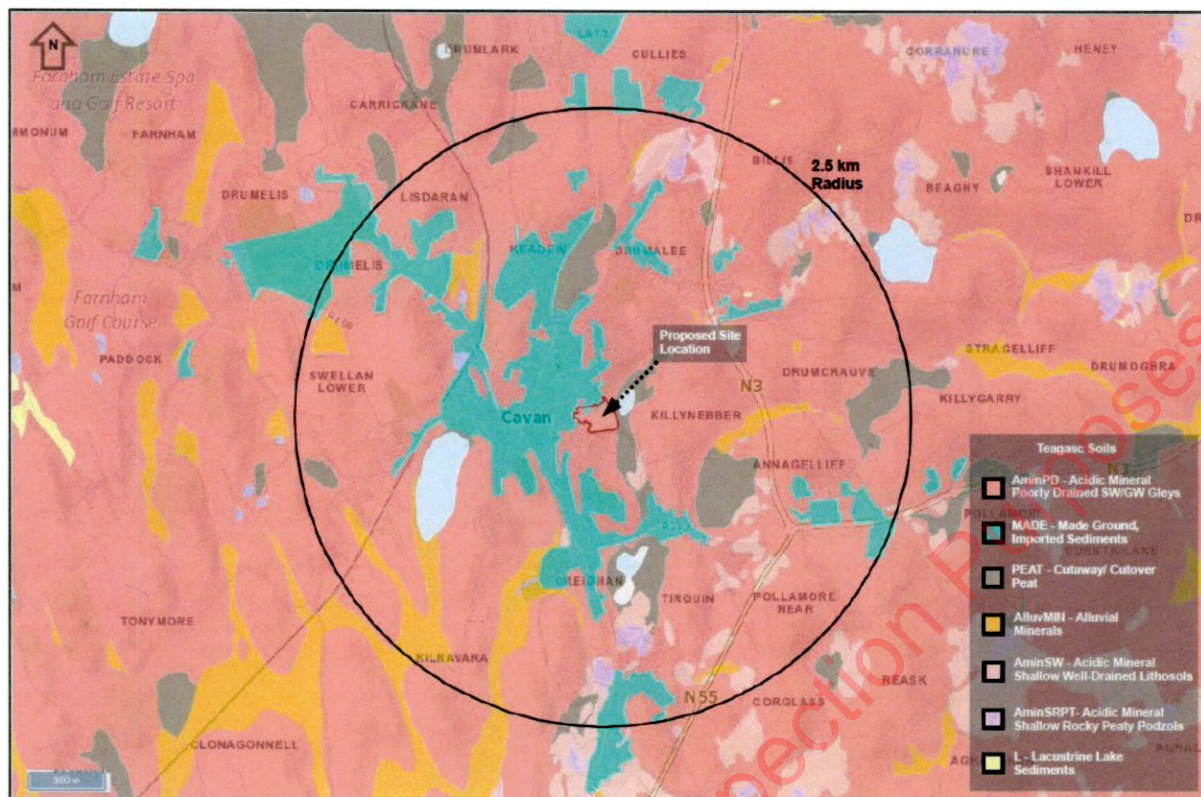
7.1.8 Soils and Subsoils

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 side consists of imported made ground also.

Under the Irish Soil Information System (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)



7.1.9 Soil Contamination

A review of the EPA & DCCAIE 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 7.4**.

Table 7.4: 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 awaste 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 7.5: 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** (See Volume 3 of the EIAR). The results of these analyses are presented in **Table 7.6**.

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

Table 7.6: 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-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 ₄)	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			

7.1.10 Landslides

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

7.1.12 Karst Features

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

7.1.13 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/m³). For workplaces the Reference Level is 400 Bq/m³

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/m³). 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.

7.2 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.

7.2.1 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.

7.2.2 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 7.7**.

Table 7.7 – 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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7.2.3 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 in **Section 7.6.3** of *EIAR Volume 2 – Main Report* and summarised in **Table 7.8**.

Table 7.8 – 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		

7.2.4 Sources - Operational Phase

The operational phase effects anticipated and considered throughout the lifetime of the operation of the facility are considered in detail in **Section 7.6.4** of *EIAR Volume 2 – Main Report* and summarised in **Table 7.9**.

Table 7.9 – Severity/ Magnitude of Impact during construction phase

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

7.3 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.

7.3.1 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.

7.3.2 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 GSDS, 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 detention basins
- 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**.

7.4 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.

7.4.1 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**, in Chapter 7 of the **EIAR Volume 2 – Main Report**

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**.

7.4.2 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**, in Chapter 7 of the **EIAR Volume 2 – Main Report**

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**.

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8.0 Hydrology and Hydrogeology

Chapter 8 of Volume 2 of the EiAR 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.

8.1 Receiving Environment

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

- Hydrology
- Hydrogeology

8.1.1 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 km² with approximately 7,400 km² 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.

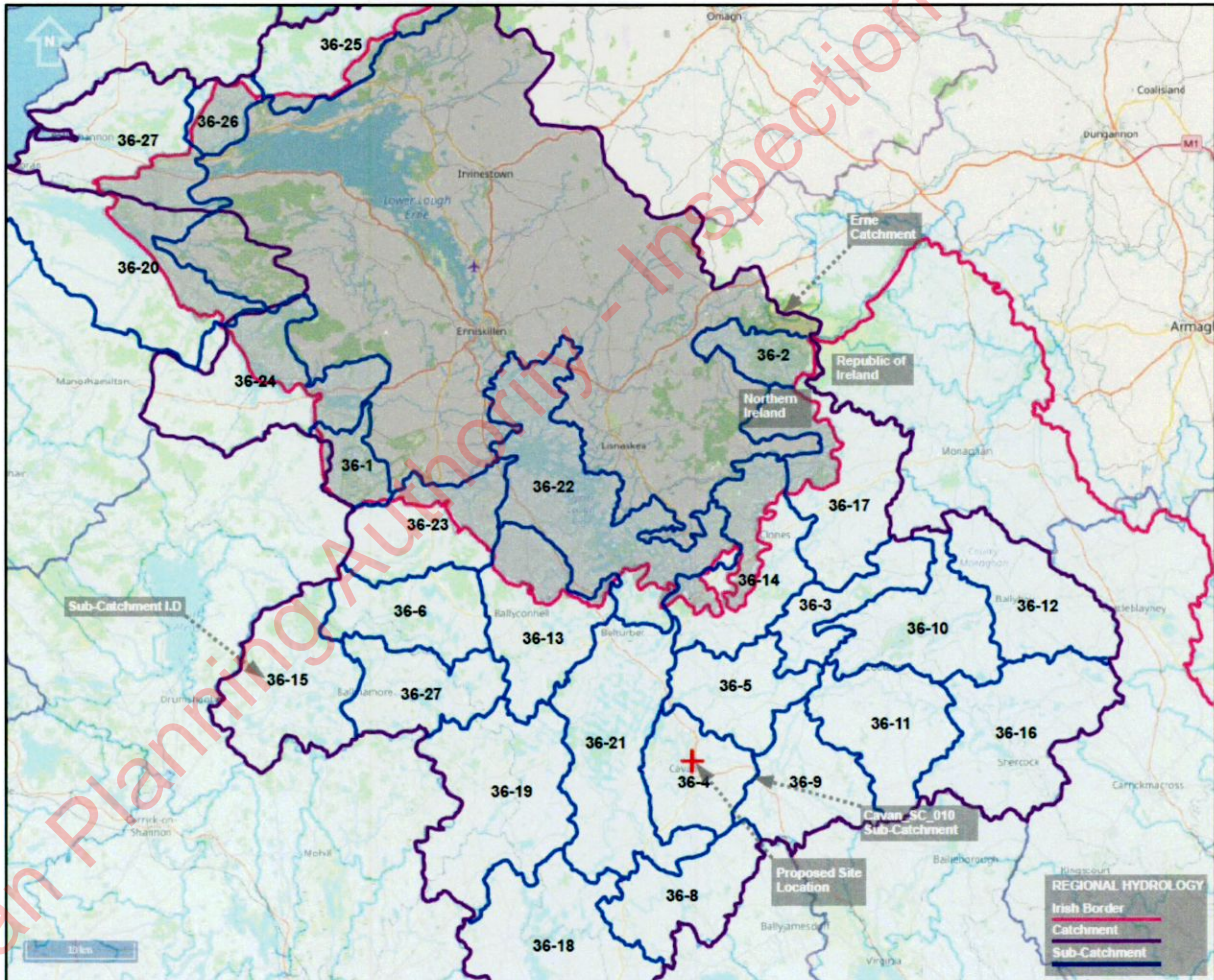
The proposed development is located with the Erne Catchment, hydrometric area 36. The principal river in the catchment (hydrometric area 36) is the Erne (which drains part of County Cavan before crossing the border into Northern Ireland near Belturbet). This catchment is predominantly rural with the 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 Dennmore 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 8.1 & 8.2.

Figure 8.1: Erne River Catchment and Sub-Catchments (EPA Maps)



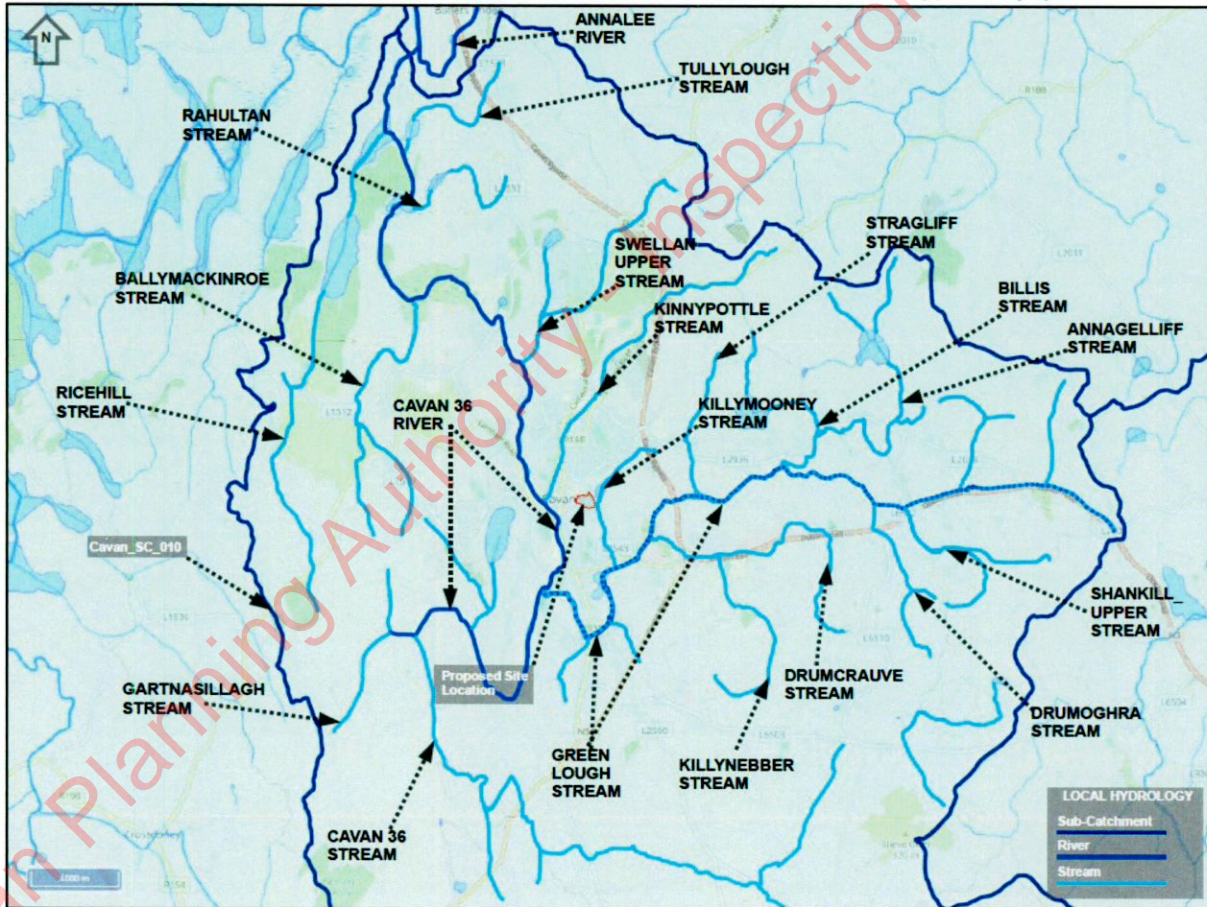
The principal hydrological feature closest to the site is Lough Oughter, ca. 3.8km northwest. Lough Oughter is a lake, or complex of lakes, in County Cavan covering more than 8,900 ha. The complex of lakes lies on the River Erne and forms the southern part of the Lough Erne complex. The lakes are

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 are 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 8.2: 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 8.2**, 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.

8.1.2 Protected Areas

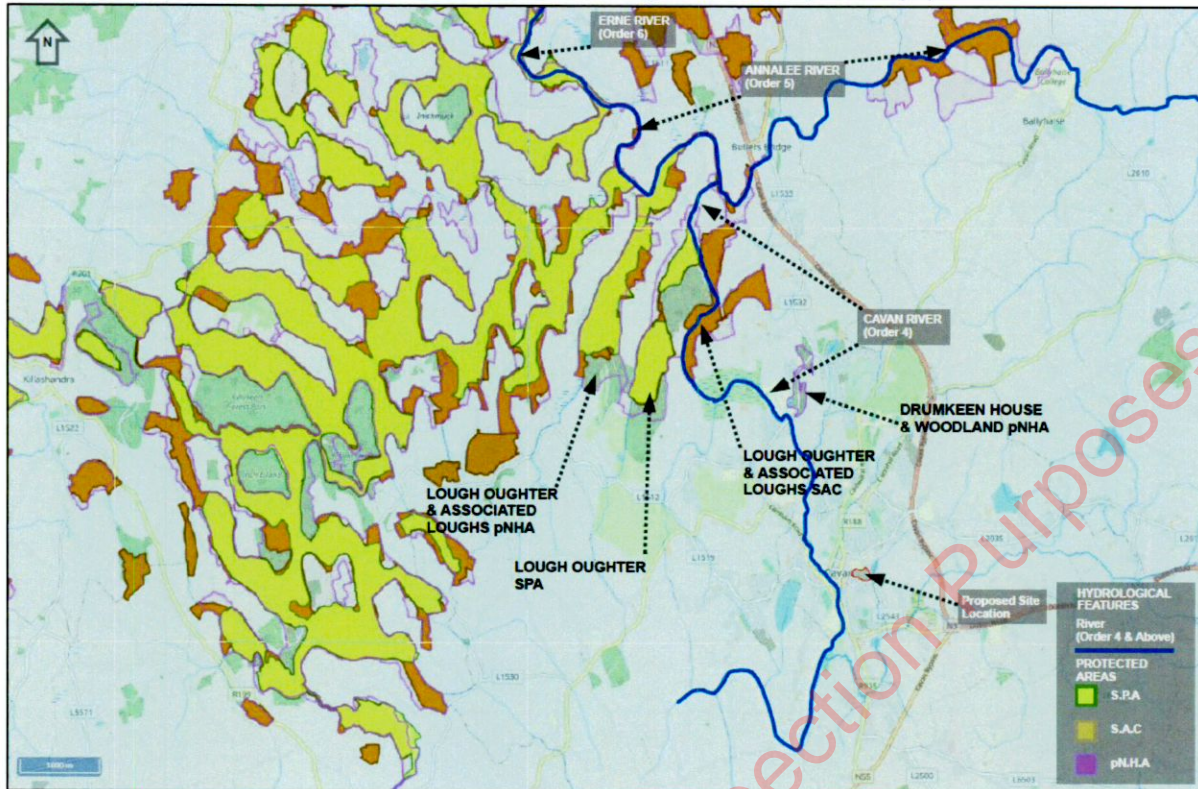
There are four European Designated sites within 10 km of the proposed development, one of which is designated as a Special Areas of Conservation (SACs), one as a Special Protected Areas (SPAs) and two of which are designated as proposed or designated Natural Heritage Areas (NHA's), (Refer to Chapter 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 8.3**.

Figure 8.3: 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 8.1** below.

Table 8.1: 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	

8.1.3 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.

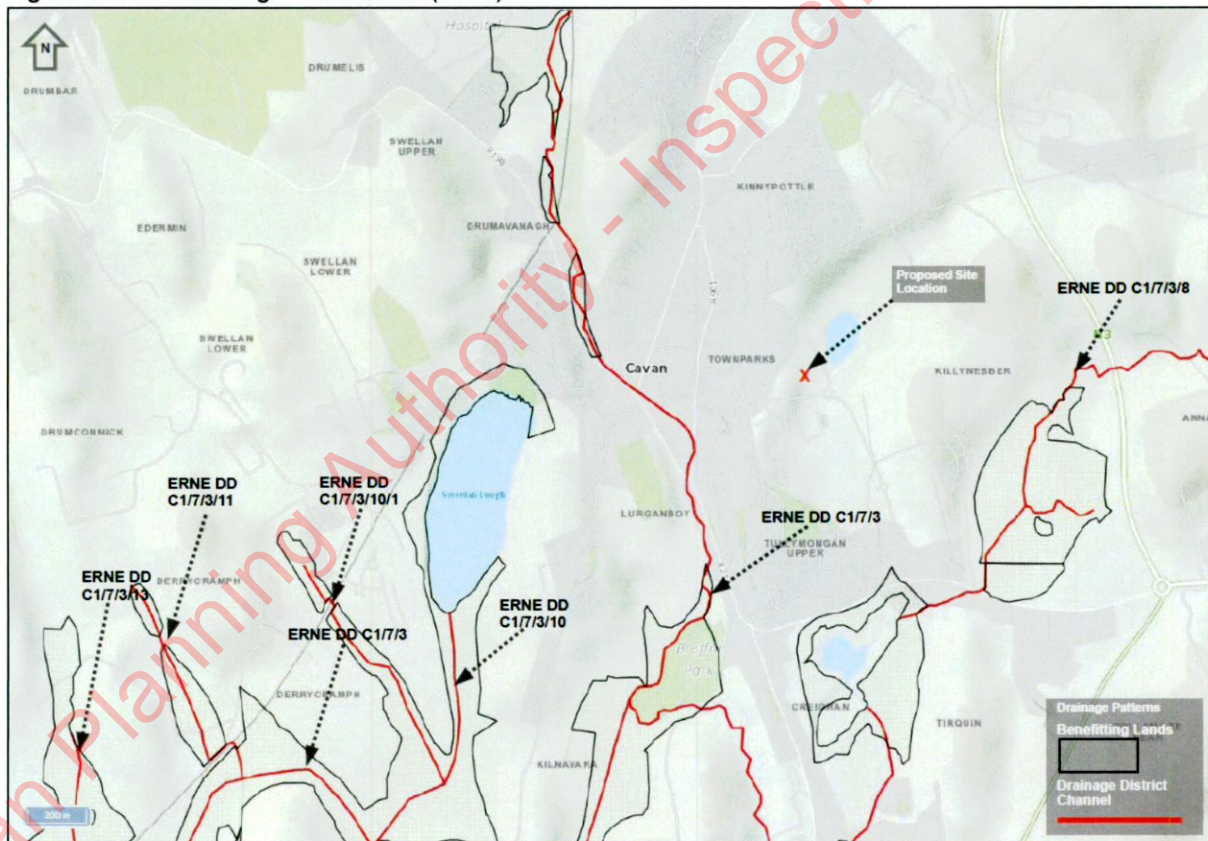
The local drainage network within the locality of Cavan Town has been modified under the Drainage District (DD) scheme. Drainage Districts were carried out by the Commissioners of Public Works under a number of drainage and navigation acts from 1842 to the 1930s to improve land for agriculture and

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 8.4**.

Figure 8.4: 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.

$$Qbar = 0.00108AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$$

Based site-specific inputs a Qbar value (mean annual flow from the site catchment) for 1 in 1 years was calculated as 22.48 l/s.

8.1.4 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.

8.1.5 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.

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 8.5**.

Figure 8.5: 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 8.2**.

Table 8.2: 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** (See Volume 3 of the EIAR).

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.

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).

8.1.6 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.

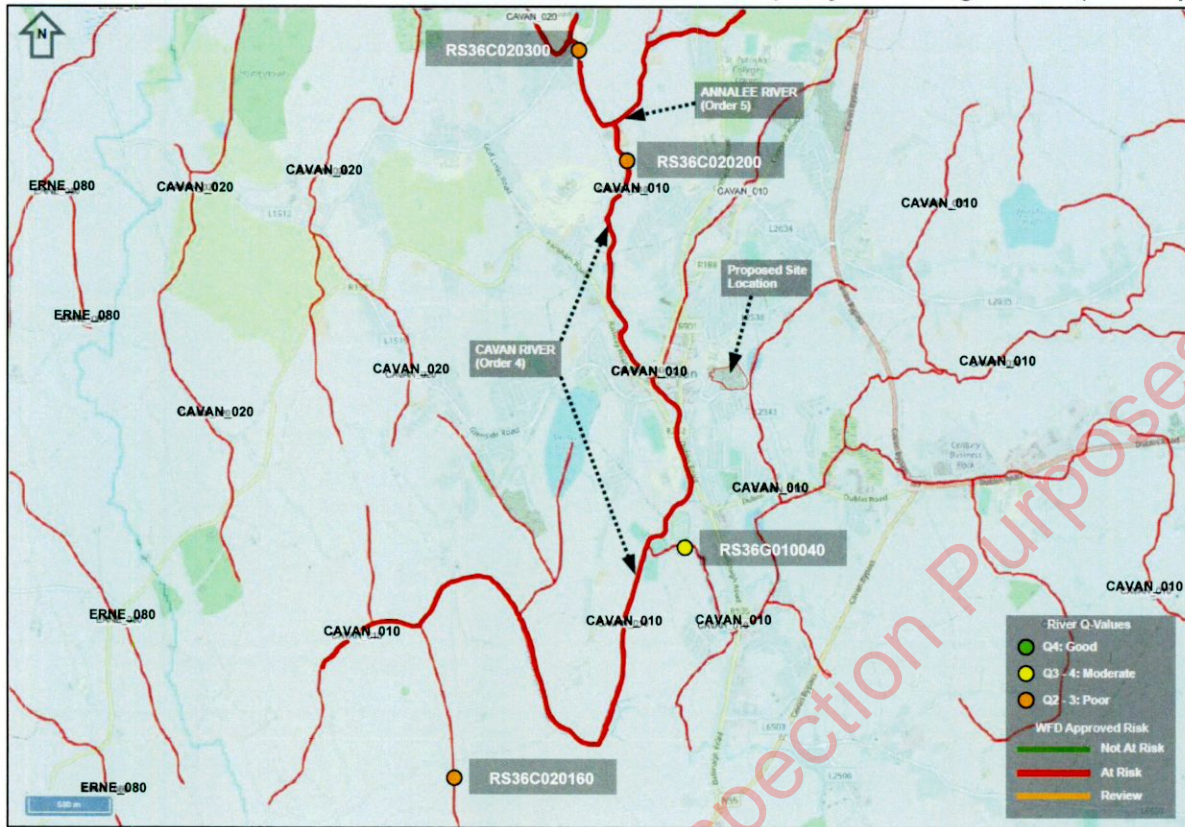
W 05: Support the development of group water supplies and public drinking water supplies throughout the county.

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.

8.1.7 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 8.6**.

Figure 8.6: Water Framework Directive Risk and locations of water quality monitoring stations (EPA maps)



The four monitoring stations within the Cavan_010 catchment are listed in **Table 8.3**, along with their associated Q-Ratings.

Table 8.3: 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 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 8.4**.

Table 8.4: Description of Receiving Waters – Cavan_010 River

Characteristic	Classification	Status	Interpretation
Receiving Waterbody Name	Cavan_010	At Risk	Receiving Water body is the Cavan_020, poor status Inputting water body is Beaghy Lake, moderate status
Waterbody Type	River		-
WFD Status	SW 2013-2018	Poor	-
Resource	Not Classified		No drinking water abstractions
Biological Status	Invertebrate	Poor	Indicative of anthropogenic disturbance
	Fish Status	N/A	
Supporting Chemistry Conditions	Oxygenation Conditions	Pass	<ul style="list-style-type: none"> • DO status Pass; • Phosphorus (P) conditions indicate moderate eutrophication levels
	Nitrogen	Good	
	Phosphorus	Moderate	
	Other Nutrients	N/A	
	Specific Pollutant Conditions	N/A	
Chemical SW Status	Low	Low	-

8.1.8 Hydrogeology

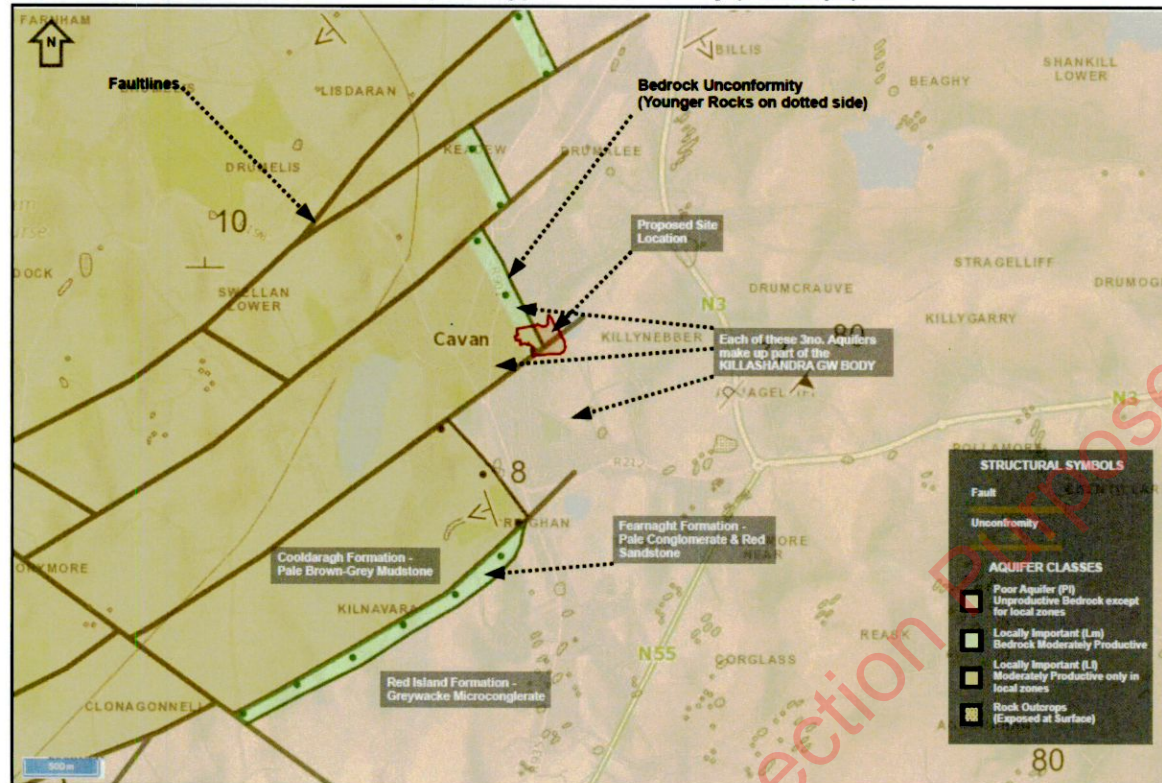
Regional & Local Hydrogeology

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 8.7** below.

Figure 8.7: 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. 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.

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 8.7**), 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.

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 8.8**). This data is summarised in **Table 8.5** below.

Table 8.5: Groundwater Wells with 2.5km of the site (GSI Well Database)

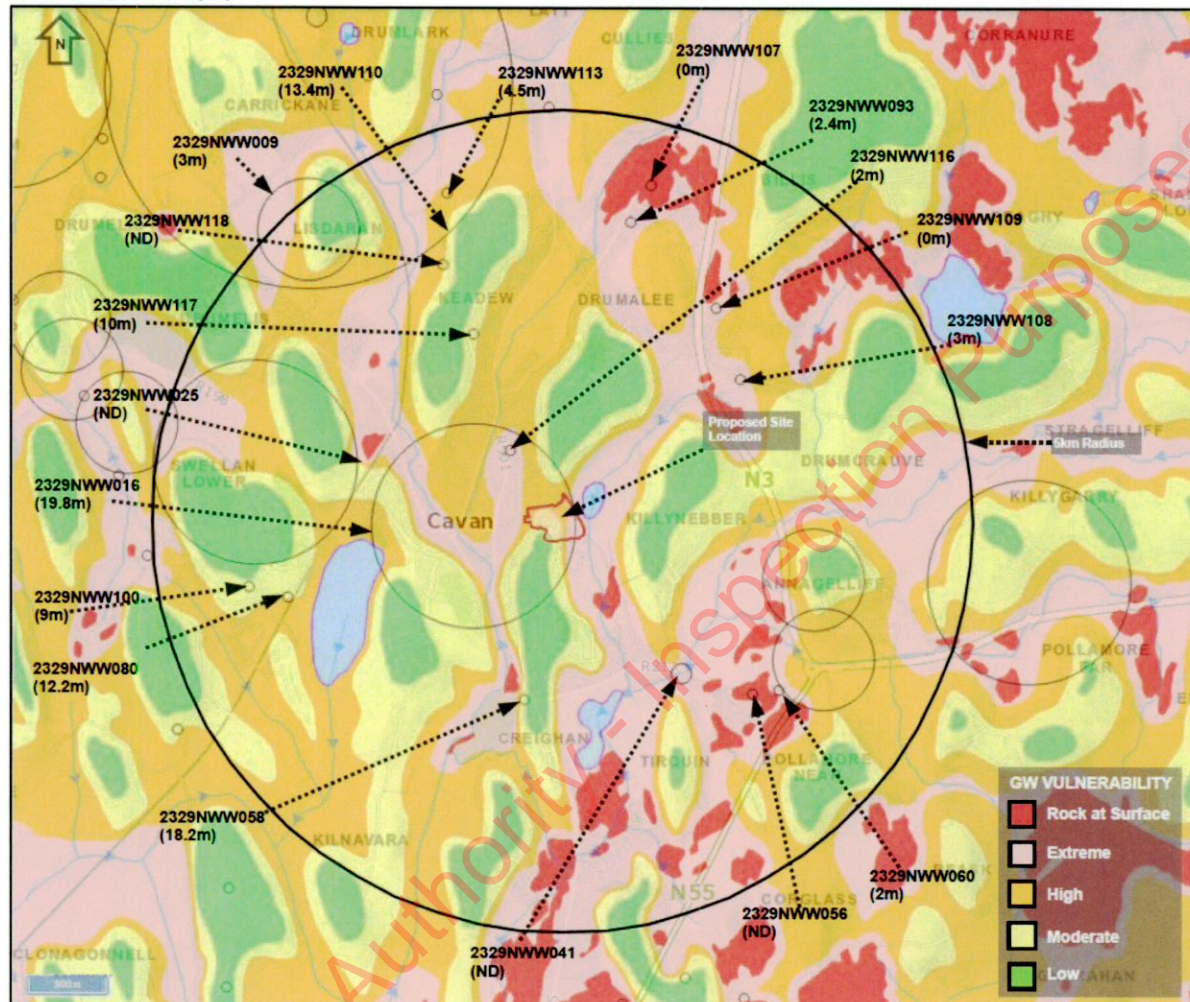
GSI Reference	Easting Northing	Well Type	Depth (m bgl)	Depth to Rock (m)	Well Use	Yield m ³ /d	Proximity to site
2329NWW110	241090, 306910	Borehole	18	13.4	Unknown	129.6	1.55m NW
2329NWW009	241090, 306200	Borehole	48.7	3	Agri & domestic	21.8	1.69km NW
2329NWW025	240830, 305060	Borehole	22.9	-	Agri & 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 8.8 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 8.8: 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

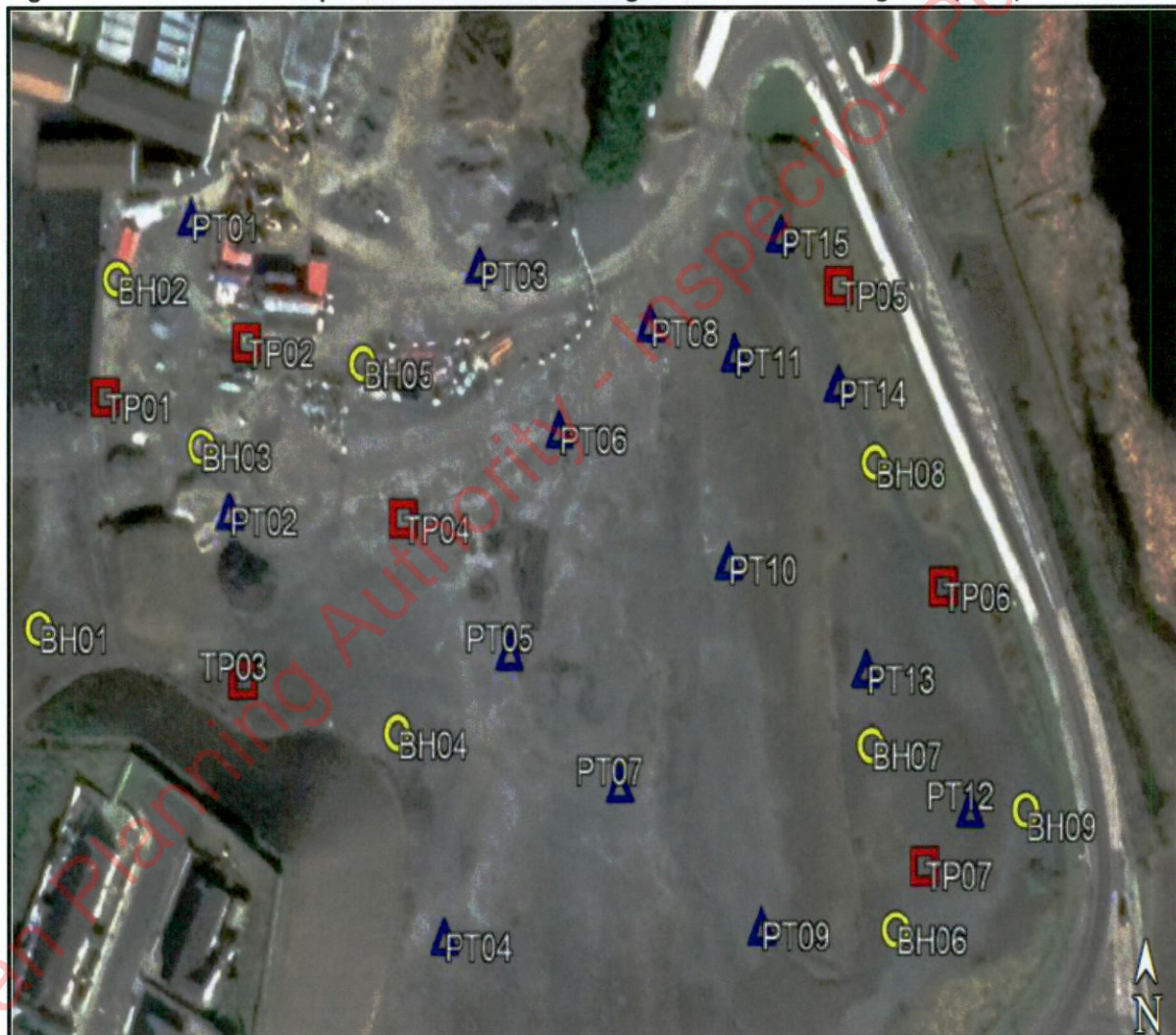
Detailed borehole logs and description of the site investigation are presented in **Appendix 8.4** but the general structure of the ground can be described as follows in **Table 8.6**:

Table 8.6: Summary of ground conditions at the proposed site (IGSL)

Soil Type/ Geological Unit	Maximum Depth (m bgl)	Description and Interpretation
Made Ground	From surface to 0.4m – 1.1m.	MADE GROUND – (comprising dark grey / black clay and gravel fill).
Overburden (a)	From 0.4 – 1.1m to 1.1 – 2.8m	Stiff brown sandy SILT/CLAY with some gravel.
Overburden (b)	From 1.1 – 2.8m to 3.2 – 10.0m	Stiff and very stiff dark brown sandy gravelly CLAY with medium cobble content.
Overburden (c)	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 8.9**.

Figure 8.9: 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”).

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.

8.1.9 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.

8.1.10 Groundwater Vulnerability Assessment

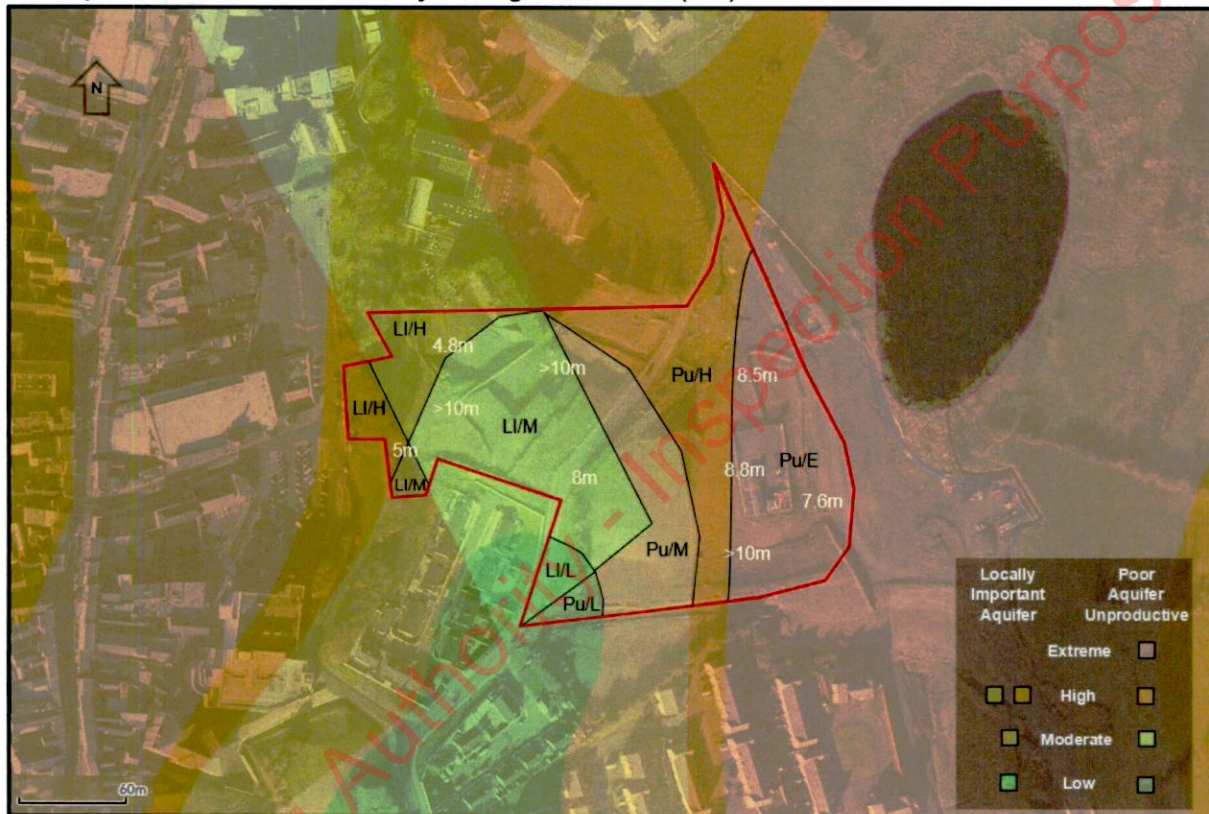
This area of Cavan is not classified as a Source Protection Area, and this vulnerability assessment will be carried out under section 1 of **Table 8.7**, as follows:

Table 8.7 – Summary of Sampling requirements for groundwater vulnerability assessments

	Aquifer Type	Sampling Requirements
Ground Water Protection Scheme (GWPS) does not exist	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 site of the proposed development 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 8.10**.

Figure 8.10: Groundwater Vulnerability Assessment of Underlying Aquifers. White font indicates location and depth of borehole. Site boundary is not georeferenced (GSI)



Site Vulnerability

Table 8.8: 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 ²	R3 ²	R3 ¹	R3 ¹	R3 ¹	R3 ¹
High (H)	R4	R2 ¹	R1	R1	R1	R1	R1	R1
Moderate (M)	R3 ³	R2 ¹	R1	R1	R1	R1	R1	R1
Low (L)	R3 ³	R2 ¹	R1	R1	R1	R1	R1	R1

R1 Acceptable, subject to normal good practice.

R2¹ Acceptable subject to a maximum organic nitrogen load (including that deposited by grazing animals) not exceeding 170 kg/hectare/yr.

R3¹ Not generally acceptable, unless a consistent minimum thickness of 1 m of soil and subsoil can be demonstrated.

R3² Not generally acceptable, unless a consistent minimum thickness of 2 m of soil and subsoil can be demonstrated.

R3³ 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**.

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.

This study has indicated that the proposed facility will not have any detrimental impact on the underlying aquifer or more importantly any wells in the area. The GSI well data has indicated a high density of wells within the vicinity predominantly designated as domestic or agricultural use. It is safe to assume that there are houses in the area which have wells not on the GSI maps.

8.2 Predicted Effects of the Proposed Development

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

8.2.1 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the local water systems. The current rate of surface water 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.

Fluvial flooding events would continue as they have historically in this area with the existing floodplains.

Groundwater status would also remain unchanged if the existing land use continued.

8.2.2 Receptor Sensitivity

The sensitivity of the receptors identified during the study of hydrological and hydrogeological features within the vicinity of the site are summarised in **Table 8.9**.

Table 8.9 – Receptor Sensitivity

Receptor	Receptor Importance	Receptor Sensitivity	Rationale
Groundwater	Local Level	High	The Killashandra Groundwater Body is a Locally Important Aquifer - Bedrock which is Generally moderately productive rendering this groundwater body's importance as moderate.

			<p>The Cavan Groundwater Body is a Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones rendering this groundwater body's importance as low.</p> <p>The groundwater vulnerability varies throughout the site from "Low" to "Extreme" according to the GSI map viewer. However, the trial pit excavations have revealed at least 4.8m of soil/subsoil cover exists, with 7 out of 9 boreholes indicating a soil cover of over 8m throughout the site. The groundwater table is adjudged to be >6.22m below ground level (bgl) in the east of the site. Overburden water was encountered at 1.24m bgl in the west. Based on the vulnerability mapping criteria a soil / subsoil thickness of 3-5m in a low permeability (clay) soil is classed as "High".</p> <p>The response matrix would indicate that vulnerability rating assigned to the site would be "R1 Acceptable, subject to normal good practice" and "R3, not generally acceptable, unless a consistent minimum thickness of 1 m of soil and subsoil can be demonstrated". This indicates that the development location is acceptable with respect to groundwater protection.</p>
Surface Water	EU Level	Extreme	The site is hydraulically connected via the Cavan & Annalee River to the Lough Oughter SPA & SAC which is protected by EU Legislation, hence this receptor's importance and sensitivity is considered to be "Extreme".

8.2.3 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 in **Section 8.6.3** of *EIAR Volume 2 – Main Report* and summarised in **Table 8.10**.

Table 8.10 – Severity/ Magnitude of Impact during construction phase

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Groundwater Killashandra & Cavan Groundwater Body	Accidental Spillages of Harmful Substances	Negative	Moderate to Significant	Temporary
	Increased Groundwater Vulnerability	Negative	Significant	Long-Term
	Excavation of Bedrock Aquifer	Negative	Significant	Long-Term
	Excavation of Contaminated Soils	Unlikely	Negligible Impact	Unlikely
Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Increased Run-off and Sediment Loading	Negative	Slight to Moderate	Temporary
	Accidental Spillages of Harmful Substances	Negative	Moderate to Significant	Temporary
	Excavation of Contaminated Soils	Unlikely	Negligible Impact	Unlikely
	Conversion of Permeable Soils to Hard standing	Negative	Moderate	Temporary

8.2.4 Sources - Operational Phase

The operational phase effects anticipated and considered throughout the lifetime of the operation of the facility are considered in detail in **Section 8.6.4** of *EIAR Volume 2 – Main Report* and summarised in **Table 8.11**.

Table 8.11 – Severity/ Magnitude of Impact during construction phase

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Groundwater Killashandra & Cavan Groundwater Body	Contaminated Run-off	Negative	Moderate to Significant	Temporary
	Foul Water	Negative	Moderate to Significant	Short-Term
	Conversion of Permeable Soils to Hard standing	Negative	Slight	Permanent
Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Contaminated Run-off	Negative	Moderate to Significant	Temporary
	Foul Water	Negative	Moderate to Significant	Short-Term
	On-Site Flooding	Negative	Imperceptible	Short-Term
	Conversion of Permeable Soils to Hard standing	Negative	Significant	Long-Term

8.3 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.

8.3.1 Construction Phase

General Mitigation Measures

A Construction Environmental Management Plan (CEMP) 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 effects on surface water and groundwater.

Increased Run-off and Sediment Loading

The main pollutants of site water are silt, fuel/oil, concrete and chemicals. There are a number of steps outlined below to eliminate contamination of site surface water runoff. The below recommendations are advised with reference to the Northern Regional Fisheries Board recommendations for protection of adjacent water courses during the construction phase:

- Harmful materials such as fuels, oils, greases, paints and hydraulic fluids must be stored in bunded compounds well away from storm water drains and gullies. Refueling of machinery should be carried out using drip trays.
- A temporary drainage system will be established complete with oil interceptors and settlement ponds to remove contaminants from run-off, prior to discharge off-site.
- Stockpile areas for sands and gravel should be kept to minimum size, well away from storm water drains and gullies leading off-site.
- Covers are to be provided over soil stockpiles when high wind and inclement weather are encountered if required.
- Silt fencing to be erected along high flow areas

- Site drains into a designed drainage network along the Cock Hill road which feeds into a detention basin before discharging to the Killymooney Stream/ Aghnaskerry River

Accidental Spillages of Harmful Substances

The following measures will minimise the risk of a release of fuels, oils, chemicals or cement products at the site:

- Establishment of bunded oil and chemical storage areas.
- Refuelling of mobile plant in designated areas provided with spill protection.
- Fuel bowsers to be located in bunded areas which can cater for 100% of the primary vessel capacity.
- Only appropriately trained site operatives permitted to refuel plant and machinery on-site.
- Regular inspections carried out on plant and machinery for leaks and general condition.
- Emergency response plan.
- Spill kits readily available throughout the site.
- Use of ready-mixed supply of wet cement products.
- Scheduling cement pours for dry days.

Increased Groundwater Vulnerability / Excavation of Bedrock Aquifer

An excavation depth of 2m - 2.5m bgl would increase the vulnerability in particular areas of the site from 'high' to 'extreme'. Mitigation measures to ensure maximum protection of groundwater include:

- Installation of hard-surfaced areas with adequate surface water drainage, interceptor and attenuation networks to eliminate percolation of contaminants to underlying groundwater in any areas where the storage of hazardous materials will be present. Establishment of a bunded location or use of portable bunds for refuelling of mobile plant and machinery
- Excavations to be backfilled as soon as possible to prevent any infiltration of contaminants to the subsurface and the aquifer.
- Landscaping to take place as soon as possible to reduce weathering.

Excavation of Contaminated Soils

The existing site consists of exposed soil and subsoil. The land was previously pasture before 2010 with a tertiary road running from the southwest corner to the northeast of the site. The ground level throughout the site has been altered since 2010 and contaminated material would have been removed and disposed of during the previous scope works in late 2010 during the construction of the realigned Cock Hill road. Deep excavations are not envisaged for the site and the excavation of contaminated material is not expected on site.

Nonetheless, 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.

Conversion of Permeable Soils to Hard standing

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) in accordance with the guidelines of the GSDSDS, the SuDS Manual Ciria C753, and the Cavan County Development Plan 2022 - 2028.

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 follows:

- Construction of detention basins with restricted outflow rates equal or less than the greenfield run-off rates, $Q_{bar-rural}$
- Car park is to be constructed with a permeable paving with an underlying stone sub-base
- Rainwater harvesting on all buildings.
- Stone media at the location of the underground attenuation tank systems
- Filter drains along verges
- Tree-pits at localised tree locations
- Petrol Interceptors to treat the surface water runoff prior discharging to the existing stormwater outflow

8.3.2 Operational Phase

Contaminated Runoff

The $Q_{bar-rural}$ was calculated for each catchment. Drainage systems will be designed to attenuate excess surface water runoff with suitable storage volumes for each character and reduce the outflow rate to below the estimated greenfield rate before discharging into the existing surface water network to the south east. It is proposed to provide a series of Sustainable Urban Drainage Systems (SuDS) such as detention ponds, permeable paving, filter drains, and petrol interceptor in order to treat surface runoff at high level and ground level.

Foul Water

Based on the population equivalent (PE) for the proposed development of #, the volume of foul water generated from the proposed development was calculated at # m^3/day . The proposed foul network will be gravity fed to the southeast of the site from where it will be pumped via a rising main up to the south of the proposed development into the existing public foul network.

Increased Groundwater Vulnerability

The proposed finished ground level will be up to 2.5m below the existing elevation of the site in certain places, increasing the vulnerability of the underlying aquifer from 'High' to 'Extreme' to the rear of the proposed supermarket. Mitigation measures to ensure maximum protection of groundwater include:

- Installation of hard-surfaced areas with adequate surface water drainage, interceptor and attenuation networks to elimination percolation of contaminants to underlying groundwater in any areas where the storage of hazardous materials will be present.
- The service yard to the rear of the supermarket is to be completely bunded and will have a Finished Floor Level (FFL) of 1.75m below the current ground level.

On-Site Flooding

The existing flood risk to the proposed site is low with the proposed site located in 'Flood Zone C'. An area to the east of the site is designated a "Flood Zone A & B" under the Cavan CDP 2022-2028. However, an assessment of the proposed flood levels from an adjacent CFRAM node and the current and proposed site levels indicate that the area in question is currently 4.05m above the highest flood extents predicted in a 0.1% AEP event. Storm water attenuation measures including the construction of tanks and ponds along with permeable paving are included in the proposed development to reduce to overall point source outflows. The supermarket roof will be drained via a siphonic drainage system with the harvested water being feed into storm water distribution boxes situated in the car park.

Increase in Flood Risk to Receiving Catchment

The Q_{bar}_{rural} was calculated for the catchment. Drainage systems will be designed to attenuate excess surface water runoff with suitable storage volumes for the site and reduce the outflow rate to below the estimated greenfield rate before discharging into the local storm water network to the east and southeast. It is proposed to provide a series of Sustainable Urban Drainage Systems (SuDS) such as permeable paving, filter drains, and petrol interceptor in order to treat surface runoff at high level and ground level.

8.4 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.

8.4.1 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 8.18**. in Chapter 8 of the **EIAR Volume 2 – Main Report**

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

8.4.2 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 8.19**. in Chapter 8 of the **EIAR Volume 2 – Main Report**

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

9.0 Biodiversity

Chapter 9 of Volume 2 of the EIAR comprises an Ecological Impact Assessment (EclA) which addresses the potential ecological impacts that may occur in the future on the terrestrial and aquatic ecology.

9.1 Receiving Environment

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

- Designated Sites
- Flora
- Fauna
- Aquatic Environment

9.1.1 Site Location & General Description

Site location maps can be seen in Figures 9.1 and 9.2.

Figure 9.1 – Site Location Map. The Application Site is Pinned.

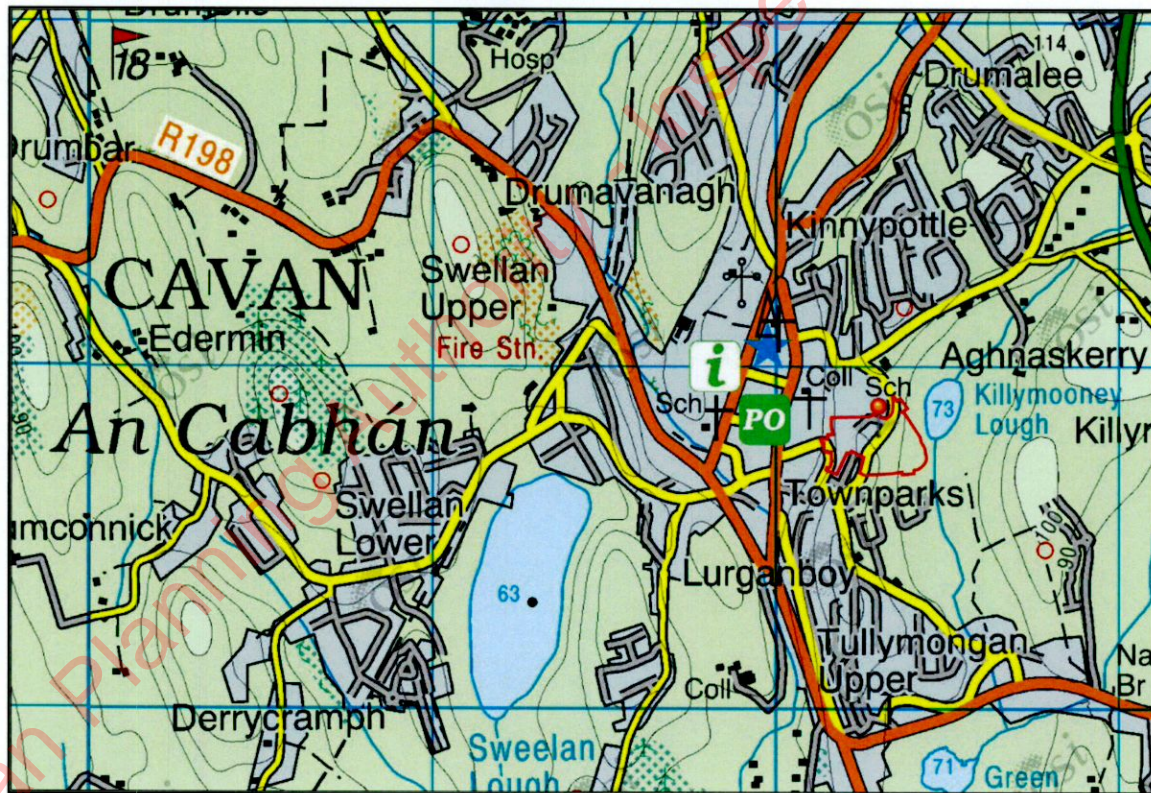


Figure 9.2 – Site Location Map.



Land Use and Habitats Surrounding the Site

Using up to date aerial photographs, an overview of the land-use and habitats surrounding the application site was assessed and noted. The land-use to the west, south and north of the site predominantly consists of the sub-urban and urban areas of Cavan. Buildings and artificial surfaces and amenity grasslands and gardens are the habitats commonly associated with these areas. Beyond the urban fabric of Cavan, agriculture is the dominant land use and improved agricultural grassland is the dominant habitat. Other habitats represented locally include unimproved and wet grasslands, hedgerows, treelines and watercourses. The site is also close to Killymooney Lough and its riparian reed and grassland habitats.

An overview of these habitats can be seen in the aerial photograph in **Figure 9.3**.

Figure 9.3 – Aerial Photograph Showing Habitats Surrounding the Study Area (Zoom Earth)



9.1.2 Designated Sites

Natura 2000 Sites

The proposed application site is not within or immediately adjacent to any site that has been designated as a Special Area of Conservation (SAC) or a Special Protection Area (SPA) under the EU Habitats or EU Birds Directive.

There are two Natura 2000 sites within 15km of this proposed development. These sites are summarised in **Table 9.1**. The location of the application site in relation to these designated areas is shown in **Figure 9.4** and a full synopsis of these sites can be read online on the website of the National Parks and Wildlife Service (www.npws.ie).

Table 9.1 – Natura 2000 Sites within 15km of the Proposed Development

Site Name & Code	Distance from Site	Qualifying Interests
Lough Oughter and Associated Loughs SAC 000007	3.4km north-west	<ul style="list-style-type: none"> Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation Bog woodland Otter Lutra lutra
Lough Oughter Complex SPA 004049	3.7km north-west	<ul style="list-style-type: none"> Great Crested Grebe (Podiceps cristatus) Whooper Swan (Cygnus cygnus) Wigeon (Anas penelope) Wetlands & Waterbirds

The generic conservation objectives of the SACs are:

- To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

The generic conservation objectives of the SPAs are:

- To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

The favourable conservation status of a habitat is achieved when:

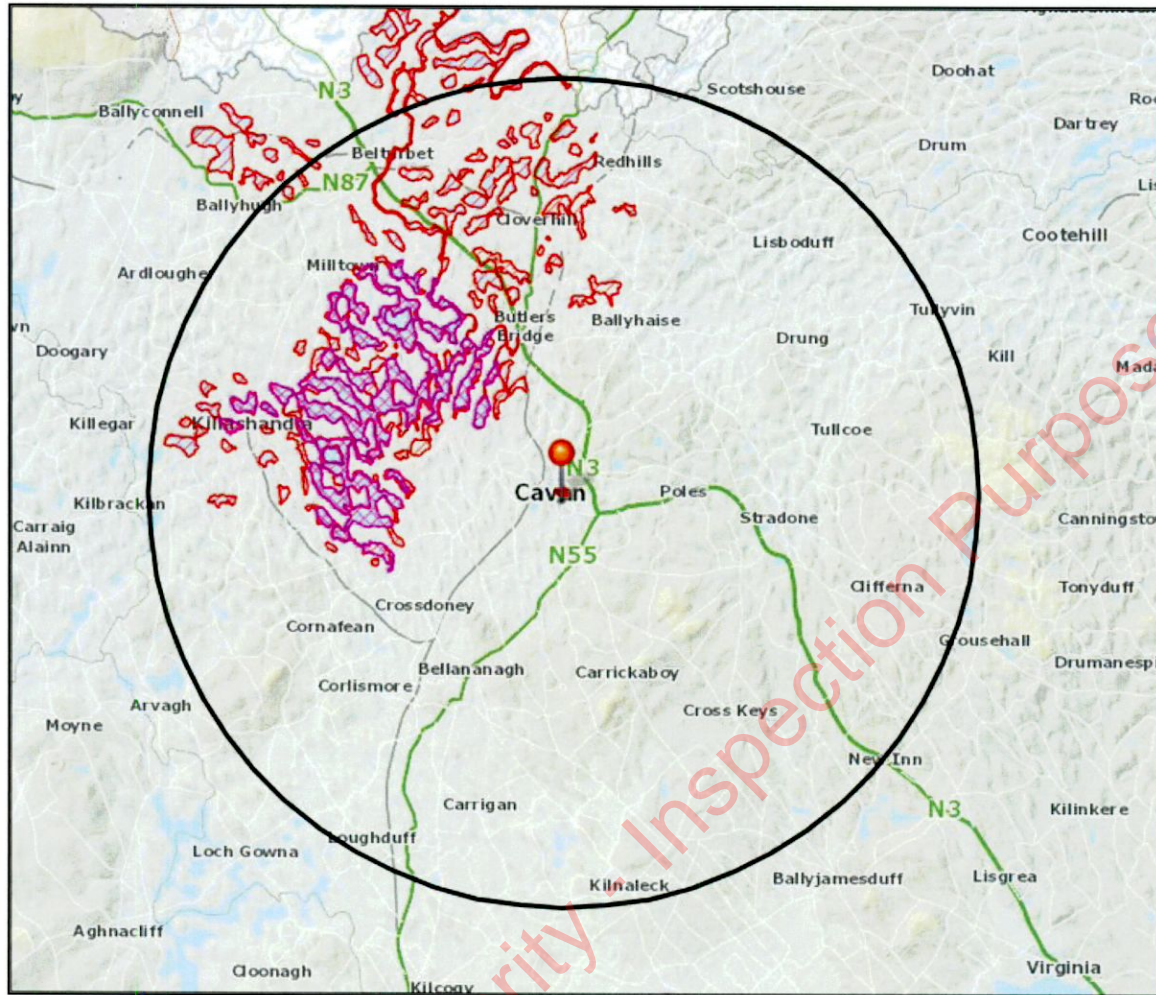
- Its natural range and area it covers within that range is stable or increasing and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future;
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- The population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future;
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

As potential significant effects upon the sites identified could not be ruled out, a separate NIS as required under Article 6 of the EU Habitats Directive has been submitted as part of this application. This NIS will allow the competent authority to undertake its statutory obligations with regards to Appropriate Assessment.

Figure 9.4 – Designated Sites within 15km of the Application Site (Pinned). SACs – Red Hatching, SPAs – Pink Hatching.



Nationally Important Sites

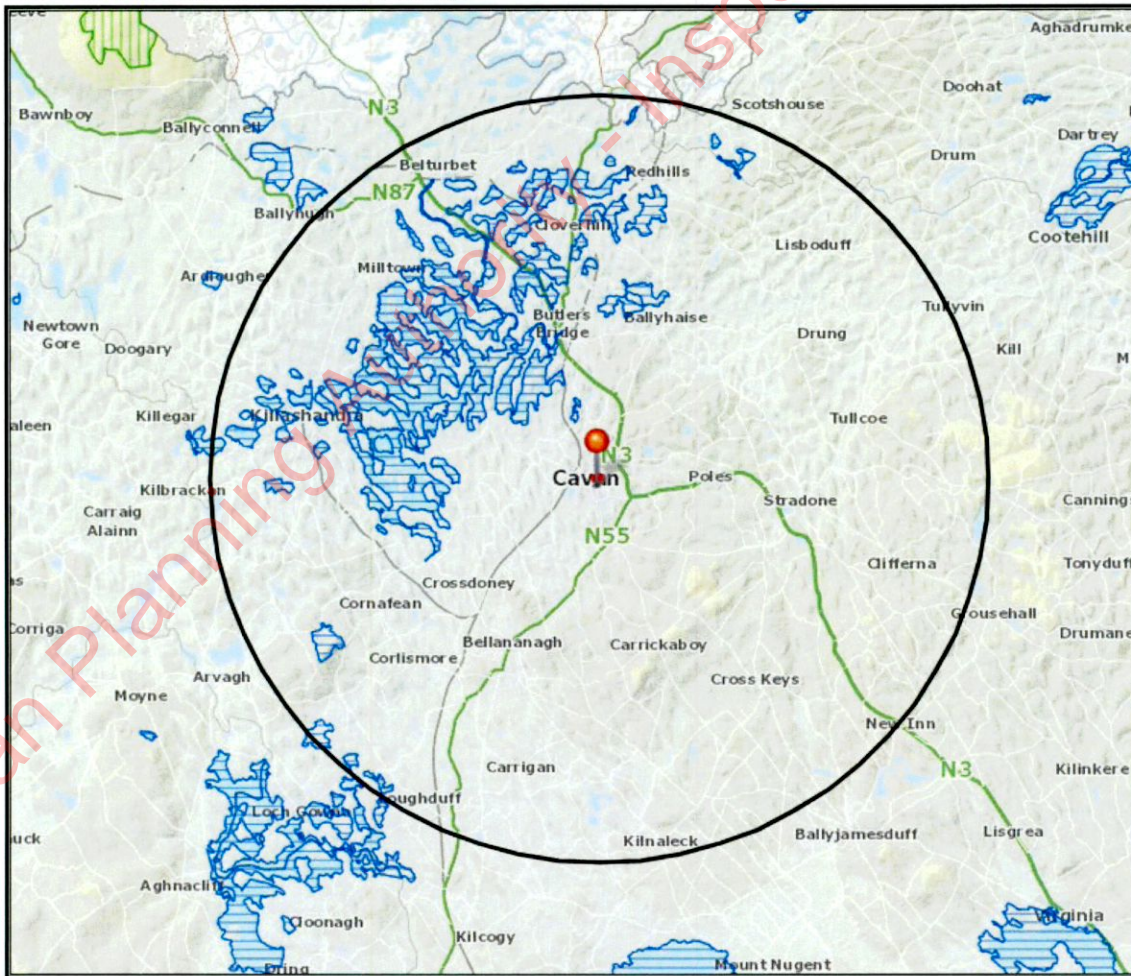
The application site is not within or immediately adjacent to any nationally designated site, such as a Natural Heritage Area or a proposed Natural Heritage Area. It is within 5km of nine sites that have been designated as proposed Natural Heritage Areas.

These sites are summarised in **Table 9.2** and a map showing their locations relative to the application site is shown in **Figure 9.5**.

Table 9.2 – Nationally Important Sites within 15km of the Proposed Development

Site Name & Code	Distance from Site
Drumkeen House Woodland pNHA 000980	2.2km north
Lough Oughter and Associated Loughs pNHA 000007	3.4km north-west
Bruse Hill pNHA 000002	11.6km south-west
Drumcor Lough pNHA 001814	13.2km north
Annagheane Lough pNHA 001836	13.6km north
Lough Garrow and Lough Gubdoo pNHA 000984	13.9km north
Cordonaghy Bog pNHA 000978	14.2km south-west
Lough Gowna pNHA 000992	14.2km south-west
Glasshouse Lake pNHA 000983	14.3km west

Figure 9.5 – The Proposed Application Site at Tullymongan Lower in Relation to proposed Natural Heritage Areas within 15km (Blue Cross Hatching)



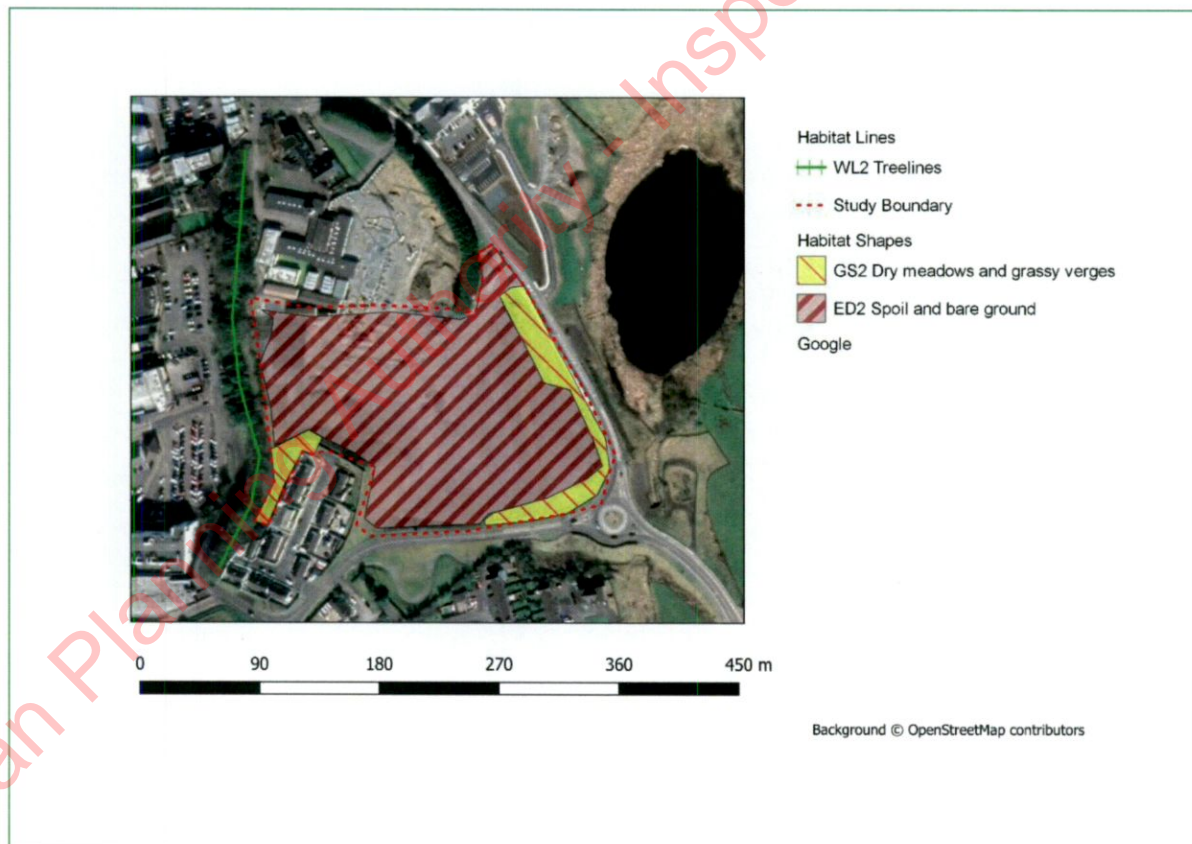
9.1.3 Flora

Habitats within the Study Area

No part of the site lies within any area that is designated for nature conservation purposes. Historically as determined from an examination of old aerial photos, the site and the lands surrounding St Francis' Estate and St Clare's National School were agricultural in nature and grasslands, hedgerows and treelines were the dominant habitats within the application site as well as in the lands surrounding Killymooney Lough. However, the construction of the Eastern Access Road (Cock Hill Road) to the east altered this entire landscape, leading to the conversion of agricultural land to built / excavated land. Significant excavations took place and now the application site is at a significantly lower level than St Francis's Estate, with a steep cliff of loose rock forming the boundary between these two areas.

The application site is greenfield however it is dominated by a heavily modified and previously excavated and infilled area. The dominant habitats within the application site include areas of spoil and bare ground (Habitat Code ED2), small patches of dry meadows and grassy verges (GS2) and treelines (WL2). These habitats are described in greater detail below whilst a habitat map is illustrated in **Figure 9.6**. A full list of the plant species recorded from the study area is shown in **Appendix 9.1** and photos of the site can be seen in **Appendix 9.2**.

Figure 9.6: Habitat Classification



Habitat Descriptions

Spoil and Bare Ground ED2

The application site is dominated by loose stone and gravel that is largely devoid of any vegetation with the exception of some scattered ruderal plants such as colts foot *Tussilago farfara*. This habitat has no biodiversity value.

Dry Meadows and Grassy Verges GS2

This habitat was noted to occur in along the verges of the site along Cock Hill Road to the east and south. It also occurs in association with the treeline boundary to the west and in the south-western corner of the site behind the residential estate. Grasses are unmanaged and tussocky here and cock's foot grass *Dactylis glomerata* and meadow grasses *Poa* sp. were common. The broadleaved species noted were typical of this habitat and included ragwort *Jacobaea vulgaris*, spear thistle *Cirsium vulgare*, autumn hawkbit *Scorzoneroides autumnalis*, short-fruited willowherb *Epilobium obscurum*, common hogweed *Heracleum sphondylium*, nettle *Urtica dioica*, red clover *Trifolium pratense* and rosebay willowherb *Chamaenerion angustifolium*. There were some broadleaved seedlings and immature shrubs / trees noted growing here including broom *Cytisus scoparius*, birch *Betula* sp., willow *Salix* sp. and pedunculate oak *Quercus robur*.

Treelines (WL1)

Although the site is largely devoid of mature vegetation, the original treeline along the Cock Hill Road to the west remains generally intact and possibly supplemented with additional planting. This treeline occurs on a steep embankment that slopes down towards Cock Hill Road to the west as it leads down to the existing carpark and Tesco shop. Common species in this treeline include birch, pedunculate oak and beach *Fagus sylvatica*. Gorse *Ulex europaeus* was also frequent.

Overall Evaluation of Habitats within the Site

Overall, the biodiversity of this application site is generally of low value. The habitats within it are generally highly modified. The grassy verge habitats would provide some suitable sources of nectar for local populations of pollinating insects in the summer months. The treeline along the western site boundary is of higher biodiversity value and this would provide some suitable nesting and perching sites for birds within an urban environment.

The site was also considered in terms of its connectivity to Killymooney Lough, a small lake that lies approximately 40m east of the application site. The riparian habitats around this lake include wet grassland and reed swamp habitats. There is no connectivity between the application site and Killymooney Lough and there are no riparian or wetland habitats within the application site.

Rare and Protected Plant Species

An examination of the website of the National Parks and Wildlife, the National Biodiversity Data Centre and the Online Atlas of Vascular Plants for Ireland revealed that there are no records for any plant species protected under the Flora Protection Order from within the 10km square (H40) of the proposed

application sites. The majority of the habitats within the site are all highly modified and no protected plant species were noted within the site.

Invasive Species

No non-native invasive species that are regulated for control under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477) were recorded from within the study area. Particular attention was paid to the potential presence of Japanese knotweed *Fallopia japonica*, which is very common in urban areas and disturbed ground in Ireland. This species has been recorded from within the 1km of this application site (H4204).

9.1.4 Fauna

Protected Mammals

Records from the National Biodiversity Data Centre reveal the presence of the following protected mammals from within the 10km square (H40) of this proposed application site:

- Eurasian Badger (*Meles meles*)
- Eurasian Red Squirrel (*Sciurus vulgaris*)*
- European Otter (*Lutra lutra*)
- Lesser Noctule (*Nyctalus leisleri*)
- Nathusius's Pipistrelle (*Pipistrellus nathusii*)
- Pine Marten (*Martes martes*)
- Pipistrelle (*Pipistrellus pipistrellus sensu lato*)
- Soprano Pipistrelle (*Pipistrellus pygmaeus*)
- West European Hedgehog (*Erinaceus europaeus*)*

*Indicates that records for this species exist from the 1km square, i.e., N4204.

All these species are protected under the Irish Wildlife Acts. In addition, the otter *Lutra lutra* is protected under Annex II of the European Habitats Directive. The field survey of the site found no badger setts present within the site, and no obvious worn tracks or trails that could be attributed to badgers. There are no freshwater or riparian habitats within the site, therefore the site is not suitable for use by the otter. However, the lands to the west of the site around Killymooney Lough remain optimal for the otter and as part of the surveys for a separate residential development (Planning Reference: 21/528) evidence for the presence of the otter around Killymooney Lough was noted.

There are no buildings within the application site that would be used by roosting or hibernating bats and the treeline along the western site boundary is likely to be of limited value for bats.

The site is of limited value for mammals in a local context.

Birds

No birds of conservation concern were noted within the site during the site survey. The site is of extremely limited value for birds. The treeline along the western perimeter provides the only habitat for

nesting within the site and given the urban context of this treeline its overall value to local birds is likely to be limited. The birds observed on the day of the survey included magpie *Pica pica* and hooded crow *Corvus cornix*.

Amphibians, Reptiles and Invertebrates

There are no habitats within the application site suitable for amphibians (common frog or smooth newt) or reptiles (lizard). The grassy verges within the site are likely to provide sources of nectar for a common range of aerial invertebrates in the spring and summer months.

9.1.5 Aquatic Environment

Water Features and Quality

Surface Waters

The application site is located within the Erne Hydrometric Area (36) and Catchment (36), and the Cavan Sub-Catchment (010) and Sub-Basin (010). There are no water courses within the application site. The site is 43m west of Killymooney Lough. This is a small lake that occurs along the Killymooney Lough Stream [First Order Stream, EPA Code: IE_NW_36C020300]. The Killymooney Lough Stream rises in lands approximately 762m upstream of Killymooney Lough. The stream flows in a southerly direction, through Killymooney Lough until its confluence with the Green Lough Stream [Third Order Stream, EPA Code: IE_NW_36C020300]. This Green Lough stream flows in a southerly and then northerly direction until its confluence with the Cavan River, at a point approximately 1.1km south-west of the application site.

The Cavan River is a tributary of the Erne system. It flows east of Cavan Town in a northerly / north-westerly direction through Coalpit Lough, then Derrygid Lough. It meets the Annalee River south-west of Butlers Bridge.

The EPA have classified the ecological status of the Killymooney Lough Stream, the Green Lough Stream and the Cavan River at points close to the application site as poor¹. The ecological status of the Annalee River varies from poor to moderate. In 2020, the EPA noted a Q value of 3-4 from the Green Lough Stream from the Bridge near Breffni Park, which is approximately 1km south of the application site. Further downstream in the Cavan River near Drumkeen House, a Q3 was noted. A Q3-4 is indicative of moderate ecological status and a Q3 is indicative of poor status and both of these are unsatisfactory. Under the requirements of the Water Framework Directive, any status below good (Q4) is unsatisfactory and all watercourses must achieve good status under the requirements of this Directive.

Ground Water

The application site straddles the Cavan Groundwater Body (East) and the Killeshandra Groundwater Body (West). The overall Water Framework Directive status of both these waterbodies is noted as good.

¹ Taken from <https://gis.epa.ie/EPAMaps/>. Period for WFD Status 2013 – 2018.

The area underlying the proposed site itself has a mixture of 'Moderate' to 'High' groundwater vulnerability in the centre and west of the site with a smaller area to the east of the site classified as 'Extreme'.

9.1.6 Ecological Evaluation

Summary of the Value of the Application Site

The site at Tullymongan Lower is within 15km of two sites designated under the Natura 2000 network, i.e., the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA. These sites are 3.4km and 3.7km north-west of the site respectively. The site is also within 15km of nine sites designated as Natural Heritage Areas (NHAs and pNHAs). The closest pNHA to the site is the Drumkeen House Woodland pNHA and this is 2.2km north of the site.

Within the application site itself, the dominant habitat is spoil and bare ground. This habitat has no biodiversity value. Other habitats present include strips of dry meadows and grassy verges and treelines. The dry meadows and grassy verges are well represented in the local area and are considered to be of low biodiversity value locally. The treeline along the western boundary is the most important ecological features on the site, however it is quite isolated in this urban environment and it does not provide connectivity to other treelines, woodlands or areas of higher biodiversity value outside of the site.

Overall, it is considered that the site is of limited value for fauna, including birds, bats and terrestrial mammals.

9.2 Predicted Effects of the Proposed Development

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

9.2.1 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the local water systems. The current rate of surface water 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.

Fluvial flooding events would continue as they have historically in this area with the existing floodplains.

Groundwater status would also remain unchanged if the existing land use continued.

9.2.2 Receptor Sensitivity

The sensitivity of the receptors identified during the study of hydrological and hydrogeological features within the vicinity of the site are summarised in **Table 9.3**.

Table 9.3 – Receptor Sensitivity

Receptor	Receptor Importance	Receptor Sensitivity	Rationale
Natura 2000 Sites	European Level	Extreme	The application site is 3.4km south-east of the Lough Oughter and Associated Loughs SAC and 3.7km south-east of the Lough Oughter Complex SPA.
National Heritage Areas (NHAs)	National Level	High	The application site is not within or adjacent to any site designated as a Natural Heritage Area. The closest pNHA to the site is the Drumkeen House Woodland pNHA, which is 2.2km north of the site.
Local Habitat	Local Level	Moderate to Low	The dominant habitat within the application site is Spoil and Bare Ground. This habitat has no ecological value and therefore its loss constitutes a negligible ecological impact. However, any loss or fragmentation of the treeline along the western boundary of the application site would constitute a permanent negative local impact.
Local Wildlife	Local Level	Low	The removal of treeline vegetation during the bird nesting season could result in direct mortality of birds or the destruction of their eggs. In addition, during site preparation and construction, local populations of birds and mammals may be disturbed by the increase in noise, traffic and human activity.

9.2.3 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 in **Section 9.6.3** of *EIAR Volume 2 – Main Report* and summarised in **Table 9.4**.

Table 9.4 – Severity/ Magnitude of Impact during construction phase

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Natura 2000 Sites	Deterioration of water quality in the Lough Oughter and Associated Loughs SAC / SPA	Negative	Moderate	Temporary
National Heritage Areas (NHAs)	Increased Run-off and Sediment Loading	Negative	Slight	Temporary
Local Habitat	Any loss or fragmentation of local treeline	Negative	Slight	Permanent
Local Wildlife	Increase in noise, traffic and human activity	Negative	Slight	Temporary

8.2.4 Sources - Operational Phase

The operational phase effects anticipated and considered throughout the lifetime of the operation of the facility are considered in detail in **Section 9.6.4** of *EIAR Volume 2 – Main Report* and summarised in **Table 9.5**.

Table 9.5 – Severity/ Magnitude of Impact during construction phase

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Local Habitat	Any loss or fragmentation of local treeline	Negative	Not Significant	Long Term
Local Wildlife	Increase in noise, traffic and human activity	Negative	Not Significant	Long Term

9.3 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.

9.3.1 Construction Phase

General Mitigation Measures

Site preparation and construction must be confined to the development site only and it must adhere to all the mitigation measures outlined in this Chapter and the accompanying NIS. Work areas should be kept to the minimum area required to carry out the proposed works and the area should be clearly marked out in advance of the proposed works.

It is recommended that all these measures, along with measures contained in the NIS are included in a Construction and Environmental Management Plan. This plan should be submitted to Cavan County Council prior to commencement for approval.

Increased Run-off and Sediment Loading

The main pollutants contained in construction site water include silt, fuel/oil, concrete and chemicals. There are a number of steps outlined below to eliminate contamination of site surface water runoff. The below recommendations are advised:

- Harmful materials such as fuels, oils, greases, paints and hydraulic fluids must be stored in bunded compounds well away from storm water drains and gullies. Refuelling of machinery should be carried out using drip trays.
- A temporary drainage system will be established complete with oil interceptors and settlement ponds to remove contaminants from run-off, prior to discharge off-site.
- Stockpile areas for sands and gravel should be kept to minimum size, well away from storm water drains and gullies leading off-site.
- Run-off from machine service and concrete mixing areas must be contained on site;
- All material and earth removed should be stockpiled within a bunded area or within a geotextile barrier until required for use.
- Covers are to be provided over soil stockpiles when high wind and inclement weather are encountered if required.

Where concrete is being poured on site, the following concrete / aggregate management measures should include:

- Best practice in bulk-liquid concrete management must be employed on site addressing pouring and handling, secure shuttering, adequate curing times etc.
- Where concrete shuttering is used, measures should be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils.

- Ready mix concrete wagons and mixers should be washed off site to minimise emissions into any local watercourses.
- Activities which result in the creation of cement dust should be controlled by dampening down the areas.
- Raw and uncured waste concrete should be disposed of by removal from the site or by burial on the site in a location and manner which will not impact upon the local watercourses.

Any excavated material arising from the construction process must not be disposed of within any designated site. It must be used responsibly within the boundary of the application site or disposed of in a licensed facility using a registered contractor.

Accidental Spillages of Harmful Substances

The following measures will minimise the risk of a release of fuels, oils, chemicals or cement products at the site:

- Establishment of bunded oil and chemical storage areas.
- Re-fuelling of mobile plant in designated areas provided with spill protection.
- Fuel bowsers to be located in bunded areas which can cater for 100% of the primary vessel capacity.
- Only appropriately trained site operatives permitted to refuel plant and machinery onsite.
- Regular inspections carried out on plant and machinery for leaks and general condition.
- Emergency response plan.
- Spill kits readily available throughout the site.
- Use of ready-mixed supply of wet cement products.
- Scheduling cement pours for dry days.

Conversion of Permeable Soils to Hard standing

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) in accordance with the guidelines of the GDSDS, the SuDS Manual Criteria C753, and the Cavan County Development Plan 2021 - 2027. 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 follows:

- Rainwater harvesting on all buildings.
- Detention basins
- Filter drains along verges
- Tree-pits at localised tree locations
- Petrol Interceptors

Protection of Biodiversity Features within the Site

The treelines and hedgerows within the site remain the most important ecological feature within the site itself. These treelines must be retained, with the exception of those diseased or decaying trees that need to be removed for safety purposes. The protection of the trees and their associated Root Protection Zone (RPA) is vital to maintain the health and long-term viability of the remaining trees. Therefore, it is recommended that prior to site works that the RPA of these treelines is fenced off and tree protection measures are put in place. The RPA of a treeline generally is as wide as the width of the largest crown along that treeline.

It is recommended that any trees that require removal are felled outside of the bird nesting season (March to August) and under the supervision of a professional arborist. It is best practice to remove these trees by soft felling (limb by limb) in order to allow any birds to escape.

Prior to the removal of any trees on site, especially older trees with features such as cracks, fissures and ivy, should be inspected by a bat ecologist prior to removal, as these types of trees often have ivy, fissures and cracks that make them suitable for roosting or hibernating bats. If bats are roosting in the trees, a derogation license for the removal of these bats will be required from the National Parks and Wildlife Service.

9.3.2 Operational Phase

Landscaping and Lighting

The landscaping of the site offers the potential for biodiversity enhancements within the site. Future landscaping of the site should adhere to the following recommendations:

- A landscape plan should be prepared for the site and this plan should include for the planting of natural grassland areas within the site, along with the maintenance of the existing treelines in the site. Plants with a biodiversity value should be used in the final landscaping scheme, i.e., either native plants or non-native that have good sources of nectar for insects.
- Natural verges along the treelines that are to be retained should be retained and managed appropriately for the benefit of wildlife. They should not be sprayed with herbicide and a low intensity mowing or strimming regime should be incorporated. This will benefit local pollinators.
- Lighting should be kept to a minimum around the remaining trees on the site. Light must not be directed at any tree or around the eaves of the existing house. Guidelines from Bat Conservation Ireland are available for considering how to avoid light pollution of the trees to allow for uninterrupted feeding, commuting and roosting of bats.

9.4 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.

9.4.1 Construction Phase

Impacts to ecological receptors 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

9.4.2 Operational Phase

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**.

10.0 Waste Management

Chapter 10 of Volume 2 of the EiAR assesses the likely significant effects waste arising from the proposed development on the surrounding environment.

10.1 Receiving Environment

Two authorities remain in waste collection and one local authority landfill remains open in county Cavan, however waste management is now very much a private sector activity while the role of the local authorities is largely confined to regulation and educational activities. A list of private licensed waste handling contractors available in county Cavan can be viewed on the National Waste Collection Permit Office website or on the Cavan County Council website.

The closest waste management facility to the proposed development is run by Oxigen Environmental ca. 1.75km east of the eastern boundary of the subject site. Other companies within proximity of the site include Cavan Waste Disposal Ltd. ca. 2km to the southeast or McElvaney's Waste and Recycling centre approx. 3.7km northeast from the sites' eastern boundary.

With regard to waste management, the proposed development will generate waste materials during both the construction and operational phases.

10.5.1 Construction Phase

The Construction phase will yield surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised, a standalone Construction Environmental Management Plan (CEMP) has been prepared as part of this application. The CEMP will provide practical guidelines and information on the proper management of waste produced during the construction phase of this project. In addition, excavations will be required to facilitate construction. The main non-hazardous and hazardous waste streams that are likely to be generated by the removal of existing hardstanding on site, site preparation and construction activities at site are shown in **Table 10.1**.

Table 10.1 – Potential Waste Arisings – Construction Phase

Waste Material	EWC Code
Concrete, bricks, tiles, ceramic	17 01 01-03 & 06-07
Wood, glass and plastic	17 02 01-04
Bituminous mixtures, coal tar and tarred products	17 03 01-03
Metals (including their alloys)	17 04 01-07 & 09-10
Soil and stones	17 05 03-04
Gypsum-based construction material	17 08 02
Mixed C&D waste	17 09 04
Electrical and electronic components	20 01 35-36
Batteries and accumulators	20 01 33-34
Liquid fuels	13 07 01-03
Paints	08 01 12
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04

10.5.2 Operational Phase

The proposed development will give rise to a variety of waste streams when the development is complete and operational. An Operational Phase Waste Management Plan (OWMP) which accompanies this EIAR has been prepared for the proposed development as a standalone document. This OWMP will ensure all waste management during the operational phase is conducted in line with the current legal and industry standards and will help to ensure that the development meets the targets outlined in the *Connacht/Ulster Region Waste Management Plan 2015 – 2021*.

During the operational phase of the proposed development, all staff will be encouraged to promote, waste prevention, minimisation, reuse, recycling, and recovery in accordance with the Cavan County Development Plan 2022-2022 waste management objective number 6. All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site. Table 10.2 below summaries the various waste streams and the anticipated management strategy to be used for typical wastes to be generated at a development of this scale and nature.

Typical Waste Categories

The typical waste that will be generated at the proposed development once operational will include the following:

- Biodegradable food waste (organic waste).

- Dry mixed recyclables (DMR) – including cardboard, non-confidential paper, newspapers, leaflets, aluminium cans, tins, Tetra Pak cartons, plastic bottles.
- Glass.
- Category 3 food waste - Organic food waste, Category 1 waste (raw meat, fish and/or poultry)
- Plastic packaging – can go into DMR waste or General depending on plastic type.
- Mixed non-recyclables (MNR)/General waste.
- Waste Electrical and Electronic Equipment including batteries (WEEE).
- Detergents and Cleaning Products.

Table 10.2 - Typical operational phase waste streams and management strategy

Waste Type	Hazardous	Onsite Storage Method	Removal Offsite
Dry Mixed Recyclables (DMR)	N	Segregated bins and/or compaction/bailing	Recycle
Mixed Non-Recyclables	N	Segregated bins and/or compaction	Recovery/Disposal
Food waste Category 1 (Organics) Category 3 (Meat)	N/Y	Segregated bins Clean triple bagged, leak proof lined cage	Composting Incineration
Glass (segregated by colour)	N	Segregated bins	Recycle
WEEE	Y	Segregated bins	Return to supplier
Cleaning Products	Y/N	Segregated bins	Disposal

Wastes should be segregated into the appropriate waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling, and recovery of waste diversion from landfill wherever possible. **Table 10.2** summarises the various waste streams and the anticipated management strategy to be used for typical wastes to be generated at a development of this scale and nature.

All waste leaving site will be recycled or recovered, with the exception of those waste streams where appropriate recycling/recovery facilities are currently not available. All waste leaving the site will be transported by suitable permitted contractors and taken to suitably permitted or licenced facilities. All waste leaving the site will be recorded and copies of relevant documentation maintained.

10.2 Predicted Effects of the Proposed Development

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

10.2.1 Do-Nothing Scenario

If the proposed development was not to go ahead there would be no construction waste or operational waste generation at the site and no increased demand on the local waste infrastructure..

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

10.2.2 Construction Phase

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 impact. The Construction Environmental Management Plan (CEMP) provides an outline of the commitments in relation to management of the site throughout the construction phase, to ensure that construction activities have the least impact on the surrounding environment.

This CEMP has been prepared to provide an outline for the management of waste during the construction phase of the project, it will ensure that there are no significant impacts from waste generated throughout the project by methods such as safe and secure storage of waste and raw materials, proper segregation etc.

Below is an outline of the objectives in relation to waste management from the CEMP:

- Ensure that all activities on site are effectively managed to minimise the generation of waste and to maximise opportunities for reuse and recycling of waste materials.
- Ensure that all wastes generated onsite are removed from site by an appropriately permitted waste contractor and that all wastes are disposed of at an appropriate licensed/permitted facility in accordance with the Waste Management Act 1996 as amended.
- Ensure that an adequate system is in place for the management, storage, segregation, and recycling of waste.
- Outline how the measures proposed above shall be implemented.

The use of authorised waste hauliers and permitted/licensed waste facilities will ensure that the waste materials generated from the removal of the hardstanding area, site preparation and construction activities are appropriately managed off site. The potential impacts of handling and treatment of waste off site at permitted/licensed facilities are considered in the authorisation of these waste facilities. Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated segregated areas for waste skips and bins will need to be identified across the site, signage will be erected to aid and promote waste segregation as much as possible. These areas will need to be easily accessible to waste collection vehicles and for segregation, it is an offence to obstruct permitted waste collectors from accessing the waste storage areas to service these areas.

Any opportunities for waste materials to be reused off-site will be encouraged and recommended will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction therefore have a positive impact on the greater waste infrastructure.

The potential impacts on the environment from waste generation during the construction phase are expected to be likely, **negative, moderate and temporary.**

10.2.3 Operational Phase

Given the nature of the development, the generation of waste materials during the operational phase is an unavoidable impact, typical waste streams during the operational phase are listed in table 10.2 above. There is a number of waste contractors operating in the Cavan area who are permitted to collect waste. Examples of contractors include Oxigen Environmental, Cavan Waste Disposal Limited, McElvaney's Waste & Recycling, among others. Details of waste collection permits (granted, pending, and withdrawn) for the Region are available from the National Waste Collection Permit Office (i.e., Offaly County Council).

Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery or landfill. As reported in the Connacht-Ulster Waste Management Plan 2015 - 2021, there is two remaining active landfills in the region, one at Rathroeen, Ballina, Mayo operated by Mayo County Council and the second at Scotch Corner, Castleblayney, Monaghan operated by Monaghan County Council. There are two other landfills in the region that have significant remaining constructed capacity but it is not deemed financially viable to open them at this time: one is located in Corranure, Co. Cavan and owned by Cavan County Council, the other is East Galway Residual Landfill, Ballinasloe, County Galway. Further details of the waste handling facilities within the county and waste region are discussed in the OWMP.

Failure to implement best practice for waste management (separation, segregation etc), and the use of non-permitted waste contractors or unauthorised facilities would give rise to inappropriate management of waste and potentially result in negative environmental impacts or pollution such as litter issues or the presence of vermin within the development and the surrounding areas.

As a result of the proposed development the potential impact of operational waste generation is expected to be **negative, moderate to significant, long-term**.

7.3 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.

7.3.1 Construction Phase

To help mitigate any potential impacts from the proposed development a project specific CEMP has been prepared in line with the requirements of the guidance document issued by the Department of Environment Heritage and Local Government (DoEHLG). Adherence with this CEMP will control and promote effective waste management taking the waste hierarchy into consideration (prevention, minimisation, reuse, recycling, recovery, and disposal of waste material generated during the construction phase of the proposed development).

Where possible, this cut material will be reused on site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and offsite.

As per the CEMP, there will be a number of mitigation methods put in place which are listed in section 10.8.1 above. These mitigation measures will ensure that the waste arisings from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *Connacht/Ulster Waste Management Plan (2015 - 2021)* and the Cavan County Council Bye Laws 2019. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved and will encourage sustainable consumption of resources and promotion of a circular economy.

7.3.2 Operational Phase

During the Operational phase of the development there will be various waste streams generated which are listed in section 10.6.2.1 above. As per the legislation, regulations, and bye-laws all waste materials will be segregated into appropriate receptacles and stored in appropriate bins located in a designated waste storage area that is easily accessible to the contracted waste collection provider and employees but not to members of the public as outlined in the OWMP. All waste receptacles used will comply with the BS EN 840 2012 standard for performance requirements of mobile waste containers. All waste will need to be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

All mitigation measures during the operational phase (as per the OWMP) will ensure the waste arisings from this development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *Connacht/Ulster Waste Management Plan (2015 - 2021)* and the Cavan County Council Bye-Laws 2019. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved, lessen the burden on the waste infrastructure and promote a circular economy.

7.4 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 site-specific Construction Environmental Management Plan (CEMP) and Operational Waste Management Plan (OWMP) will be implemented throughout the duration of the construction and operational phases respectively. This document will contain all the necessary procedures required to prevent and minimise any environmental risks from waste arisings produced by the project.

The overall impact anticipated by both phases of the project following the implementation of suitable mitigation measures is considered to be **neutral to negative, slight, and short term to long term.**

11.0 Noise and Vibration

Chapter 11 of Volume 2 of the EIAR assesses the likely significant effects of the proposed development on ambient noise and vibration.

11.1 Receiving Environment

A baseline noise survey has been undertaken as part of the planning application prepared for the proposed development.

11.1.1 Choice of Measurement Locations

Three Noise Monitoring Locations (NML's) surrounding the site were selected for the noise survey; each of these locations are described in turn below.

NML1: at the (current) site entrance, close to the Cock Hill Road, at the eastern boundary of the site, at the location of the proposed eastern site entrance; also close to the location of the new primary school (NSL, currently under construction);

NML2: at the western boundary of the site immediately adjacent to the residential dwellings (NSLs) that adjoin that site boundary, and are closest to the site in the Cock Hill residential estate, ca. 30 metres from the development footprint.

NML3: in the Lakeview residential estate located to the south of the site, immediately adjacent to the residential dwellings (NSLs) that are closest to the southern site entrance, ca. 50 metres from the entrance.

The position of each noise measurement location in relation to the site boundary are identified in **Figure 11.1**.

Figure 11.1: Site Location Plan Indicating Baseline Noise Monitoring Locations

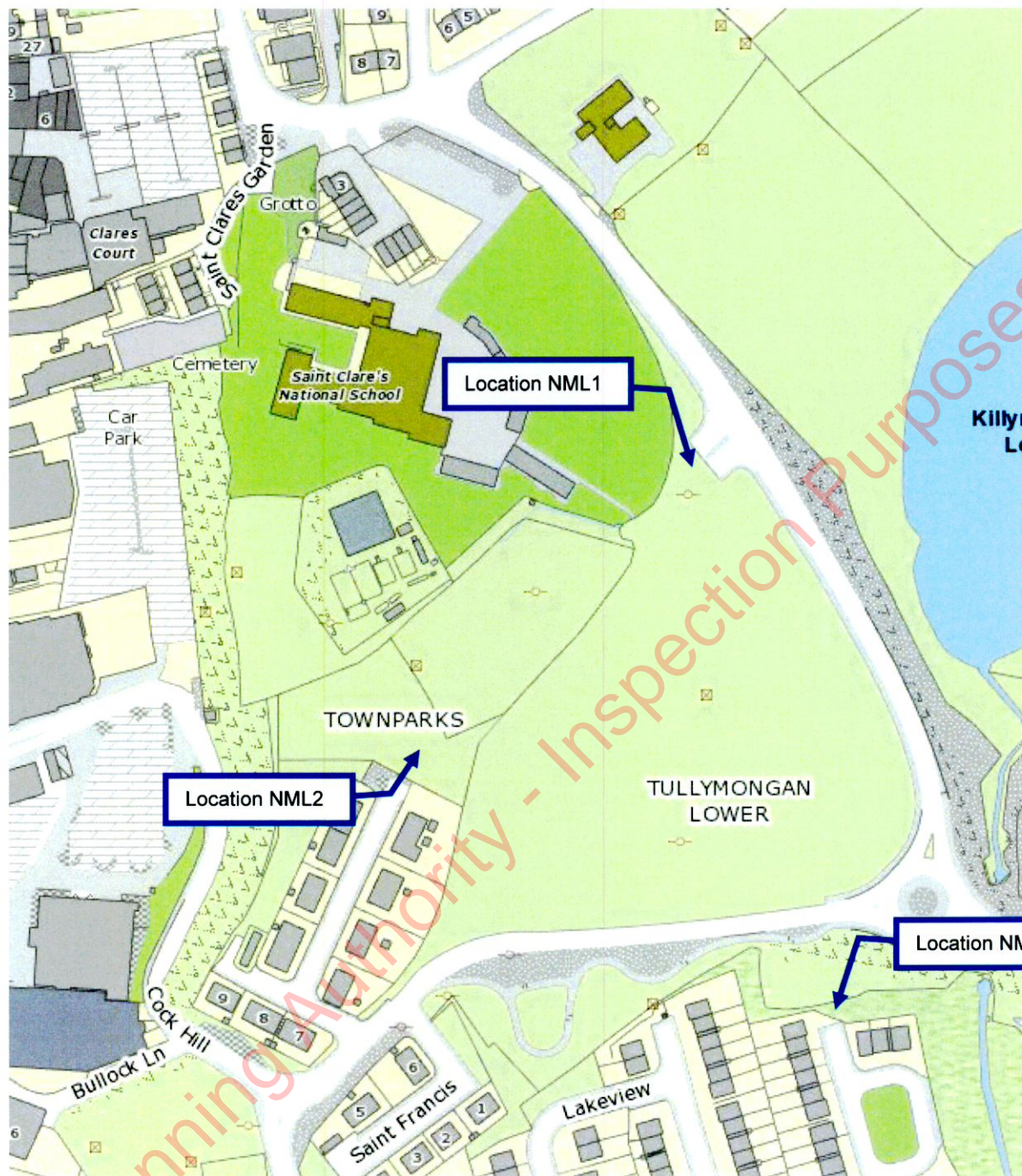


Figure 11.2: Photograph showing baseline noise measurement position NML1



Figure 11.3: Photograph showing baseline noise measurement position NML2

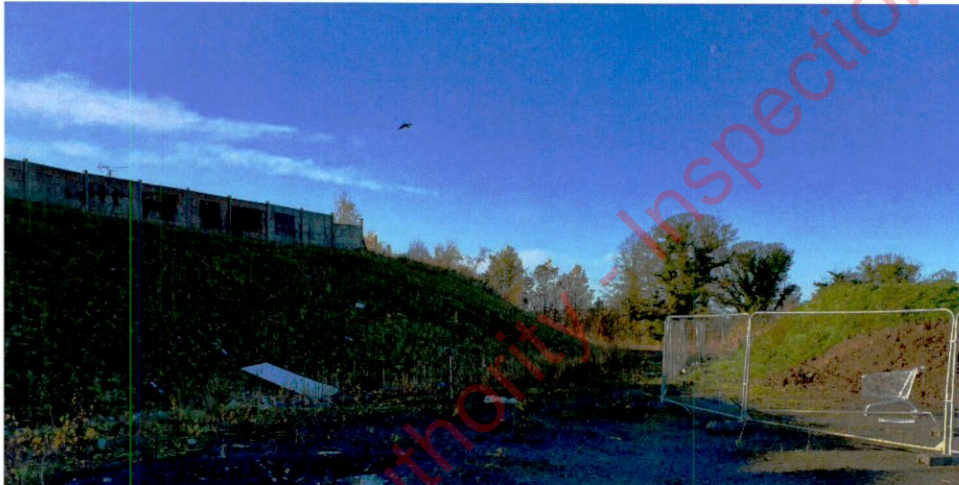


Figure 11.4: Photograph showing baseline noise measurement position NML3



11.1.2 Survey Periods

Daytime, evening and night-time attended noise measurements were conducted between 11:14hrs on 15th November 2022 to 02:10hrs on 16th November 2022.

The weather during the daytime survey was dry and sunny with temperatures in the range 8 to 10 degrees, wind speeds of 2-3 m/s in southerly and south-easterly directions.

The weather during the night-time survey was dry and clear with temperatures in the range 4 to 6 degrees, wind speeds of 2-4 m/s in southerly, south-easterly and easterly directions.

11.1.3 Instrumentation

Measurements were made using a Quest Technologies Sound Level Meter (Type 1) SE/DL and Real Time Frequency Analyser. Sample periods were 15-minute log periods. The instrumentation was calibrated using a Quest Technologies QC 20 Calibrator. Calibration certificates are available on request.

11.1.4 Measurement Parameters

The noise survey results are presented in decibels (dB), using the following parameters:

- $L_{Aeq,T}$ is the equivalent continuous sound level and is used to describe a fluctuating sound as a single value over the sample period (T).
- $L_{AFmax,T}$ The maximum A-weighted sound pressure level occurring within a specified time period (T). Measured using the "Fast" time weighting.
- $L_{AF10,T}$ Refers to those A-weighted noise levels in the top 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period (T). It is used to determine the intermittent high noise level features of locally generated noise and usually gives an indicator of the level of road traffic. Measured using the "Fast" time weighting.
- $L_{AF90,T}$ Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval (T). It is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level without contribution from intermittent sources. Measured using the "Fast" time weighting.

All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

11.1.5 Baseline Noise Survey Results

Location NML1

Table 11.1 presents a summary of the daytime (i.e. 07:00 to 19:00), evening (i.e. 19:00 to 23:00) and night-time (i.e. 23:00 to 07:00hrs) noise levels measured at Location NML1.

Table 11.1: Summary of Measured Baseline Noise Levels at Location NML1

Date and Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
	$L_{Aeq,15min}$	$L_{Amax,15min}$	$L_{A10,15min}$	$L_{A90,15min}$
15 November 2022 at 11:29	56	72	59	50
15 November 2022 at 12:30	58	78	60	52
15 November 2022 at 15:16	63	87	63	55
15 November 2022 at 21:23	52	65	56	45
15 November 2022 at 23:15	48	64	50	41
16 November 2022 at 00:24	44	62	45	36
16 November 2022 at 01:29	41	60	42	33

During the noise survey, the dominant noise sources were noted to be from construction noise on adjacent site (daytime only), occasional local road traffic and distant road traffic, birdsong and occasional pedestrian activity.

Daytime ambient noise levels were in the range 56 to 63 dB $L_{Aeq,15min}$. The daytime background noise was in the range 50 to 55 dB $L_{A90,15min}$.

Evening and Night-time ambient noise levels were in the range 41 to 52 dB $L_{Aeq,15min}$. The night-time background noise was in the range 33 to 45 dB $L_{A90,15min}$.

Location NML2

Table 11.2 presents a summary of the daytime (i.e. 07:00 to 19:00), evening (i.e. 19:00 to 23:00) and night-time (i.e. 23:00 to 07:00hrs) noise levels measured at Location NML2.

Table 11.2: Summary of Measured Baseline Noise Levels at Location NML2

Date and Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
	$L_{Aeq,15min}$	$L_{Amax,15min}$	$L_{A10,15min}$	$L_{A90,15min}$
15 November 2022 at 11:47	42	64	43	39
15 November 2022 at 12:49	44	58	46	40
15 November 2022 at 15:34	49	67	51	43
15 November 2022 at 21:41	41	55	44	38
15 November 2022 at 23:34	39	55	41	34
16 November 2022 at 00:42	38	54	41	32
16 November 2022 at 01:47	36	59	39	30

During the noise survey, the dominant noise sources were noted to be from construction noise on adjacent site (daytime only), occasional local road traffic and distant road traffic, birdsong and occasional pedestrian activity (schoolyard playground).

Daytime ambient noise levels were in the range 42 to 49 dB $L_{Aeq,15min}$. The daytime background noise was in the range 39 to 43 dB $L_{A90,15min}$.

Evening and Night-time ambient noise levels were in the range 36 to 41 dB $L_{Aeq,15min}$. The night-time background noise was in the range 30 to 38 dB $L_{A90,15min}$.

Location NML3

Table 11.3 presents a summary of the daytime (i.e. 07:00 to 19:00), evening (i.e. 19:00 to 23:00) and night-time (i.e. 23:00 to 07:00hrs) noise levels measured at Location NML3.

Table 11.3: Summary of Measured Baseline Noise Levels at Location NML3

Date and Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
	$L_{Aeq,15min}$	$L_{Amax,15min}$	$L_{A10,15min}$	$L_{A90,15min}$
15 November 2022 at 12:08	46	65	48	42
15 November 2022 at 13:10	51	76	51	43
15 November 2022 at 15:56	49	61	51	46
15 November 2022 at 22:10	44	54	47	41
15 November 2022 at 23:58	39	49	41	36
16 November 2022 at 01:04	37	56	39	32
16 November 2022 at 02:10	35	53	37	31

During the noise survey, the dominant noise sources were noted to be from occasional local road traffic and distant road traffic, birdsong and occasional pedestrian activity.

Daytime ambient noise levels were in the range 46 to 51 dB $L_{Aeq,15min}$. The daytime background noise was in the range 42 to 46 dB $L_{A90,15min}$.

Evening and Night-time ambient noise levels were in the range 35 to 44 dB $L_{Aeq,15min}$. The night-time background noise was in the range 31 to 41 dB $L_{A90,15min}$.

Traffic Flows during Baseline Noise Survey

Where appropriate, EPA noise mapping will be used, in combination with a review of available and historic TII traffic count data for nearby traffic counters, in order to estimate the effect of potential reduced traffic flows. The estimated reduction will be calculated, and the baseline data will be corrected in order to correct for any potential impacts where appropriate.

11.2 Predicted Effects of the Proposed Development

When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- construction phase, and;
- operational phase.

Construction Phase

During the construction phase the main site activities will include site clearance, ground excavation works and provision of infrastructure, construction of the buildings, road construction and landscaping. Potential impacts during the construction phase will be **short-term**.

Operational Phase

Operational phase outward noise impacts will be long-term and will typically consist of:

- noise from new building services plant;
- noise from store deliveries;
- increased noise due to additional vehicular traffic on public roads, and;
- car parking on site.

Potential impacts during the operational phase will be **long-term**.

11.6.2 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the local ambient noise and vibration conditions.

Under the 'Do Nothing' scenario there would be no change to the current land use of the site. There will be no impact on noise/vibration to surrounding receptors.

11.6.3 Potential Effects – Construction Phase

Noise

During the construction phase the main site activities will include site clearance, ground excavation works and provision of infrastructure, construction of the retail and commercial buildings, road construction and landscaping. Potential impacts during the construction phase will be short term.

BS 5228-1:2009+A1:2014 provides catalogue of source noise levels for various construction plant, machinery and activity, along with a clear methodology and procedure for the prediction of noise from construction to sensitive receptors. This allows for an indicative assessment of the likely impacts of construction activity to nearby dwellings.

Table 11.4 presents construction plant items that are considered to be typical for a site of this nature, along with the BS5228-1 reference noise emission values at the nominal distance of 10 metres.

Table 11.4: Typical Construction Plant Items and BS5228-1 Reference Noise Emission Values

Phase	Item of Plant (BS 5228-1 Ref.)	Construction Noise Level at Reference Distance (10m) dB L _{Aeq,1hr}
Site Preparation	Wheeled Loader Lorry (C2.28)	74
	Diesel Generator (C4.76)	61
	Track Excavator (C2.22)	72
	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (C3.19)	75
	Poker Vibrator (C4.33)	78
General Construction	Tower Crane (C4.48)	76
	Articulated lorry (C12.10)	77
	Hand tools	81
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68

The nearest third-party noise sensitive locations to the proposed construction works are the properties to the west (at ca. 30m) and south (at ca. 50m) of the site boundary.

The closest works area is approximately 30m from the nearest properties with the remainder of works taking place across the site at varying distances. In order to assess a worst-case scenario, construction noise levels at distances of 30m, 50m and 100m have been used although a prediction to 10m distance is also provided as a reference in **Table 11.4**.

The calculations also assume that the equipment will operate for 66% of a typical 12-hour working day and that a standard site hoarding, typically 2.4m height will be provided around the perimeter of the construction site for the duration of works. **Table 11.5** summarises the construction noise predictions.

Table 11.5: Typical Construction Noise Predictions at Various Distances

Phase	Predicted Construction Noise Level dB L _{Aeq,11hr} at 30m	Predicted Construction Noise Level dB L _{Aeq,11hr} at 50m	Predicted Construction Noise Level dB L _{Aeq,11hr} at 100m
Site Preparation	68	63	56
Foundations	68	63	56
General Construction	69	64	58
Landscaping	66	61	55

With consideration of the site location, the likely construction phase activities, the distances from these works to nearby dwellings and the proposed construction noise criteria (i.e. 70 dB L_{Aeq,11hr} for weekday daytime periods) it is **not** expected that potentially significant noise impacts will be encountered when works are occurring, with approximately 30 metres as the closest point to neighbouring dwellings.

Though no significant noise generation is expected from the construction project, noise mitigation measures will be put in place during construction in order to reduce related impacts as far as is reasonably practicable. The use of best practicable means (BMP) to control emissions can constitute a ground of defence against charges that a nuisance is being caused. Typical mitigation measures that should be considered are presented in the relevant sections of this document.

Vibration

With consideration of the distance from site boundaries to nearby sensitive receptors, and proposed general methods of construction, it is projected that vibration emissions to nearby receptors will be not significant. Vibration mitigation measures are, however, presented in the relevant sections of this document in order to ensure that construction vibration emissions are adequately controlled.

11.6.4 Operational Phase

Noise from new Building Services Plant

Any new proposed building services plant, such as extract fans, condensers, air handling units and pumps shall be designed and specified such that cumulative noise emissions do not exceed the following criteria, at the external façade of existing noise sensitive locations:

- Daytime/Evening (07:00 to 23:00 hours): 50 dB L_{Aeq,1hr}
- Night (23:00 to 07:00 hours): 40 dB L_{Aeq,15min}

Plant noise emissions should not contain any characteristics that would warrant any acoustic feature penalties under the BS 4142:2014 assessment procedure.

Adherence to the noise criteria outlined above will ensure that impacts are low, when assessed in accordance with British Standard BS4142:2014+A1: 2019: 'Methods for Rating and Assessing Industrial and Commercial Sound'.

Noise from Store Deliveries

The noise from Service Yard / Delivery Activity has been assessed to the nearest noise sensitive locations NML1 – NML3. The distance from the perimeter of the service yard to these nearest noise sensitive locations is approximately as follows:

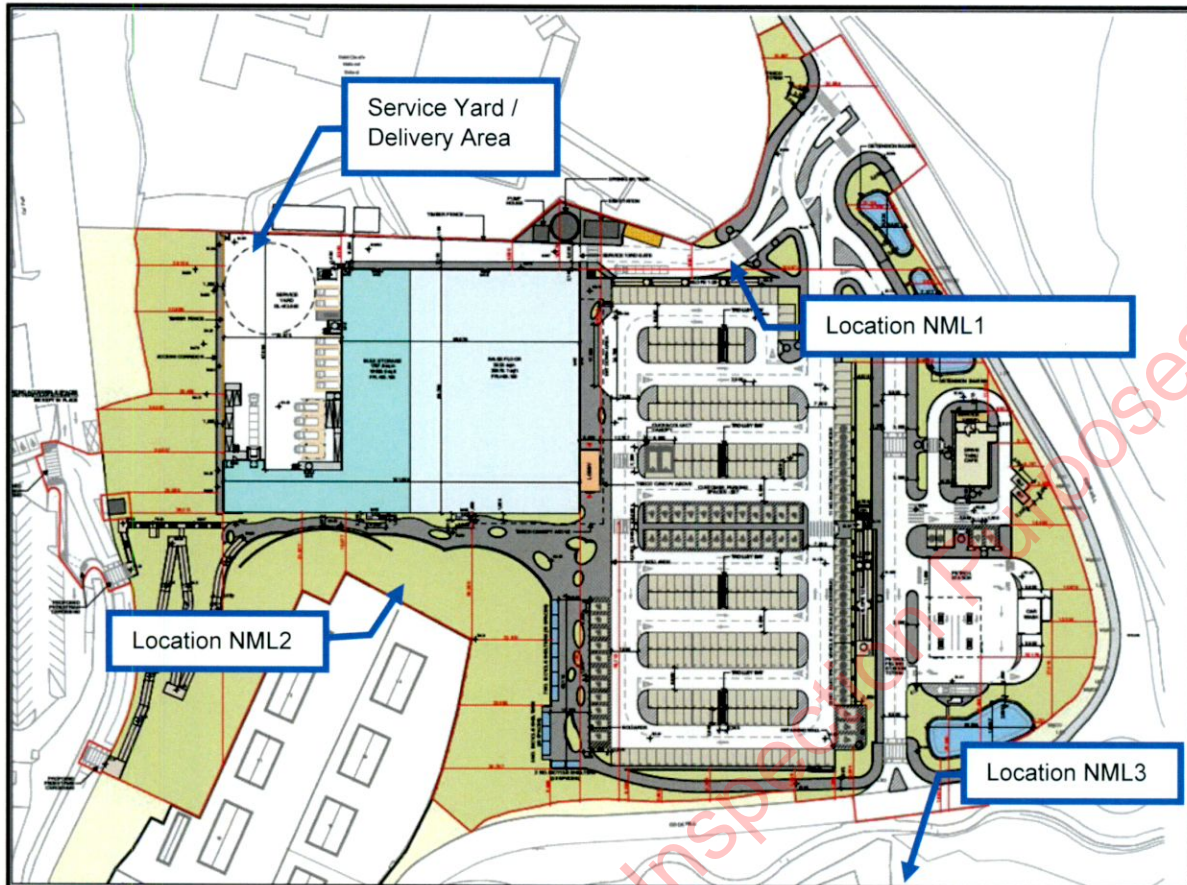
- NML1: 160 m
- NML2: 100 m
- NML3: 280 m

Information relating to deliveries has been provided by the client and are reproduced below:

- The store's operational hours will be Monday to Sunday 07:00 – 23:00hrs;
- Deliveries to the store are intended via HGV twice daily – 1 for Fresh food delivery & 1 for Ambient food delivery; and
- Delivery Hours will be subject to route planning from the Tesco Distribution centre. However, it is likely that deliveries will occur in the early morning period between ~05:00 and 07:30hrs.

The service yard/delivery area is located to the west of the site where delivery vehicles will pull into the designated area and then unload their vehicle. Goods will then be rolled into the main building, before the delivery vehicle leaves the site.

Figure 11.5: Proposed Site Plan Indicating Service Yard Location



The noise levels generated by Service Yard / Delivery Activity have been calculated based on source levels taken from ORS’s database, which are presented in **Table 11.6** below.

Table 11.6: Noise Levels for Typical Loading Bay Activity

Activity	Sound Pressure Level (dB L _{Aeq,T} at 10 metres)	Duration of Activity	Source Height (m)
Truck arriving & reversing into internal loading bay (including reversing alarm)	69	2-minutes	1.5
Truck being unloaded	65	15-minutes	1.5
Truck departing from internal loading bay	71	1-minute	1.5

On the basis of the above source noise levels, with corrections applied regarding activity duration, distance and screening due to the proposed boundary walls, **Table 11.7** presents the results of the noise calculations from Service Yard / Delivery Activity to the nearby receptors.

Table 11.7: Service Yard / Delivery Activity Noise Calculations at Dwellings

Receptor	Calculated External		Complies?
	Noise Level at Receptor (dB L _{Aeq,T})	Noise Criteria (dB L _{Aeq,T})	
NML1	29	Daytime (07:00-23:00hrs): 50 dB L _{Aeq,1hr} Night-time (23:00-07:00hrs): 40 dB L _{Aeq,15-min}	✓
NML2	34		✓
NML3	27		✓

Calculations indicate that additional noise mitigation measures are required with regard to the operation of the proposed Service Yard / Delivery area.

Increased Noise due to Additional Vehicular Traffic on Public Roads

A traffic impact assessment has been prepared as part of this EIAR. Information provided by the traffic consultant (Sytra Ltd) was provided to ORS Ltd. and this information has been used to determine the predicted change in noise levels in the vicinity of the adjacent road network along which traffic will travel to and from the site. Traffic data for the following scenarios has been reviewed in preparing this assessment:

- Base AADT for Years 2025 (Opening Year) and 2040 (Opening Year + 15 Years), and;
- Base + Development AADT for Years 2025 (Opening Year) and 2040 (Opening Year + 15 Years).

AADT flow data has been used to assess the potential change in noise levels along the adjacent roads between the base year and the scenarios incorporating future site traffic. Changes in road traffic noise on the local road network have been considered using prediction guidance contained within Calculation of Road Traffic Noise (CRTN) issued by the Department of Transport in 1988. The future traffic flow data takes account of the proposed development. **Tables 11.8** and **11.9** summarise the calculated change in road traffic noise level for the assessment years.

Table 11.8: Assessment of Change in Traffic Noise Levels on Roads Surrounding the Site (AADT: Base 2025 vs Base + Development 2025)

Road Link	AADT Traffic Flows		Predicted Change in Noise Level, dB (L _{A10})
	Do Nothing (2025)	Do Something (2025)	
Cock Hill (North)	5685	7662	+1.1
Cock Hill (West)	3191	3350	+0.2
Ardkeen East	6176	7420	+0.8
Arkeen West	4104	4264	+0.2
Cock Hill (South)	6757	7809	+0.6
R212 East	15656	16357	+0.1
R212 West	12505	12760	+0.1

Table 11.9: Assessment of Change in Traffic Noise Levels on Roads Surrounding the Site (AADT: Base 2040 vs Base + Development 2040)

Road Link	AADT Traffic Flows		Predicted Change in Noise Level, dB (L _{A10})
	Do Nothing (2040)	Do Something (2040)	
Cock Hill (North)	6301	8279	+1.2
Cock Hill (West)	3537	3696	+0.2
Ardkeen East	6845	8089	+0.7
Arkeen West	4549	4709	+0.1
Cock Hill (South)	7489	8542	+0.6
R212 East	17353	18055	+0.2
R212 West	13861	14116	+0.1

The calculated increase in noise level is less than 2.5 dB along all roads assessed, referring to the relevant guidelines confirms that this calculated change in noise level is '**Negligible**' and the associated impact is '**Not Significant**'.

Car Parking on Site

The noise from vehicular use within the car park has been assessed to the nearest noise sensitive locations NML1 to NML3. Information relating to the use of the car park have been provided by the client and are reproduced below:

- Number of Car Parking Spaces: 297 No.
- Typical Operating Hours: Daytime (07:00 – 23:00hrs)

Information relating to typical noise levels from car parks is provided in ISBN 3-936385-26-2 / ISSN 0723-0028 "Parking Area Noise - Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centres and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks", 6. Revised Edition.

This Standard describes methods for establishing and calculating source noise levels from car parks of different type, capacity, intensity of use and construction; including Supermarket Car Parks.

Section 8.2 (of The Standard) entitled Parking Areas at Ground Level, prescribes a calculation method for Normal Case as follows:

$$L_w'' = L_{w0} + K_{PA} + K_I + K_D + K_{Str0} + 10 \cdot \lg(B \cdot N) - 10 \cdot \lg(S/1m^2) \text{ in dB(A)}$$

Where: L_w'' = Plane-specific sound power level of all processes in the parking area.

L_{w0} = Initial sound power level for one motion/hr (Ref. Table 30: 65.4 dB(A) for supermarket (inc. shopping trolley on asphalt).

K_{PA} = Correction for parking area type (Ref. Table 34: shopping trolley on asphalt + 3dB(A)).

K_I = Correction for impulse character (Ref. Table 34: +4 dB(A)).

K_D = Correction for traffic passaging and searching for carport in the driving lanes = $2.5 \times \lg(f \cdot B - 9)$.

K_{Str0} = Correction for lane surfaces (0 dB(A)).

f = Carports per unit of the reference value (0.07 for Supermarkets).

B = Reference quantity of car parking spaces (297 No.)

N = Motion frequency during the daytime period (6am - 22pm) = 0.07 (Ref. Table 33 - 0.07 - Large Consumer Market).

S = Total area resp. partial area of the parking area.

On the basis of the above calculation, a plane-specific sound power level (L_w'') of 88 dB(A) has been calculated for the proposed car park. Annex A of ISBN 3-936385-26-2 describes the method to follow to calculate the sound level at an assessment location (i.e. residential buildings) and recommends noise propagation calculations are carried out in accordance with ISO 9613-2. **Table 11.10** presents the results of the noise calculations from car park use to the nearby receptors.

Table 11.10: Car Park Noise Calculations at Neighbouring Dwellings

Receptor	Calculated External Noise Level at Receptor (dB L _{Aeq,T})	Noise Criteria (dB L _{Aeq,T})	Complies?
NML1	50	Daytime (07:00-23:00hrs):	✓
NML2	48	50 dB L _{Aeq,1hr} Night-time (23:00-	✓
NML3	50	07:00hrs): 40 dB L _{Aeq,15-min}	✓

Calculations indicate that additional noise mitigation measures are not required with regard to the operation of the proposed Car Park.

11.3 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.

11.3.1 Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2'. Whilst construction noise and vibration impacts are calculated to be within the criteria set out in this document for the majority of the time, the contractor will ensure that all necessary noise and vibration control measures will be used, in order to ensure impacts to nearby residential noise sensitive locations are not significant.

The following mitigation measures are required during the construction of the proposed development:

- Use of a site hoarding, minimum 2.4m height to be erected around the perimeter of the construction site for the duration of works where the distance of works is 30m or less to nearby noise sensitive locations;
- Limiting the hours of construction to the following:
 - Monday to Friday 07.00 – 19.00
 - Saturday 07.00 – 13.00

In exceptional circumstances, and subject to agreement with CCC, extended hours of operation may be applied for. In such instances an assessment of potential noise impacts shall be carried out in advance of works taking place, and submitted to CCC, as part of the extended hours request.

- Monitoring levels of noise and vibration during critical periods and at sensitive locations;
- Maintaining site access roads even so as to mitigate the potential for vibration from lorries;
- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers as necessary around items such as generators or high duty compressors;
- Situate any noisy plant as far away from sensitive properties as is reasonably practicable and the use of vibration isolated support structures where necessary;

- Establishing channels of communication between the contractor/developer, Local Authority and residents, and;
- Appointing a site representative responsible for matters relating to noise and vibration.

During the construction phase all scaffolding, hoarding and cranes would only be in use for as long as necessary to facilitate the construction of the proposed development. The impact of these is considered negligible. No additional mitigation is required.

11.3.2 Operational Phase

Noise from new Building Services Plant

Any proposed new plant shall be designed and specified such that noise emissions do not exceed the following criteria, at the external façade of existing and/or proposed new noise sensitive locations:

- Daytime (07:00 to 23:00 hours) 50 dB LAeq,1hr, and;
- Night (23:00 to 07:00 hours) 40 dB LAeq,15min.

Where necessary noise mitigation measures shall be installed in order to ensure that the above plant noise limits are not exceeded. Such measures may include attenuators to the atmosphere side of supply/extract fans, acoustic barrier screens to chillers/condensers and, where required, acoustic louvres to plantrooms. During the design process the position, finished floor level, height and massing of the proposed development were technically assessed to reduce and mitigate any potential effect on the daylight, sunlight and overshadowing of the adjacent properties. This informed the final design. The impact of the proposed development is considered negligible.

Noise from Store Deliveries

During the operational phase of the development, noise mitigation measures with respect to store deliveries on site are not deemed necessary.

Increased Noise due to Additional Vehicular Traffic on Public Roads

During the operational phase of the development, noise mitigation measures with respect to traffic coming to/from the development are not deemed necessary.

Car Parking on Site

During the operational phase of the development, noise mitigation measures with respect to car parking on site are not deemed necessary.

11.4 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.

7.4.1 Construction Phase

During the construction phase of the project there will be some negative impact on nearby noise sensitive locations due to noise/vibration emissions from construction activity. The implementation of suitable control measures will ensure that the impact is minimized. The residual impact from construction is as follows.

Table 11.11: Construction Phase Residual Noise/Vibration Impacts

Quality	Significance	Duration
Negative	Moderate	Short-term

7.4.2 Operational Phase

The anticipated residual impact from the operational phase of the development is summarised as follows.

Table 11.12: Operational Phase Residual Noise/Vibration Impacts

Quality	Significance	Duration
Negative	Not Significant	Long-term

The operational phase outward noise emissions will be controlled to comply with the recommended World Health Organisation (WHO) Guidelines, the potential health impacts associated with operational phase site noise emissions are not significant

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12.0 Air Quality and Climate

Chapter 12 of Volume 2 of the EiAR assesses the likely significant effects of the proposed development on ambient air conditions and climate.

12.1 Receiving Environment

12.1.1 Site Location and Receptor Identification

A qualitative assessment of construction dust has been undertaken in line with the IAQM 2014 guidance. The study area for this assessment was 350m from the proposed development boundary and or within 50m of the roads used by construction vehicles on the public road up to 500 m from the site entrance.

The first stage is to assess the requirement for an evaluation. The requirement for an assessment is based on distances of human and/or ecological receptors of the site.

Human receptors are within 350m of the site boundary, but none are located within 50m of the trackout route; consequently, construction dust has the potential to cause an adverse effect on the locality. No designated ecological receptors are within 50m of the trackout route or site boundary; therefore, construction dust will not have the potential to effect adversely on ecological receptors.

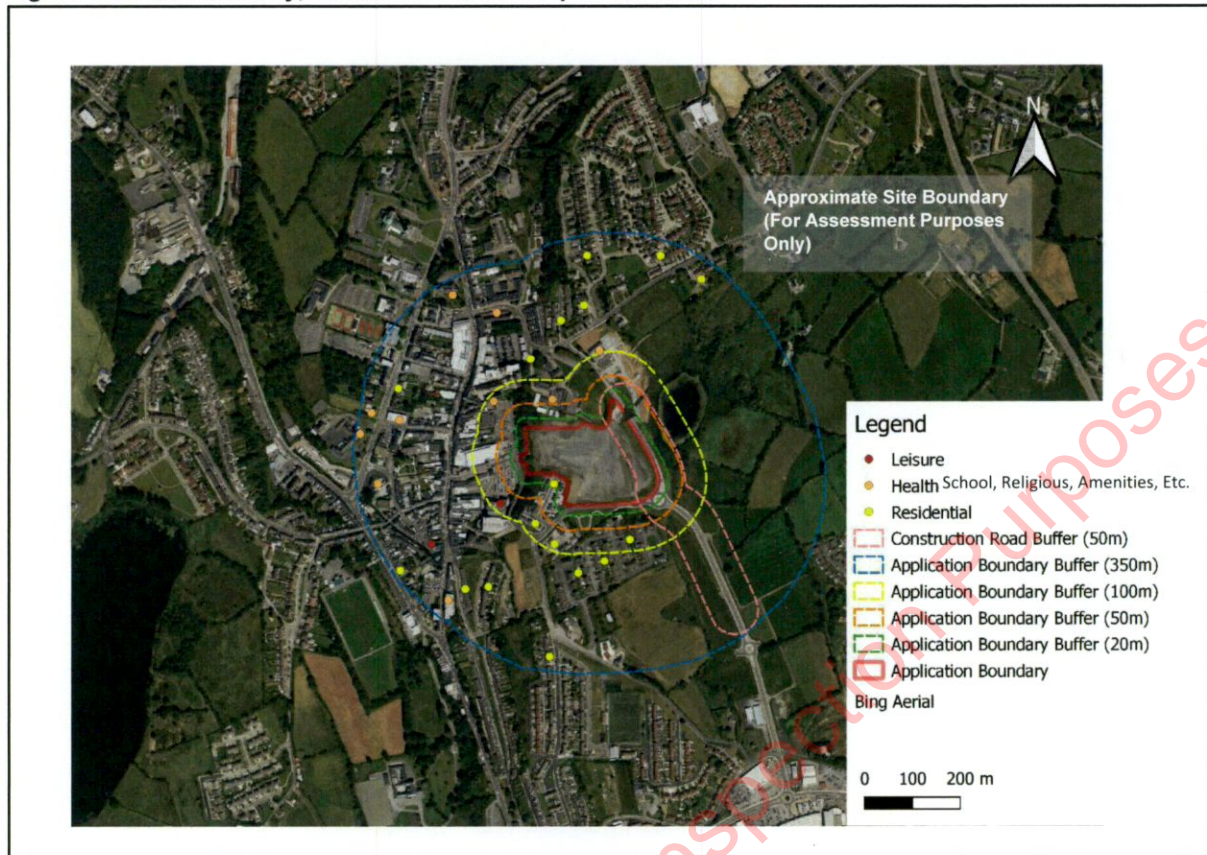
There are approximately 22 residential, amenity, health and leisure receptor clusters within 350 meters of the site boundary and none within 50 metres of applicable construction routes. The number includes buildings and clusters of receptors e.g., apartment blocks and housing estates and not the individual residences contained within these.

Human receptors are largely housing estates located to the South & North of site. There is a school located within 30-35m of the site boundary and there are many commercial receptors located at varying distances and directions from the site boundary to the West & North-West.

The nearest human & residential receptor to the site is a residential housing estate located approximately 5m South-West of the site boundary area. There are places of work, commercial and retail, which are located close by also (less than 50m) to the West of the site boundary. Dust will be created during the construction of the proposed development which may have adverse effects on local sensitive receptors e.g. residents living nearby.

The construction dust assessment study area including identified receptors is included as part of **Figure 12.1.**

Figure 12.1 Site boundary, buffer zones and receptor locations



12.1.1 Air Quality

A review of publicly available information was conducted to determine the baseline air quality within the region. This investigation comprised the quantification of targeted pollutants or contaminants of concern, already in existence in the ambient air, within the vicinity of the proposed site. The source of these substances can be derived from agriculture, domestic, construction, industrial processes and transport.

The main air quality pollutants relevant to this evaluation are considered to be NO_2 , PM_{10} and $\text{PM}_{2.5}$. These contaminants are regarded as the three most significant air pollutants released by vehicular combustion processes or produced by vehicle emissions in the atmosphere through chemical reactions once released. These pollutants are regarded to have the greatest potential result in harmful effects to human health.

A desk study was carried out applying data gathered from the EPA website (airquality.ie). A monitoring station is based in Cavan Town which monitors PM_{10} & $\text{PM}_{2.5}$ and has been in operation since July 2020. Carrick-on-Shannon lies approximately 48km to the West and measures NO_2 , PM_{10} and $\text{PM}_{2.5}$, Longford Town situated 39km Southwest also has a monitoring station which measures PM_{10} & $\text{PM}_{2.5}$ while Kilkitt station positioned 33km East monitors NO_2 . NO_2 , PM_{10} and $\text{PM}_{2.5}$ monitoring data recorded for 2021 are shown in **Table 12.1**.

Table 12.1: Regional ambient levels of air quality pollutants (airquality.ie)

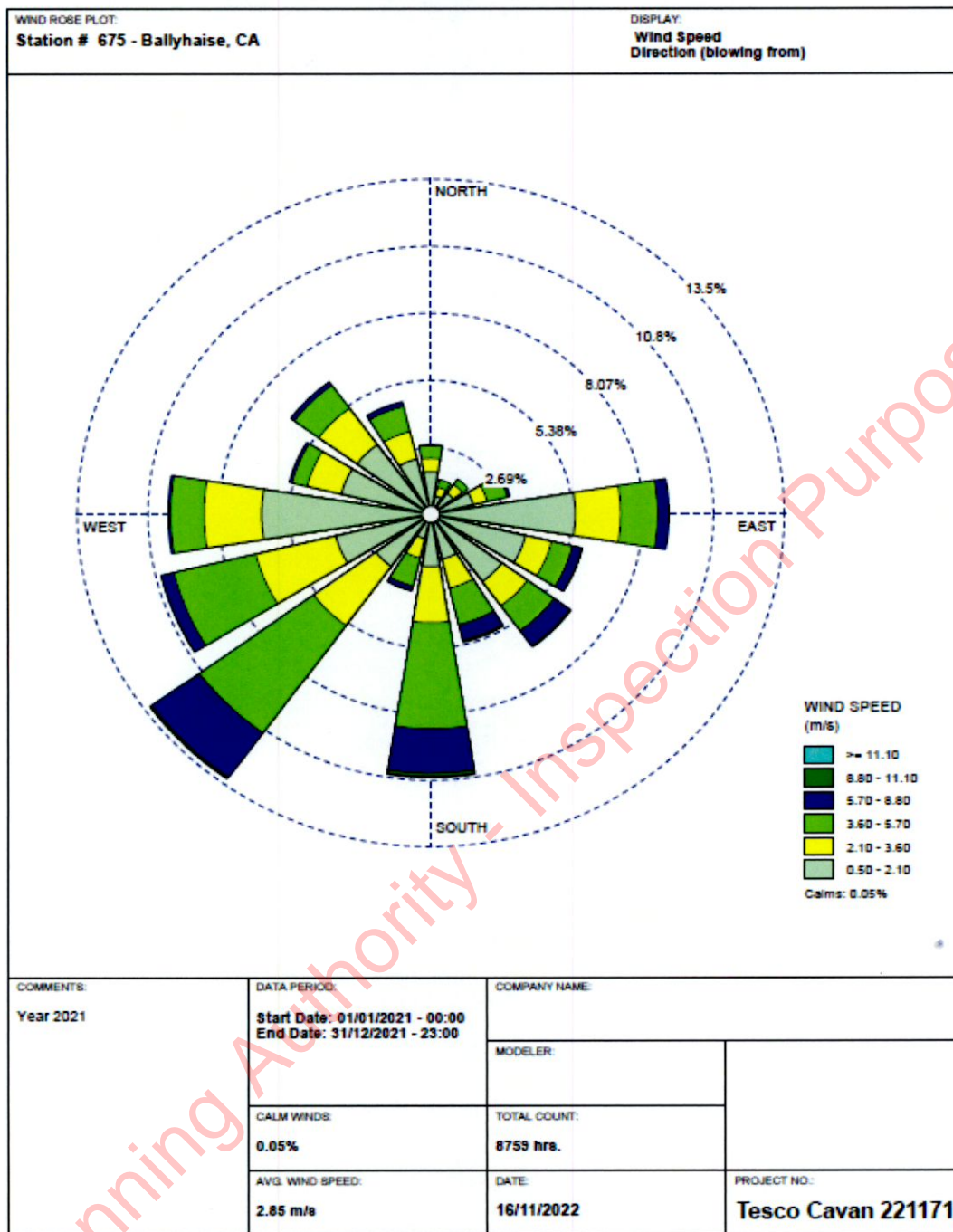
Site	2021 ($\mu\text{g}/\text{m}^3$)		
	NO ₂	PM ₁₀	PM _{2.5}
Cavan Town	-	10.6	7.4
Longford Town	-	13.9	9.4
Kilkitt, Co. Monaghan	2.4	7.8	-
Carrick-on-Shannon, Co. Leitrim	11.2	9.4	5.9
Air quality standard	40	40	25

No exceedances of the air quality standards (AQSs) were recorded at the Cavan Town monitoring site for PM₁₀ & PM_{2.5}. No exceedances of the AQS were recorded at the Kilkitt or Carrick-on-Shannon monitoring sites for NO₂ (which would both be situated in Air Quality Zone D, similar to Cavan Town). Therefore, exceedances of the relevant AQSs at the subject site for these parameters are not expected.

12.1.2 Wind

A key meteorological parameter which influences the dilution and dispersal of airborne contaminants is wind speed and direction. A wind chart reflecting hourly data arising from the Ballyhaise Automatic Weather Station (AWS) is included in **Figure 12.2 & Figure 12.3**.

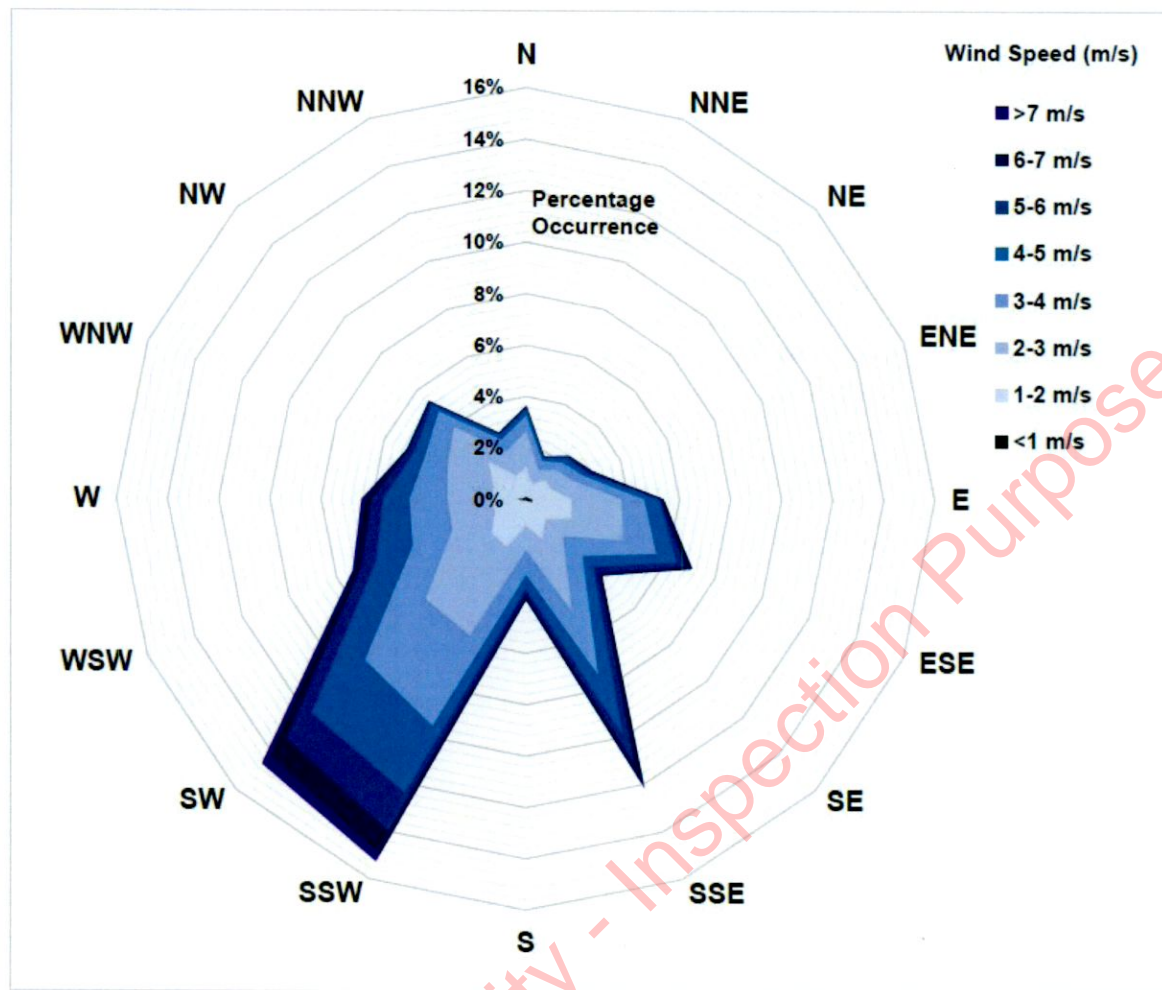
Figure 12.3: Prevailing Wind Direction 2021 Hourly Data (Ballyhaise AWS)



The prevailing wind direction is from South-West.

Average wind speed for the monitoring period in 2021 was 2.85 m/s with the highest wind speed (11.8 m/s) recorded on the 23rd of February and the lowest wind speed (below detection) recorded for days in August and October.

Figure 12.4: Wind Rose for Ballyhaise Weather Station 2003 - 2022



12.1.3 Climate

Climate change, or global warming, arises from the emission of excessive greenhouse gases such as carbon dioxide (CO₂) into the atmosphere. Some of the effects will be disruptive, affecting whole ecosystems, our biodiversity and food systems, with consequences for human welfare and health. Changing weather patterns and more extreme weather events will put property and livelihoods at risk and place new demands on our infrastructure, our water supplies, and how we manage our urban and rural environments.

The expected climate change effects for Ireland are:

- Average annual temperature to increase, milder winters, and a longer growing season.
- Average spring and summer rainfall to reduce, with extended dry periods.
- More frequent heavy rainfall in autumn and winter.
- A changed biodiversity: Some plant and animal species may not adapt in time.

Ireland at present experiences a maritime climate, with prevailing south-westerly winds hailing from the Atlantic Ocean. Maritime climates experience generally cool summers and mild winters, with a much

smaller annual temperature range. The influence of maritime conditions decreases with distance from the Atlantic Coast.

The nearest meteorological station to the planned development site that has a substantial record of data is Clones, an inland monitoring station. Weather monitoring ceased at the Clones meteorological station in 2007. **Table 12.3** displays the average observed climate data for this site 1978 – 2007 available on the Met Eireann website (<https://www.met.ie/climate/30-year-averages>).

Table 12.3: Baseline Climatic Conditions (Clones Monitoring Station, 1981 – 2007)

Month	Max. temp. (°C)	Min. temp. (°C)	Days of air frost (days)	Daily sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)	Monthly mean wind speed (knots)
January	7.2	1.6	9.4	1.5	87.6	15	9.2
February	7.8	1.6	8.5	2.2	71	12	9.4
March	9.7	3	5	3	84	15	9.4
April	12.1	4.2	2.5	4.6	61.6	12	7.9
May	15.1	6.5	0.4	5.6	63.4	12	7.2
June	17.4	9.5	0	4.6	70.9	12	6.7
July	19.2	11.4	0	4.4	70.8	13	6.3
August	18.8	11.1	0	4.2	88.7	13	6.3
September	16.6	9.2	0	3.6	76.2	13	7
October	13.1	6.6	1.1	2.8	102.7	15	7.8
November	9.8	3.9	4.2	1.8	85.1	14	8.2
December	7.6	2.3	7.4	1.2	98.4	15	8.7
Annual	12.9	5.9	38.4	3.3	960.4	161	7.8

The climate data derived from the Clones meteorological station reveals that during the monitoring period, the wettest months within the region tend to be from October to January. High levels of precipitation during these months provides a dampening effect for potential air emissions, lessening a pathway between sources and potential receptors.

12.1.4 Future Climate Conditions

EPA report, High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach, Report No. 339 details projected future baseline conditions. The report indicates that mid-century mean annual temperatures are predicted to rise by 1.3 – 1.6°C under worse case scenarios and incidences of heatwaves are expected to rise by the middle of the century. The coldest 5% of daily minimum temperatures are projected to rise by 1–2.4°C. Incidences of intense precipitation occurrences are

predicted to increase over the year as a whole and in the winter and autumn months, with “likely” predicted increases of 5–19%. The number of extended dry periods (defined as at least 5 consecutive days for which the daily precipitation is less than 1mm) is also projected to increase substantially by the middle of the century over the full year and for all seasons except spring. The projected increases in dry periods are largest for summer.

12.2 Predicted Effects of the Proposed Development

The assessment focuses on predicted effects in relation to air quality and climate. The assessment relates to effects occurring during both the construction and operational phases of the development.

12.2.1 Do-Nothing Scenario

The Do-Nothing scenario relates to the preservation of the current site with no planned development occurring. In this situation, air quality will continue as per the baseline levels described in Section 12.4 and will alter with respect to changes in the local & wider area (this includes but is not limited to: affects from new potential developments, road layout / traffic patterns, upgrades/developments to vehicle technology etc.). Considering this, the do-nothing scenario can be deemed neutral in terms of air quality and climate.

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

12.2.2 Receptor Sensitivity

The most likely effects on air quality will be from construction dust emissions (nuisance dust & PM₁₀/PM_{2.5} emissions) associated with activities such as excavations, infilling materials, stock piling and movement of vehicles.

Construction dust usually deposits within 200m of a construction area, however the bulk of this deposition will occur within the first 50m. There are a small number (<10) of sensitive receptors (residential receptors) within 50m of the site. Therefore, the surrounding area can be classified as low risk with respect to construction dust effect in this regard.

Table 12.4 describes the established sensitivity of the locality. Construction activities are applicable up to 350m from the planned development site boundary, however trackout actions are only deemed applicable 50m from the periphery of the route and up to 500m from the exit of the site (for larger sites),

Table 12.4 Sensitivity of the area

Potential Effect		Sensitivity of the surrounding area		
		Earthworks	Construction	Trackout
Dust soiling	Receptor sensitivity	High	High	High
	Number of receptors	1-10	1-10	1-10
	Distance from the source	<20m	<20m	<20m

	Overall Sensitivity of the Area	Medium	Medium	Medium
Human health	Receptor sensitivity	High	High	High
	Number of receptors	1-10	1-10	1-10
	Distance from the source	<20m	<20m	<20m
	Overall Sensitivity of the Area	Low	Low	Low
Ecological	Receptor sensitivity	N/A		

According to the National Parks and Wildlife Services website (<https://www.npws.ie/>) there are no ecologically designated sites (Special Protection Areas, Special Areas of Conservation or Natural Heritage Areas) within 50 m of the site boundary or potential routes along which trackout could arise therefore construction dust would not have an effect on any ecological receptors.

12.2.3 Construction Phase - Air Effects

Dust emission magnitudes (prior to mitigation) for earthworks, construction and track out actions which are shown in **Table 12.5**.

Table 12.5 Summary of Dust Emissions Magnitudes (Before Mitigation).

Activity	IAQM Criteria	Dust Emission Magnitude
Earthworks	<p>Total site area where earthworks may occur is >10,000m²</p> <p>Undeveloped land –soil type may include potentially dusty soil</p> <p>The number of heavy earth moving vehicles active at any one time is estimated to be approximately 5-10</p> <p>The height of bunds on site will be 4-8m</p> <p>The total material to be moved is estimated to be <20,000 tonnes</p> <p>Earthworks may occur in both wet and dry months.</p>	Medium
Construction	<p>Total building volume will approximately be <25,000m³.</p> <p>Construction materials are expected to be potentially dusty.</p> <p>On-site concrete batching are not expected to be proposed.</p>	Medium
Trackout	<p>Number of heavy vehicles per day out of the site is estimated to be 10-50</p> <p>Vehicle may travel on unpaved roads 50-100m</p> <p>The surface type of the site has the potential to be dusty</p>	Medium

According to IAQM construction dust guidance the following factors are considered with regard to sensitivity of an area:

- The sensitivity of specific receptors in the locality;
- The quantity and location of the receptors;
- With regard to the human health assessment, the areas background annual mean PM10 concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Human and ecological receptors are assessed against the potential effect from the associated construction of the development and HGV routes which could generate trackout. It is expected that site traffic will access/egress the site Cock Hill Rd. on the NE site boundary.

Where appropriate dust management measures and construction stage mitigation methods are in place it is predicted that all construction effects would not be significant.

Construction Traffic Emissions

To remain as conservative as possible traffic emissions with regard to construction were assessed also. Emissions associated with construction traffic can affect local air quality. In particular, the proposed routes used for deliveries and any sensitive receptors that line these routes may experience effects to local air quality.

The potential effect of construction traffic associated with this proposal was estimated as a worst case Annual Average Daily Traffic (AADT) scenario of 200 (which is approximately 2 to 4 times the expected peak AADT to assume worst case potential effect) with a mean traffic speed of 20km/hr. Effects associated with construction traffic will be negligible as can be observed in **Table 12.6**.

Table 12.6 Projected construction traffic concentration contribution

Link Location	Carbon monoxide Annual mean (mg/m ³)	Benzene Annual mean (µg/m ³)	Oxides of nitrogen Annual mean (µg/m ³)	Particulate Matter 10µm Annual mean (µg/m ³)	Days > 50 (µg/m ³)
Worst case receptor 3m from road centreline on any road	< 0.003	< 0.0003	<0.7	<0.14	0

12.2.4 Operational Phase – Air Effects

LA105 DMRB guidance gives details for assessing significance of air quality effects of a development in relation to nitrogen dioxide (NO₂) and particulate matter (PM₁₀). **Table 12.7** describes the corresponding terms used to describe the level of significance from the DMRB in conjunction with EPA EIAR guidance.

Table 12.7 Air quality effects (Operational Stage)

Magnitude of change in annual mean NO ₂ or PM ₁₀ (µg/m ³)	Magnitude (DMRB)	Significance (EPA)
>4 (>10%)	Large	Significant, Very Significant, Profound
>2 (>5%)	Medium	Moderate
>0.4 (>1%)	Small	Slight
<0.4 (<1%)	Negligible	Not significant, Imperceptible

Applicable air quality standards are not expected to be breached at the planned development during operation. The DMRB Screening Method spreadsheet was used to forecast pollution concentrations at 3 receptor positions. A robust and conservative approach was utilized when assuming background concentrations where it was assumed that site was comparable to Carrick-on-Shannon (11.2 µg/m³ for NO₂) and Longford Town (13.9µg/m³ for PM₁₀ and 9.4 µg/m³ for PM_{2.5}). **Table 12.8** (shown below) shows the results of “Do Minimum” (DM) & “Do Something” scenarios for 2025 assuming (as a worst case scenario), receptors are 3m away from road links and 5% of the total AADT is comprised of HGVs.

Table 12.8 Projected NO₂ and PM₁₀ traffic concentrations

Receptor	NO ₂				PM ₁₀			
	DM (µg/m ³)	DS (µg/m ³)	Change (µg/m ³)	Magnitude	DM (µg/m ³)	DS (µg/m ³)	Change (µg/m ³)	Magnitude
R1	13.6	13.8	0.2	Negligible	14.7	14.8	0.1	Negligible
R2	16.1	16.3	0.2	Negligible	15.7	15.8	0.1	Negligible
R3	14.0	14.5	0.5	Small	14.9	15.1	0.2	Negligible

12.2.5 Operational Phase – Climate Effects

The planned development will produce GHG emissions during operation due to the necessity to heat, cool and power the buildings relying on mains power to do so. An approximation of the planned developments annual energy requirement has been projected to be 2,160kWh/yr. As per SEAI data conversion factors, the emission factor for CO₂ per unit of energy for electricity (2021) is 345.8 gCO₂/kWh. The factor has been used in conjunction with the developments annual energy requirement as shown in **Table 12.9**.

Table 12.9 Estimated Operational Phase GHG Emissions from Energy

Parameter	Value
Annual energy demand of development	2,160 kWh
GHG Emissions	746,928 gCO ₂ eq / 0.746tCO ₂ eq

The proposed development will increase CO₂ emissions by 0.0000019% of Ireland's EU 2020 emissions target for CO₂ (37,651,000 t/annum) and 0.0000022% of the 2030 target (32,860,000 t/annum). Therefore, the impact of the proposed development on national GHG emissions is not significant in terms of Ireland's obligations under the EU 2020 target.

The effect of the planned developments traffic emissions of CO₂ were evaluated also by way of the DMRB screening. The output from the screening model shows that the effect of the planned development will be to raise CO₂ emissions by <0.001% of Ireland's EU 2020 and 2030 emission objectives for CO₂. Therefore, the effect of the planned development on Ireland's GHG emissions is considered insignificant with regard to national commitments under the EU 2020 objectives.

12.3 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.

12.3.1 Construction Phase

Site Dust Management Plan

The aim is to provide appropriate site supervision by inhibiting dust to develop to unsuitable airborne levels at source. This is to be accomplished by appropriate site strategy and well known/established control procedures.

Throughout the construction planning stage, the location of activities and storage piles will acknowledge and recognise nearby sensitive receptors/locations and existing prevailing winds to inhibit the chance of significant dust nuisance/soiling (see **Figure 12.3/12.4** for windrose for Ballyhaise Meteorological Station).

The prevailing wind is mainly southerly to south-westerly therefore construction compounds and storage piles should be located downwind of sensitive receptors/locations to decrease the likelihood for nuisance dust to affect/occur at sensitive receptors.

Suitable site supervision will involve the capacity to respond to unfavourable weather conditions by restricting construction activities on-site or by immediate effective control measures prior to the likelihood of nuisance incidences.

Throughout periods where rainfall greater than 0.2mm/day, dust generation is generally suppressed (BRE 2003, UK ODPM 2002). The likelihood for significant dust incidences is also connected to threshold wind speeds greater than 10 m/s (19.4 knots) (at 7m above ground) to displace loose material from storage piles and other exposed materials (USEPA 1986). Due care should be integrated into site works during periods of high wind as these are times where the possibility for significant dust emissions is highest. The prevailing meteorological conditions in the site locality are favourable for dust suppression on average for the majority of an average meteorological year. However, there will be instances where due diligence will be necessary to ensure dust nuisance events are not experienced.

Below details examples of the methods that shall be used during periods of unfavourable meteorological events:

- Contractors shall have good site management procedures throughout the construction works to avoid the creation of airborne dust. Contractors are obliged to guarantee that sufficient preventive measures to limit dust generation are employed through suitable method statements, accounting for the risks and mitigation measures described in the CEMP;
- Throughout working hours, dust control procedures will be assessed as appropriate, subject to the prevailing meteorological conditions;
- The name and contact details of an appropriate person to contact concerning air quality and dust issues shall be exhibited on the site boundary, this notice board should also detail head/regional office contact details;
- It is advisable that community engagement commence before works begin on site describing the nature and duration of the works to local residents and businesses.
- Where complaints are received concerning dust, records will be maintained including likely causes and suitable action taken to alleviate any issues as a result of the construction. During the management of any complaints this will be in agreement with a suitable Complaints Procedure.
- During activities which pose a high probability of dust production and/or during periods of adverse weather conditions the rate of site inspections should be increased.
- Site inspections will be completed frequently to monitor compliance with dust control strategies set out in the CEMP and the results recorded of these inspections, including nil returns.
- The dust reduction strategies should be evaluated at regular intervals during the project to preserve the effectiveness of the techniques employed and to safeguard the minimisation of dust using best practice and procedures. In the event of dust spoiling/nuisance occurring beyond the boundary of the site, site activities will be assessed, and suitable measures utilized to negate the nuisance. Outlined dust mitigation measures to be employed are described below.
- Create and employ a stakeholder communications plan that includes community relations before work begins on site.
- Fully enclose certain operations, where possible, when there is a high possibility for dust generation.
- Prevent site runoff of water or mud.
- Keep site barriers and fencing clean using watering procedures.
- Get rid of materials that have the capability to produce dust from site immediately, unless being reused on site.
- Prevent the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible.
- Use cutting or grinding equipment fitted with suitable dust suppression techniques such as water sprays or local extraction.
- Make certain an adequate water supply is available on the site for effective dust/particulate matter suppression/mitigation.

- Use enclosed shoots and conveyors and covered skips.
- Reduce drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever possible.
- Make certain equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Strictly no bonfires or burning of waste materials on site.

Site Roads / Haulage Route

Construction HGV/truck activities on site roads (especially unpaved roads) can be a substantial source of fugitive dust if suitable control measures have not been applied. The use of speed restrictions is commonly the most effective way of suppressing dust on unpaved haul roads. Various studies have proven that this method can have an effectiveness varying from 25 to 80% (UK ODPM 2002):

- A speed limit of 15km/hr will be applied as an effective control measure for dust for on-site vehicles utilizing unpaved road surfaces.
- Entrance gates should be located at a minimum 10m from local sensitive receptors as much as is reasonably practical/possible.
- Watering of the site will be utilized during periods of prolonged dry weather to ensure unpaved or areas associated with problematic dust are kept moist. Frequency of watering will be dependent on weather conditions, vehicle activity and soil type, dust suppression such as sprinklers, bowsers etc. should be available during the construction phase.
- A road sweeper will be applied as required to control mud and dust on the roads.
- All vehicles must switch off engines once stationary i.e. no idling vehicles on site.
- Use water aided dust sweepers on the access and local roads to eliminate dust/mud as required.
- Vehicles entering and leaving sites must be covered to prevent dusty emissions from materials during transport.
- Document all inspections of haul roads and any follow-up action in a site logbook.
- Employ a wheel washing system with rumble grids to remove collected dust and mud prior to leaving the site where reasonable.
- Sand and other aggregates must be stored in banded areas and are not allowed to dry out and become airborne, unless this is required, in which case ensure that appropriate additional control measures are in place.
- Bulk cement and other fine powder materials must be delivered in covered tankers and stored in silos with suitable control systems to negate escape from material and overfilling during delivery.

Land Stripping / Earth Moving

Land stripping / earth-moving works throughout periods of high winds and dry weather conditions can be a significant cause of dust.

- Throughout dry and windy periods, and when there is a possibility of dust nuisance, watering shall be performed to ensure moisture content of materials being relocated is high enough to increase the stability of the soil and thus suppress dust.

- During times of very high winds (gales), actions likely to generate significant dust emissions should be rescheduled until the gale has receded.
- Revegetate earthworks and exposed areas/soil stockpiles to stabilize surfaces as soon as practicable
- Use hessian mulches where it is not possible to revegetate or cover with topsoil, as soon as is practicable
- Only remove covers in small areas during work and not all at once.

Storage Piles

The position and moisture content of storage piles are key factors which determine their capacity for dust emissions. The below measures shall be utilized to minimise fugitive dust formation from storage piles:

- Overburden material shall be shielded from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be positioned downwind of sensitive receptors.
- Adequate watering will take place to ensure the moisture content is high enough to suppress dust. The watering of stockpiles has been found to have an 80% control efficiency (UK ODPM 2002).
- Plan site layout so that machinery and dust causing activities including stockpiling are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary which are at least as high as any stockpiles on site. she

Site Traffic on Public Roads

Escape of debris, aggregates and fine material onto public roads should be decreased to a minimum by utilizing the following measures:

- Vehicles delivering or collecting material with capacity for dust emissions shall be covered with tarp always, to limit the blow-off of dust.
- A wheel wash facility should be installed near the entrance of the construction site, where feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary.

Summary of Dust Mitigation Measures

The constant control of fugitive dust will maintain the prevention of significant emissions, instead of an inefficient attempt to manage them once they have been released. The main elements with respect to control of dust will be:

- The design of a site policy on dust and the allocation of the site management responsibilities for dust issues.

- The creation of a documented system for managing site practices regarding dust control.
- The development of a method by which the functionality of the dust minimisation plan can be consistently monitored and assessed; and
- The requirement of effective procedures to handle any complaints.

These procedures will be strictly monitored and assessed continuously throughout the construction stage. In the occurrence of dust nuisance outside the site boundary, activities likely to raise dust would be restricted and adequate procedures applied to resolve the problem before the recommencement of construction operations.

Climate and Regional Air Quality

Various site-specific mitigation methods can be applied throughout the construction stage of the proposed development to support emissions reduction. The restriction of on-site or delivery vehicles from leaving engines idling, even over brief periods. Reducing waste of materials due to inadequate timing or over stocking of materials on site will assist to minimise the carbon footprint of the site.

Traffic

Traffic emissions associated with site have been projected as not significant therefore no detailed mitigation/remediation related to air and climate emissions from traffic have been described.

7.3.2 Operational Phase

The planned development is not expected to have a significant effect on local air quality, and the residual effects of the development on air quality during operation are expected to be suitable. Throughout the operational phase, likely climate change effects are considered to be not significant. Best practice techniques measures have been recommended nonetheless to minimise the effect of the development on the air quality.

12.4 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 air quality and climate.

12.4.1 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 12.14**. in Chapter 12 of the **EiAR Volume 2 – Main Report**

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

7.4.2 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 12.15**, in Chapter 12 of the *EIAR Volume 2 – Main Report*

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

13.0 Microclimate

Chapter 13 of Volume 2 of the EIAR comprises an assessment of the Daylight, Sunlight and Overshadowing; and local Wind Patterns (collectively known as the local microclimate) within the site and the surrounding environs.

13.1 Receiving Environment

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

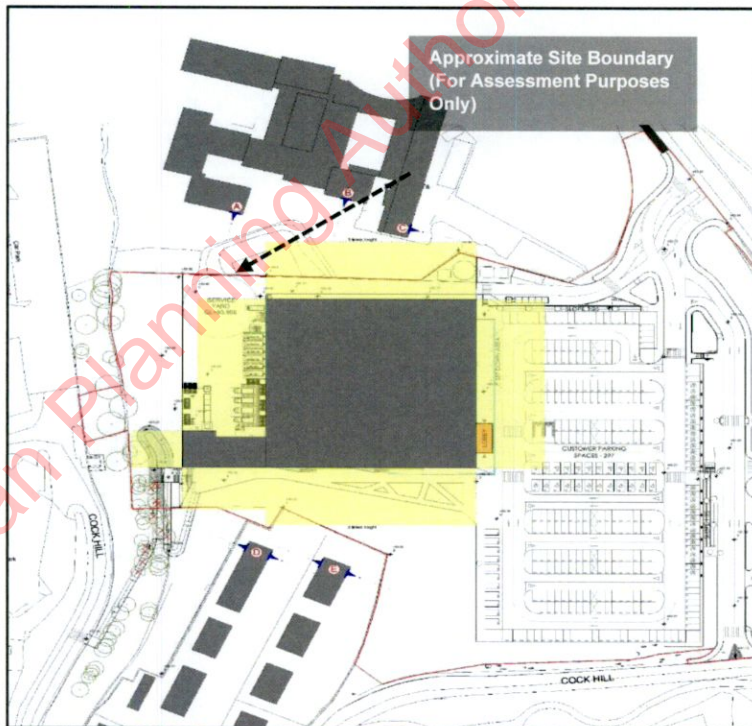
- Daylight, Sunlight & Overshadowing
- Prevailing Local Wind Conditions

13.1.1 Daylight, Sunlight and Overshadowing

The site for the proposed development is in Cavan Town located in the townlands of Townparks and Tullymongan Lower. The site is bounded to the West by the back lands of Main Street, to the North by St. Clare's National School, to the East and South by Cock Hill Road. There is a small housing estate, St. Francis's, Cock Hill to the Southwest.

St. Clare's National School has planning permission for an extension, which includes playing pitches to the south of their site. This extension and ground works have been assessed in this report for potential impact on daylight, sunlight and overshadowing. **Figure 13.1** details potential receptors identified within the zone of influence of the proposed development.

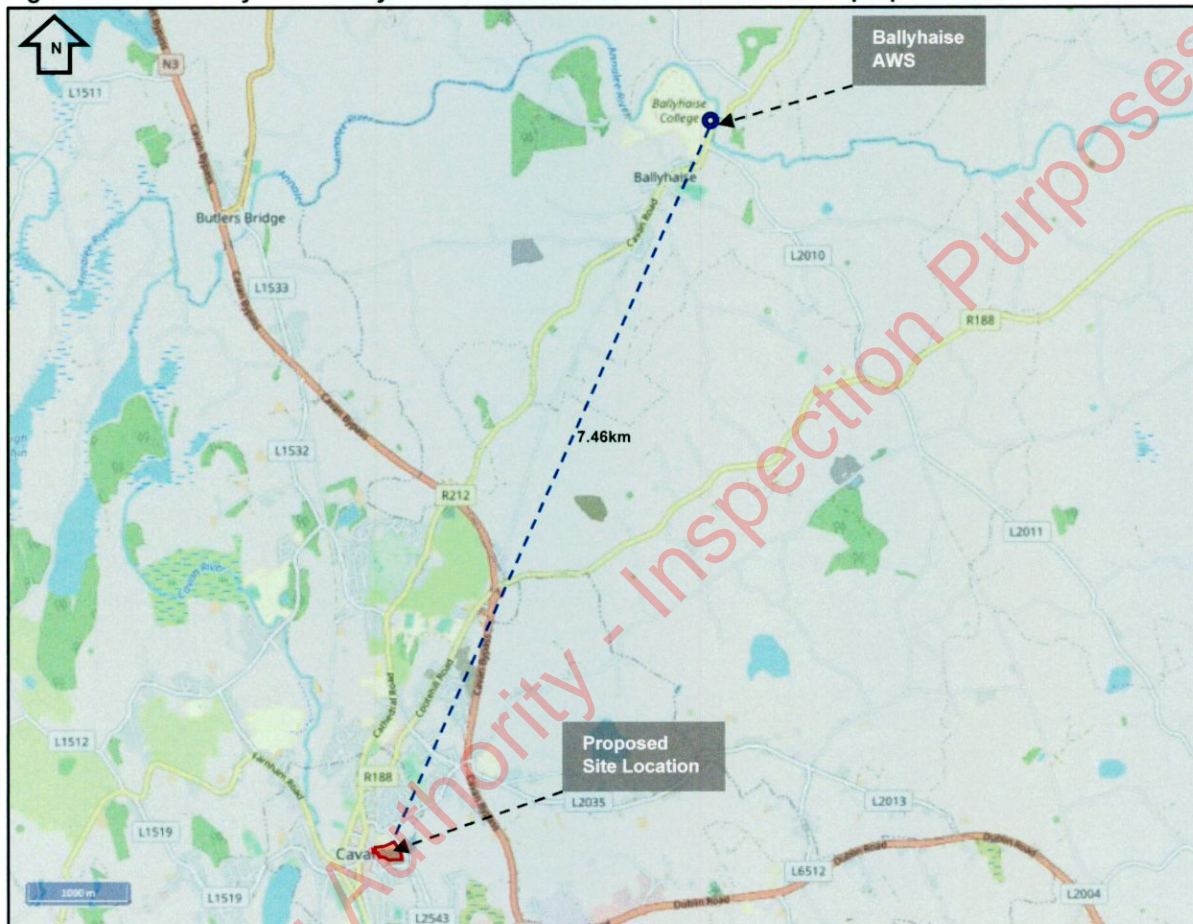
Figure 13.1 Proposed site plan showing the zone of influence on adjacent properties



13.1.2 Wind

This wind analysis considers the complete development being exposed to the prevailing wind conditions at the site. The nearest synoptic weather station to the proposed site, with a complete data set for wind speed and direction, is the Ballyhaise Automatic Weather Station (AWS), situated within the grounds of Teagasc Agricultural College. This weather station is located ca. 7.46km northeast of the proposed site, as illustrated in **Figure 13.2**, below.

Figure 13.2: Proximity of the Ballyhaise Automated Weather Station to the proposed site



Data collected from Ballyhaise Weather Station was used to develop a wind profile for the proposed site location. Wind data has been collected at this weather station since the 8th of October 2003 until the present day.

Transferability of Data

The Ballyhaise Weather Station is located on a hill, similar to that of the proposed site location at Cock Hill. The Weather station elevation above sea level is 78mOD compared to the proposed finished floor level of 85.150mOD of the retail unit at Cock Hill. The wind data at Ballyhaise is hence deemed to be broadly comparable to conditions at the proposed site.

Wind Data

Based on an analysis of the 18-year data set, the average windspeed predicted to occur at the proposed site is 3.33 metres per second (m/s).

Figure 13.4 below outlines the average wind speed distribution predicted at the site throughout a given year. This indicates the percentage of days per month during which winds reach a certain speed. Calmer conditions (<6 m/s) are most likely to occur between May and September. The occurrence of windier conditions (>6 m/s) steadily become more likely from September to January, with conditions slacking off once more from February to May.

Figure 13.4: Wind Speed Diagram for Ballyhaise AWS

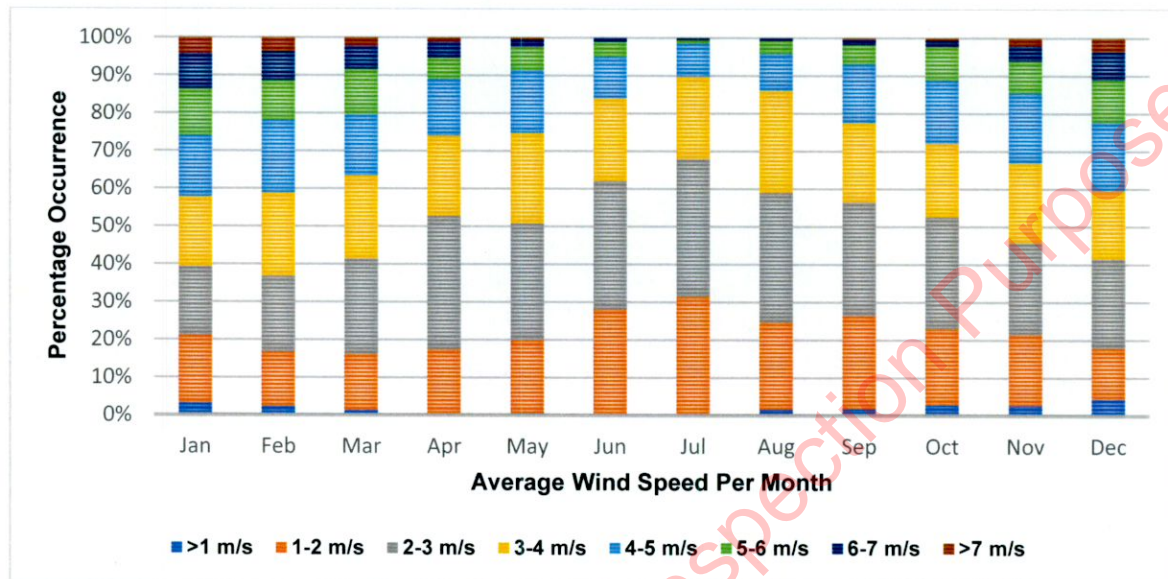
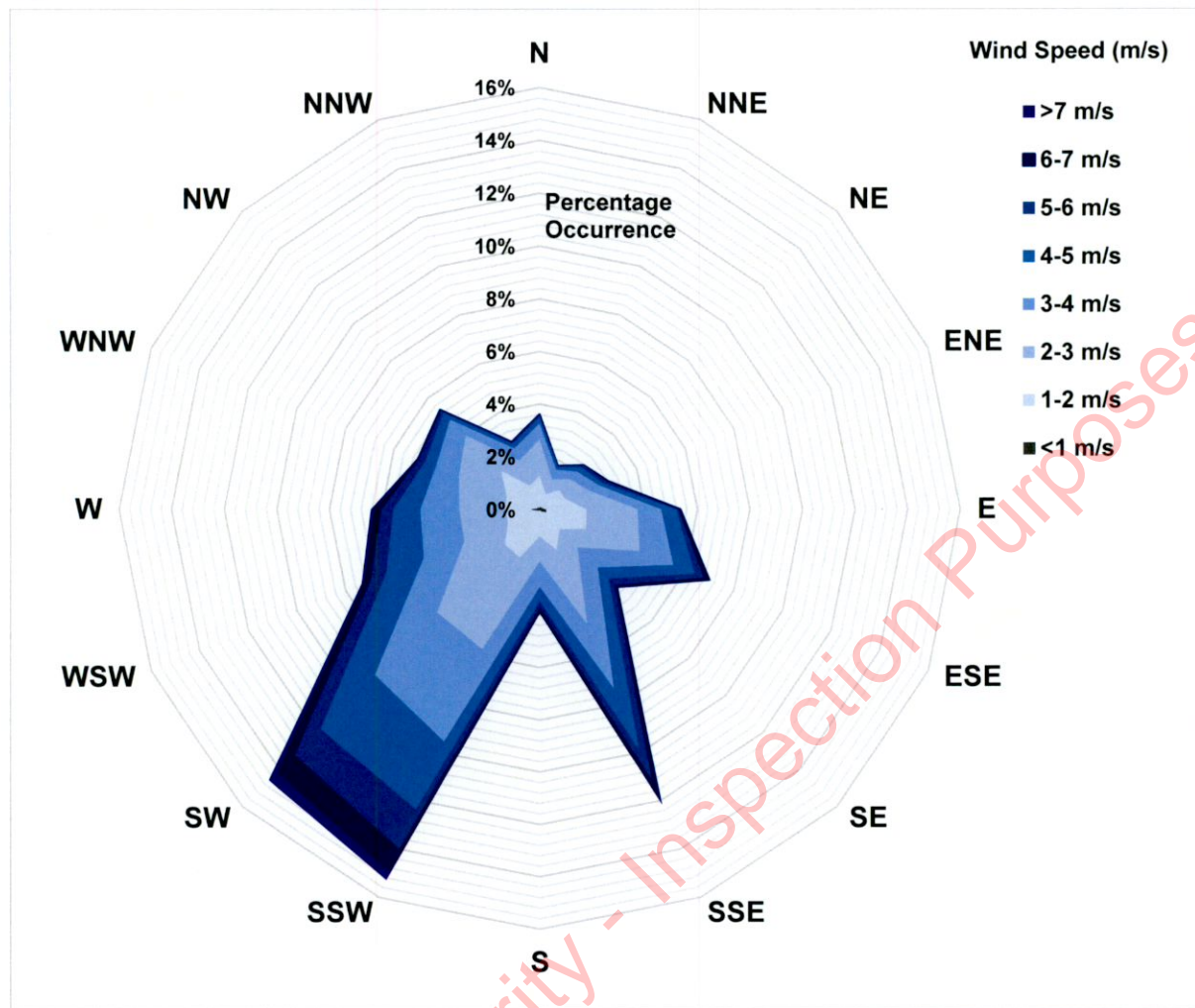


Figure 13.3 displays a wind rose for Cavan, using the 18-year data set from Ballyhaise AWS. This chart indicates how many hours per year the wind blows from a particular direction. The prevailing wind direction at the proposed site is from a southwesterly direction.

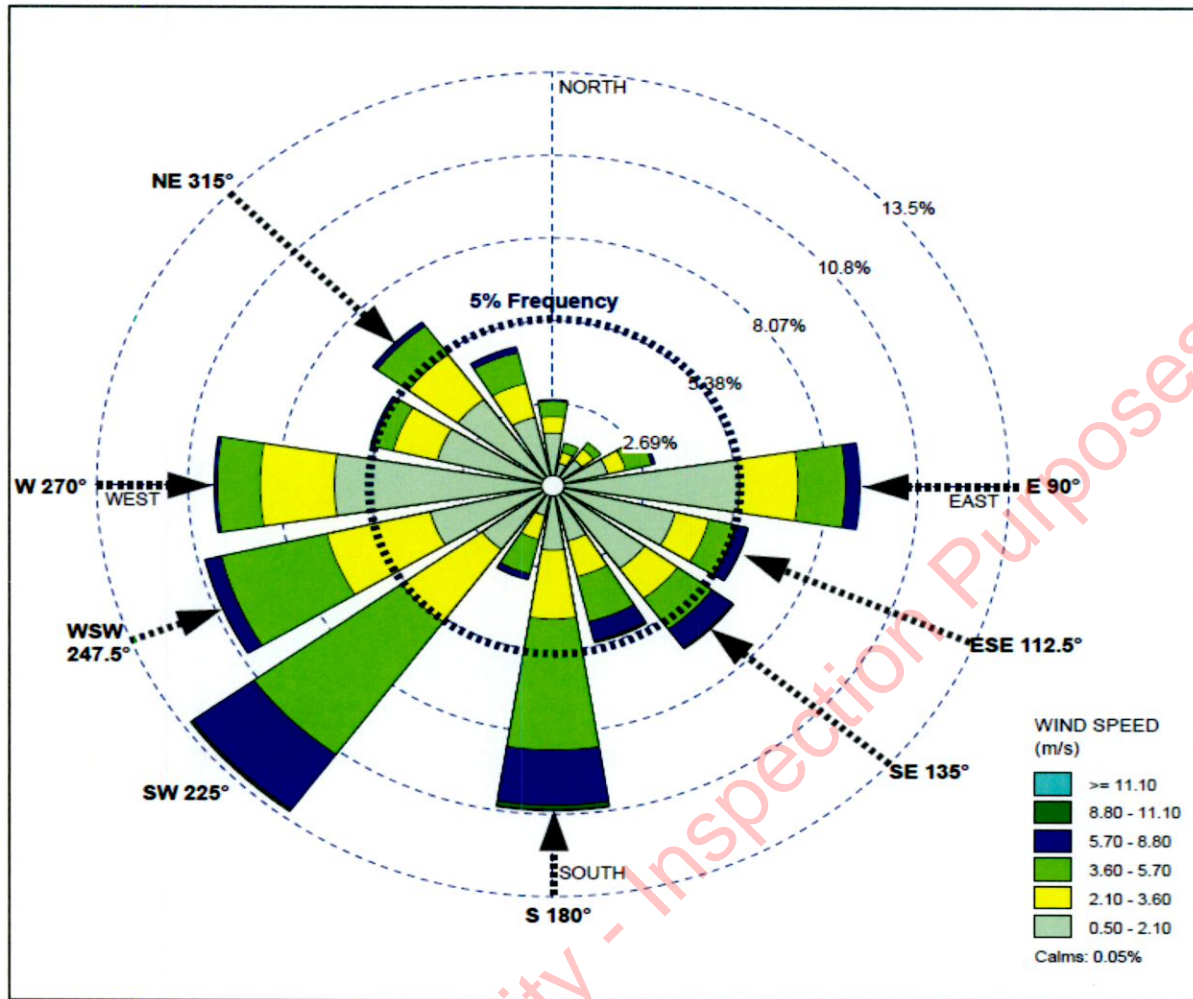
Figure 13.3: Wind Rose for Ballyhaise Weather Station 2003 – 2022 - Windspeeds and Direction



The wind rose in **Figure 13.4** is derived from 2021 data only. Comparison with the wind rose in **Figure 13.3**, derived from an 18-year dataset, wind speeds have been lower than average last year. The prevailing wind direction remains relatively consistent with the 18-year average, with a gentle southwesterly breeze as the predominant wind conditions.

The assessment of wind comfort levels at the new development will be based on the dominating wind directions throughout the year. Based on the criterion of occurrence frequency, if the proposed site is exposed to a wind from a specific direction for more than 5 percent of the time, then the microclimate analysis should consider the impact of this wind (accounting for its direction and most frequent speed) on the local microclimate. **Figure 13.4** overleaf and **Table 13.7**, characterise the most prevalent wind directions, which exceed the 5% threshold.

Figure 13.4: Wind Rose for Ballyhaise Weather Station (2021 data only) (AERMOD)



13.4.4 Wind Modelling

The proposed development will consist of the construction of a mixed-use retail development comprising a retail building (3,333m²), Storage Area (1,767.9m²), Petrol Filling Station with Drive-Thru Café, Car Park totaling 297 spaces, a service yard and works to the public realm to improve pedestrian access.

The existing level of the site ranges in elevation from 81.037mOD towards the southeast, to 84.946mOD towards the northwest of the site. The tallest structure proposed will be the retail unit, the apex of which will be ca. 7.8m in height. The peak of this roof will be 3-4 metres lower than the existing residential housing estate located to the southwest of the site.

The Wind Analysis Criteria set by the City of London states that the threshold for triggering a full-scale computational (CFD) wind simulation is a change of level of 25 metres hence a basic wind screening assessment was deemed sufficient for this wind study.

As detailed in **Table 13.1**, winds emerging from a total of 8 no. directions were adjudged to exceed the 5% threshold. The cumulative average velocity of the 8 no. prevailing winds is 3.4 metres per second. The cumulative average places the local wind conditions at 2-3 on the Beaufort Scale, described as a “Gentle Breeze”.

Table 13.1: Prevailing Wind Analysis - Direction & Average Wind Speed (Ballyhaise AWS 2003 – 2022)

Qualifying* Wind Direction	Frequency (%)	Average Velocity (m/s)	Beaufort Scale	Prevailing Wind Type
SW 225°	12.8%	3.8 m/s	2-3	Light to Gentle Breeze
S 180°	10.1%	3.2 m/s		
WSW 247.5°	9.8%	3.5 m/s		
W 270°	9.4%	3.4 m/s		
E 90°	8.9%	2.7 m/s		
NE 315°	7.2%	2.6 m/s		
SE 135°	6.9%	3.2 m/s		
ESE 112.5°	6.2%	3.1 m/s		
Cumulative Average Velocity:		3.4 m/s		

*Qualifying Wind Direction - Any direction in which the wind blows >5% of the year, at the site.

Comparison of the average wind speed at the site of 3.4 m/s with the Beaufort scale detailed in **Table 13.2** below describes the baseline site conditions as a “Gentle Breeze”. The Beaufort Scale for Wind on Land is used to express average wind speed as a value which can be used to predict potential wind-related impacts such as tree movement or building damage. Under the prevailing wind conditions expected on site, leaves and small twigs can be observed in constant motion and light flags would be extended.

Table 13.2: Beaufort Scale

Beaufort Number	Wind Speed (m/s)	Description	Effects on Land
0	0.0 - 0.2	Calm	Calm, smoke rises vertically
1	0.5 – 1.5	Light Air	Smoke drift indicates wind direction; vanes do not move
2	1.6 – 3.3	Light Breeze	Wind felt on face; leaves rustle, vanes begin to move
3	3.4 – 5.4	Gentle Breeze	Leaves, small twigs in constant motion, light flags extended
4	5.5 – 7.9	Moderate Breeze	Dust leaves and loose paper raised up; small branches move
5	8.0 – 10.7	Fresh Breeze	Small trees begin to sway
6	10.8 – 13.8	Strong Breeze	Large branches of trees in motion
7	13.9 – 17.1	Near Gale	Whole trees in motion; resistance felt in walking against wind
8	17.2 – 20.7	Gale	Twigs and small branches broken off trees
9	20.8 – 24.4	Strong Gale	Slight structural damage; slates blown from rooves
10	24.5 – 28.4	Storm	Seldom experienced on land; trees broken; structural damage occurs
11	28.5 – 32.6	Violent Storm	Very rarely experienced on land; widespread damage
12	>32.7	Hurricane	Violence and destruction

13.2 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.

13.2.1 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the microclimate.

Under the 'Do Nothing' scenario there would be no change to the current land use of the site. There will be no impact on daylight/sunlight/overshadow to surrounding receptors. Local wind patterns will remain unaffected.

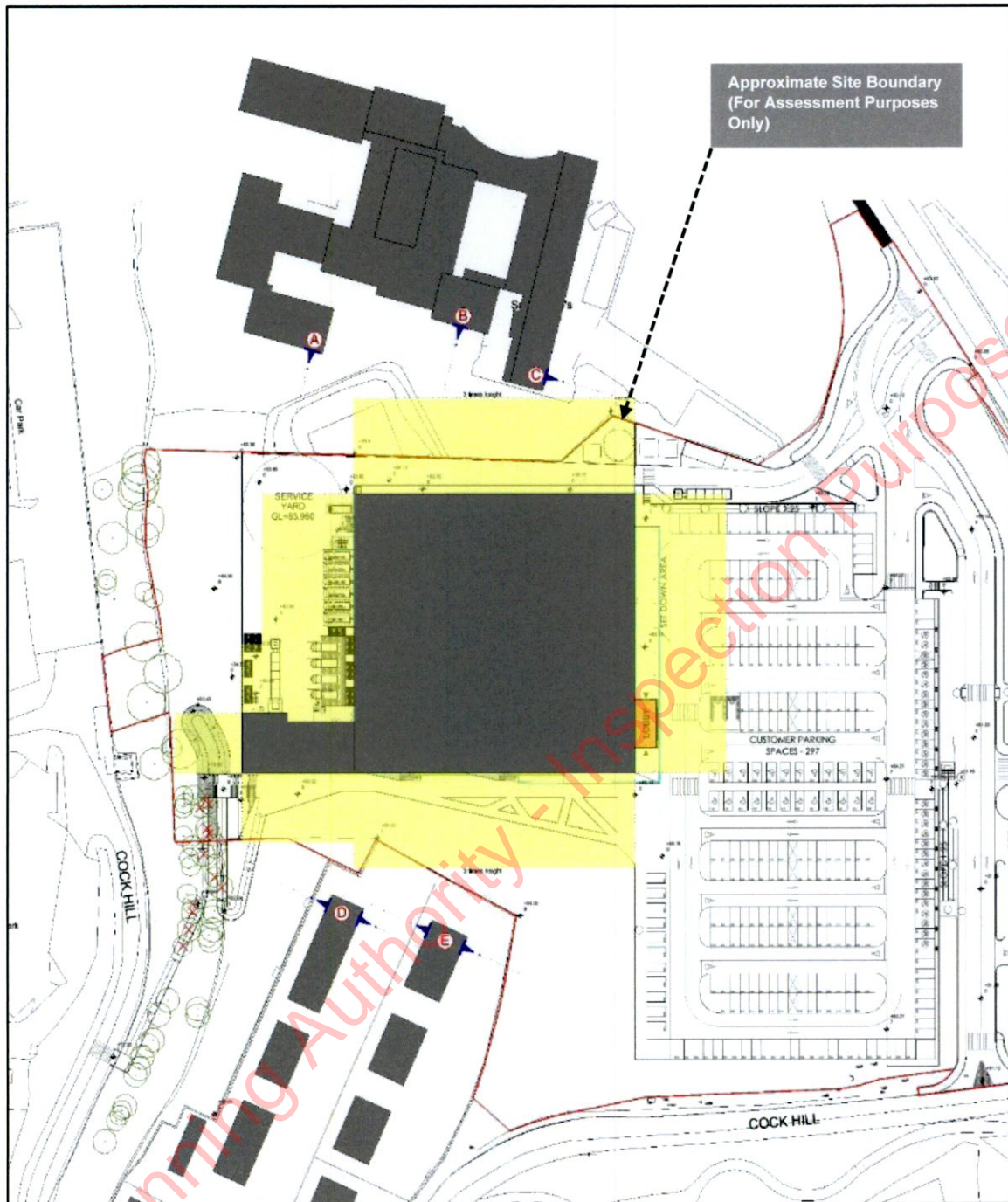
13.2.2 Receptor Sensitivity

Daylight Sunlight and Overshadowing

A total of 5 no. potential receptors were identified towards the north and south of the development labelled A-E in **Figure 13.5**.

- A. St. Clare's School, Cavan; located ca. 37m north of the proposed structure.
- B. St. Clare's School, Cavan. located ca. 59m north of the proposed structure.
- C. St. Clare's School, Cavan. located ca. 49m northwest of the proposed structure.
- D. Residential Unit; located ca. 37m southwest of the proposed structure.
- E. Residential Unit; located ca. 45m southwest of the proposed structure.

Figure 13.5 Proposed site plan outlining potential receptors



Wind - Pedestrian Comfort

Potential receptors for the wind assessment are all pedestrian circulation routes, building entrances and leisure open areas within the site and in neighbouring adjacent areas. Strong winds have the potential to have a significant effect on other receptors, including air quality, biodiversity and water quality. Such impacts are dealt with in other chapters within this study hence pedestrian comfort has been identified as the only receptor within this chapter, with respect to wind.

13.2.3 Potential Effects – Construction Phase

Potential construction phase effects with respect to microclimate are considered in detail below and summarised in **Table 13.3**.

Daylight Sunlight and Overshadowing

The site is currently vacant, so there is no demolition phase. The likely effects on the daylight and sunlight to adjacent properties would steadily increase over the construction phase, given that the completed mass of the building would cause an increased level of obstruction.

During the works the presence of a crane or bore equipment would be considered to be **neutral, imperceptible** due to their size and **temporary** nature.

Wind

The wind screening assessment revealed that the average wind speeds expected to occur on site at ground level were measured at 3.4m/s, representing a “gentle breeze”. The proposed development is a single-storey building with a height of approx. 7.8 metres above ground level.

An increase to the prevailing windspeeds is not anticipated during the construction phase of the proposed development. The prevailing wind speeds (3.4m/s) present “acceptable for occasional outdoor seating” conditions for site workers. Considering construction workers are more likely to possess suitable weatherproof clothing than the average member of the public, the impact anticipated is not significant.

Overall, the predicted effects of wind speed on operatives during the construction phase are **neutral, insignificant, and temporary**.

Table 13.3 – Construction Phase Effects (Unmitigated)

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Adjacent Units	Decreased daylight for adjacent receptors	Neutral	Imperceptible	Temporary
Construction Workers	Strong Breeze affecting site operative’s ability to work	Neutral	Insignificant	Temporary

13.2.4 Potential Effects – Operational Phase

Potential operational phase effects are considered in detail below and summarised in **Table 13.11**.

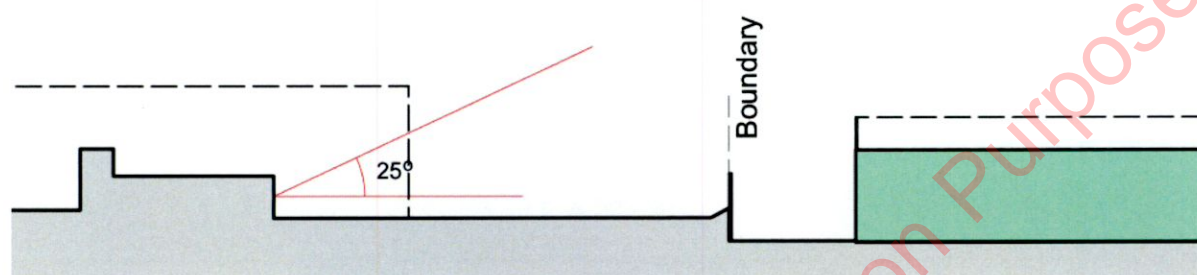
Daylight

The BRE guidelines recommend that loss of light to existing windows need not be assessed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window. The zone of influence 3 times the height of the proposal is plotted in yellow in **Figure 13.5**, above.

This preliminary analysis indicates that the projection of 3 times the height of the proposed development does not reach the window wall of any adjacent dwelling, any part of the school building or any other building.

Figure 13.5 also notes the direction of the walls with windows in the adjacent residential properties to the south and the school to the north. Locations A – C are through the windows of classrooms in the school and Locations D & E are through the windows of the closest houses No.13 & 14 St. Francis's, Cock Hill.

Figure 13.6: Section perpendicular to window wall at location B indicated in Fig 13.5



Locations A & C through Classrooms in St. Clare's National School: The windows do not face towards buildings in the proposed development, indicating any reduction in available daylight will be negligible.

Location B through a classroom in St. Clare's National School: The section through this window is shown in Figure 2. The 25° line would not be subtended by the proposed development, indicating any reduction in available daylight will be negligible.

Locations D & E through the windows in No. 13 & 14 St. Francis's, Cock Hill: The windows in habitable rooms do not face towards buildings in the proposed development, indicating any reduction in available daylight will be negligible.

Any reduction in available daylight from the proposed development will be negligible and meets the recommendations of the BRE guidelines BR209:2022 (third edition).

Sunlight

The BRE guidelines (2022) recommend assessing the main living rooms and conservatories if they have a window wall facing within 90° of due south. If the proposed development is fully north of the existing window, then sunlight need not be assessed.

Figure 13.5 shows that the proposed development is north of the dwellings in St. Francis's. The proposed development would have no impact on the sunlight in these dwellings.

The BRE document indicates that for an amenity area to have good quality sunlight throughout the year, 50% should receive in excess of 2 hours sunlight on the 21st of March. It also states that front gardens need not be assessed for sunlight.

St Clare’s National School has planning permission with playing fields to the south of their site. This area has been assessed with a calculation of Sun on the Ground. The findings are illustrated in **Figure 13.6**, below.

Figure 13.6: Existing & Proposed Radiation map of amenity areas, showing available sunlight on 21st March. Scale represents the percentage of daylight received from 0-8 hrs.

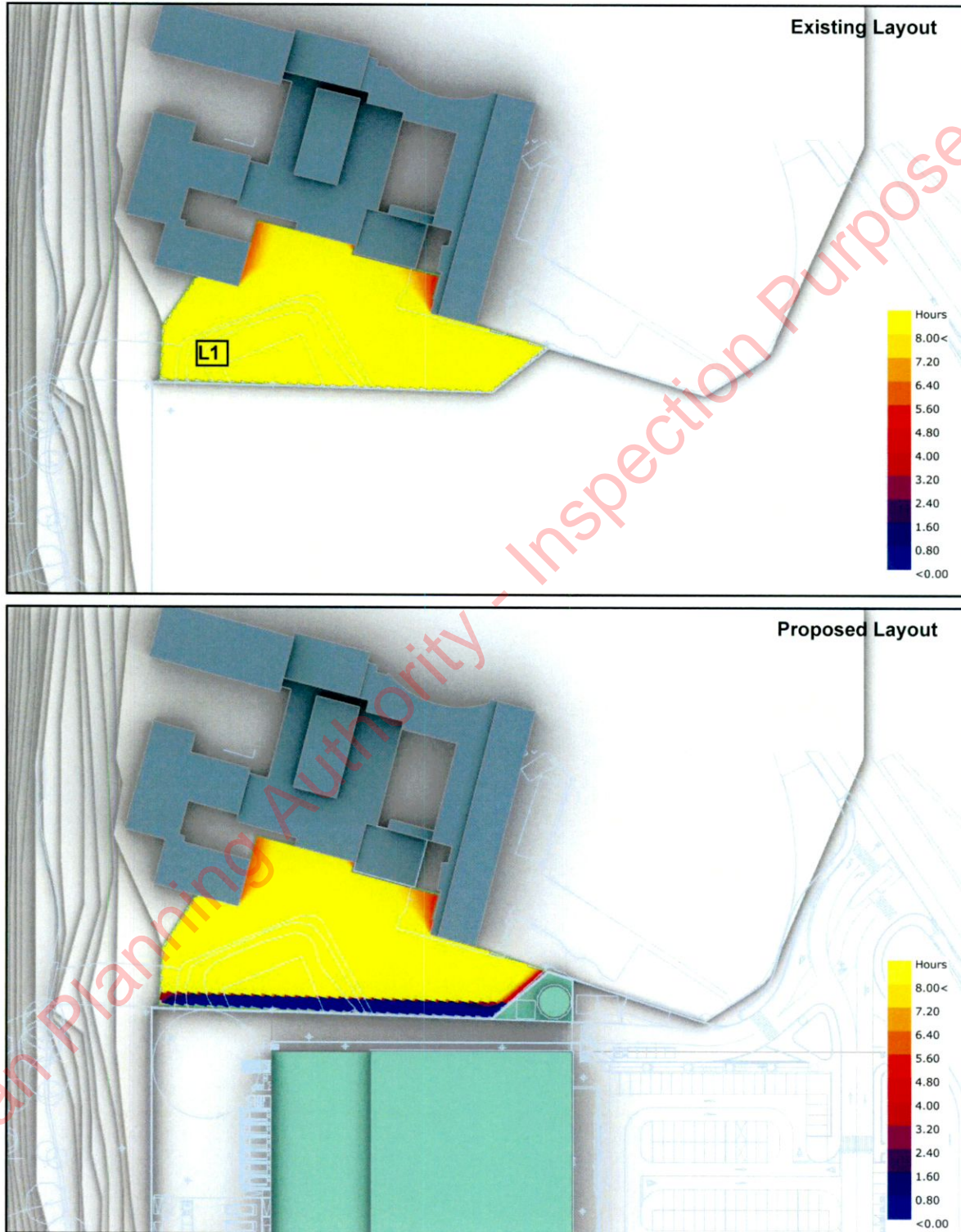


Table 13.4 Sun on the Ground to amenity areas

ID	Location	% Area receiving 2 hours sunlight on		Ratio of Proposed: Existing	Result
		21st March			
		Existing	Proposed		
L1	Rear of St. Clare's National School	100%	89.7%	89.7%	Meets Criteria

The amenity spaces to the rear of St. Clare's National School will not perceive a reduction below the current sunlight levels on the 21st of March. The area will exceed 2 hours of available sunlight over 50% of the amenity space and will not be reduced below 80% of the current value. The proposed development meets the recommendations of the BRE guidelines for gardens and open spaces.

Overshadowing

Shadow diagrams are a visual aid to understand where possible shading may occur. The use of shadow diagrams as an assessment method should be taken over the course of the day and not a specific time due to the transient nature of the sun and the shade caused by obstructions. The site is a greenfield site, there is no shadows cast from any structures on the site at present. The shadow study shows that there is no additional shading on any of the adjacent buildings. The impact of the proposed development is considered negligible.

Wind

The tallest structure proposed will be the retail unit, the apex of which will be ca. 7.8m in height. The peak of this roof will be 3-4 metres lower than the existing residential housing estate located to the southwest of the site. This building would not be considered a "tall building" (>25m in height) as described in Wind Microclimate Guidelines (2019). All buildings are sufficiently spaced so as not to create "urban canyons" or wind tunnel features which can result in wind acceleration. Furthermore, there is an existing residential housing estate located to the southwest of the proposed development site which is significantly taller than the tallest point of the proposed development. The residential estate is located in the path of the prevailing wind of the site which emerges from the southwest, offering the proposed site an added level of shelter.

Due to the low-rise nature of the development, it is considered unlikely that any of the buildings would contribute to any perceptible acceleration of wind speed due to either a vortex between buildings; due to wind speeds accelerating in the corner streams around either side of a building; or due to creation of a wind tunnel.

It is concluded that the proposed development would have no significant impact on windspeeds in the area.

Pedestrian comfort due to wind speeds can be expected to be "acceptable" with average wind speeds typically corresponding to a "gentle breeze" on the Beaufort Scale.

Overall, the predicted effects of wind speed on pedestrian comfort is **neutral, insignificant** and **long-term**.

Table 13.5 – Operation Phase Effects Summary (Unmitigated)

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Adjacent Units	Decreased daylight for adjacent receptors	Neutral	Insignificant	Long-Term
Pedestrian Comfort	Gentle Breeze creating Acceptable for occasional outdoor seating, e.g. general public outdoor spaces.	Neutral	Insignificant	Long-Term

13.3 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.

13.3.1 Construction Phase

Daylight Sunlight and Overshadowing

During the construction phase all scaffolding, hoarding and cranes would only be in use for as long as necessary to facilitate the construction of the proposed development. The impact of these is considered negligible. No additional mitigation is required.

Wind

A Construction Environmental Management Plan (CEMP) 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 effects on the local environment cause by the local wind conditions.

All relevant Health and Safety measures and controls, relating to any periods of elevated winds due to adverse weather on site during the construction phase, shall be followed and implemented by the nominated contractor.

With consideration of standard good practice Health and Safety measures that are required to be followed on site, wind impacting on the construction phase of the proposed development is not considered to represent a significant risk.

13.3.2 Operational Phase

Daylight Sunlight and Overshadowing

During the design process the position, finished floor level, height and massing of the proposed development were technically assessed to reduce and mitigate any potential effect on the daylight, sunlight and overshadowing of the adjacent properties. This informed the final design. The impact of the proposed development is considered negligible.

Wind

The impact of the proposed development on microclimate will be insignificant, thus, no site-specific mitigation measures are required.

13.4 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.

13.4.1 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 13.12.** in Chapter 13 of the **EIAR Volume 2 – Main Report**

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.**

13.4.2 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 13.13.** in Chapter 13 of the **EIAR Volume 2 – Main Report**

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

14 Landscape and Visual Impact Assessment

14.1 NTS

The LVIA describes the landscape context of the proposed development and assesses the likely landscape and visual impacts of the proposed Development on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately.

Production of this Landscape and Visual Impact Assessment involved a desk study to establish an appropriate study area, fieldwork to establish the landscape character of the receiving environment and assessment of the significance of the landscape and visual impacts of the development.

The recently adopted Cavan County Development Plan (July 2022) places the site in the same 'Town Core' land use zone as the previous CDP did. Major Retail, Commercial Carpark and Public Transport Station/ Depot are all identified as development types that are 'permitted in principle' within this generally robust and permissive zoning objective.

There are no specific planning objectives relating to the site and nor is there any designated landscape or scenic views designations relevant to the site. There is a potential flood zone identified in the eastern corner of the site, but this is not of consequence to the landscape and visual assessment and will be addressed elsewhere in the EIAR.

The site itself is essentially a brownfield site relating to former water works that has been since been prepared and terraced in anticipation of strategic scale urban development. The site lies on the eastern side of a ridge (Cock Hill) that divides the main core of Cavan Town from the less developed peri-urban setting to the east of the site. Directly to the north is St. Clare's National School and to the north east lies Killymooney Lough with its associated wetland complex. Immediately to the south are the St. Francis and Lakeview housing estates. Cavan Town is the principal town of, and located centrally within, the border county of Cavan. The town is located within a valley created by a number of surrounding hills and the land use of the wider landscape is predominantly agricultural.

With regard to mitigation measures, other than those embedded elements of the design that respond to its immediate setting in terms of perimeter planting around the site and internal walkways, there are no specific townscape and visual mitigation measures considered necessary in this instance. Landscape and urban design measures are integral to the development and will help to soften and assimilate the built form within its surrounding context in a general sense whilst adding to the quality of the development. However, it is not a case where the consideration of landscape and visual impacts before and after landscape planting would result in a materially different impact judgements.

There will be townscape and visual impacts that are specific to the construction stage in the form of clutter and intensity of movement of workers and machinery coupled with the constantly evolving, partially completed development. These are familiar and short-term effects that are considered to result in **Slight / Negative** significance of effect.

Once operational, the proposed development can be judged in terms of its permanent imprint on the townscape fabric of the receiving environs. In this regard it represents an appropriate scale, function and design quality for this latent brownfield site that currently reads as a perceptual void in the urban fabric of Cavan Town. It will form a more consolidated and legible transition between the urban form of the settlement and its eastern rural hinterland which also includes the valued habitat area of Killymooney Lough. The resulting significance of impact is therefore judged to be **Slight/Positive**.

Visual impacts were assessed at eleven viewpoints selected within the surrounding area to cover a range of viewing distances, viewing angles and visual receptor types. The visual receptor sensitivity ranged between Medium at Cavan Cathedral and an elevated lookout point in an amenity area within the Lakeview residential estate, to Medium-low for typical urban and suburban. Low sensitivity was applied to those receptors where the current view is dominated by the vacant, but prepared, brownfield site.

The magnitude (scale) of visual change ranged between 'Medium' and 'Negligible' depending on proximity and the degree of intervening screening, but what is perhaps more important to consider is the quality of those impacts and whether the effect is a positive, neutral or negative one. Where the proposed development is substantially revealed and the well-considered integration between the design and the townscape setting is most apparent, the quality of effect is deemed to be positive (VP4 and VP6). In other instances, such as VP10, where a partial view of the proposed development is introduced to the scene without its full context, it represents simply an increased scale and intensity of built development. In such cases the quality of effect is negative. Most commonly the proposed development is not visible, barely discernible and/or it does not make a material contribution to visual amenity, either positively or negatively and therefore, the quality of visual change is neutral.

Overall, it is considered that the proposed Tesco development will not result in any significant / negative townscape or visual impacts. Instead, it is considered that it is an appropriate scale and form of development for this site and the quality of the design and materials will generally make a positive contribution to an urban setting that is in need of (and zoned for) appropriate infill.

15.0 Introduction

IAC Archaeology has prepared Chapter 15 of this EIAR to study the impact, if any, on the archaeological, architectural and cultural heritage resource of a proposed commercial development, which is located within the townlands of Townparks and Tullymongan Lower, County Cavan (ITM 642296,804787). The assessment has been undertaken by Faith Bailey and Christina O'Regan of IAC Archaeology.

There are no recorded archaeological or architectural sites within the area of proposed development. However, it should be noted that the part of the eastern zone of archaeological potential that surrounds Cavan Town (CV020-055) is located within the western section of the development area. No individual sub-constraints are located within this area.

Archaeological testing of the proposed development area has already been carried out as part of the Cavan Town eastern access road project (Licence Ref.: 10E0433). A total of four archaeological sites were identified within the area of proposed development. These were excavated under licence 11E024. Archaeological testing and excavation have already taken place within the footprint of the proposed development and the site has been stripped and built up with layers of hardcore. As a result of these works, no direct or indirect negative effects are predicted upon the archaeological resource as a result of the construction of the proposed development.

As part of the consultation process, pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

No direct or indirect negative effects are predicted on any of the Protected Structures or built heritage sites located within the study area of the proposed development area. No recommendations in relation to specific architectural heritage sites are deemed necessary.

There will be no negative effects on any specific site of cultural heritage significance as a result of the proposed development. Therefore, no recommendations in relation to specific cultural heritage sites are deemed necessary.

No residual or cumulative effects were identified in relation to the archaeological, architectural or cultural heritage resource.

Cavan Planning Authority - Inspection Purposes Only.

16.0 Material Assets

Chapter 16 of Volume 2 of the EIAR assesses the likely significant effects on material assets caused by the proposed development.

16.1 Receiving Environment

The material assets of human origin within the receiving environment of the proposed development are described below under the following headings:

- Ownership & Access
- Urban Settlements
- Foul and Surface Water Disposal
- Potable Water Supply
- Transport Infrastructure
- Natural Gas Supply
- Electrical Supply
- Telecommunications
- Municipal Waste

16.1.2 Ownership & Access

The proposed development site is currently in private ownership on an area of land ca. 4.126 Ha in total. It is located just to the east of the Cavan town centre. There is no public access into or across the lands currently any no other parties have a Right of Way. The site is bounded by the road known as “Cock Hill” on its eastern and southern side, this road connects the site to the R122 which in turn is connected to the national route (N3) just on the southeast corner of Cavan town, which connects Cavan to Dublin, Athlone, and Northern Ireland. The ground of St. Clare’s National school is along the northern side of the proposed site and there are residential properties and Cavan town centre to the west.

16.1.3 Urban Settlements

The lands are currently unoccupied but have been re-profiled on as the ground currently in place is permeable and manmade. It is currently zoned as a “Town Core” within the Cavan County Development Plan 2022-2028. The lands to the west of the proposed site are also zoned as “Town Core”, “Amenity/Open space” and “Public/Community”.

The lands to the west consist of residential properties with a mix of houses and Cavan Town Centre, St. Clare’s national school directly located to the north, the east and south of the site is bounded by the road known as “Cock Hill”. The land in the opposite side of the road is currently undeveloped. The next closest major town to Cavan town is Ballinagh also in Co. Cavan, ca. 7.8 km south of Cavan town centre. Cavan Town is a gateway from Dublin, the midlands, and the North of Ireland. Dublin which is connected to Cavan via the N3 is approx. 95km to the southeast, Athlone connected via the N55 is ca.

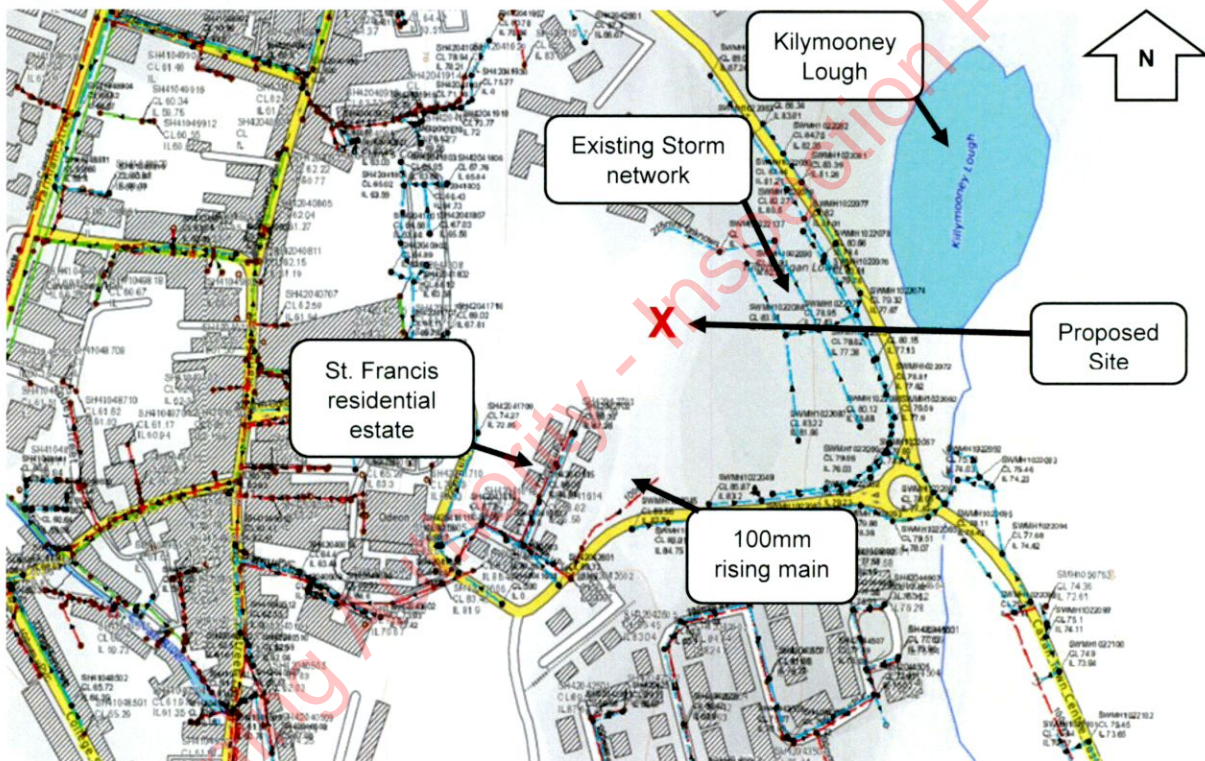
72km southwest and Enniskillen connected via the N3/A509 in county Fermanagh is 42km northwest of Cavan town centre.

16.1.4 Foul and Surface Water Disposal

There is no existing sewer network within the site borders, according to the as-constructed survey information the closest network is 150mm line located in the St. Francis residential estate to the west. A 100mm rising main extends onto the proposed site in the southwest corner and is connected to the foul network that eventually discharges into Cavan Wastewater Treatment Plant (WWTP).

With regards to storm water, there is an existing 225mm network that run along eastern side of the site which connect into a 525mm line that runs north to south eventually discharging into Kilymooney Lough. Please refer to **Figure 16.1** for an overview of the existing foul and surface water networks.

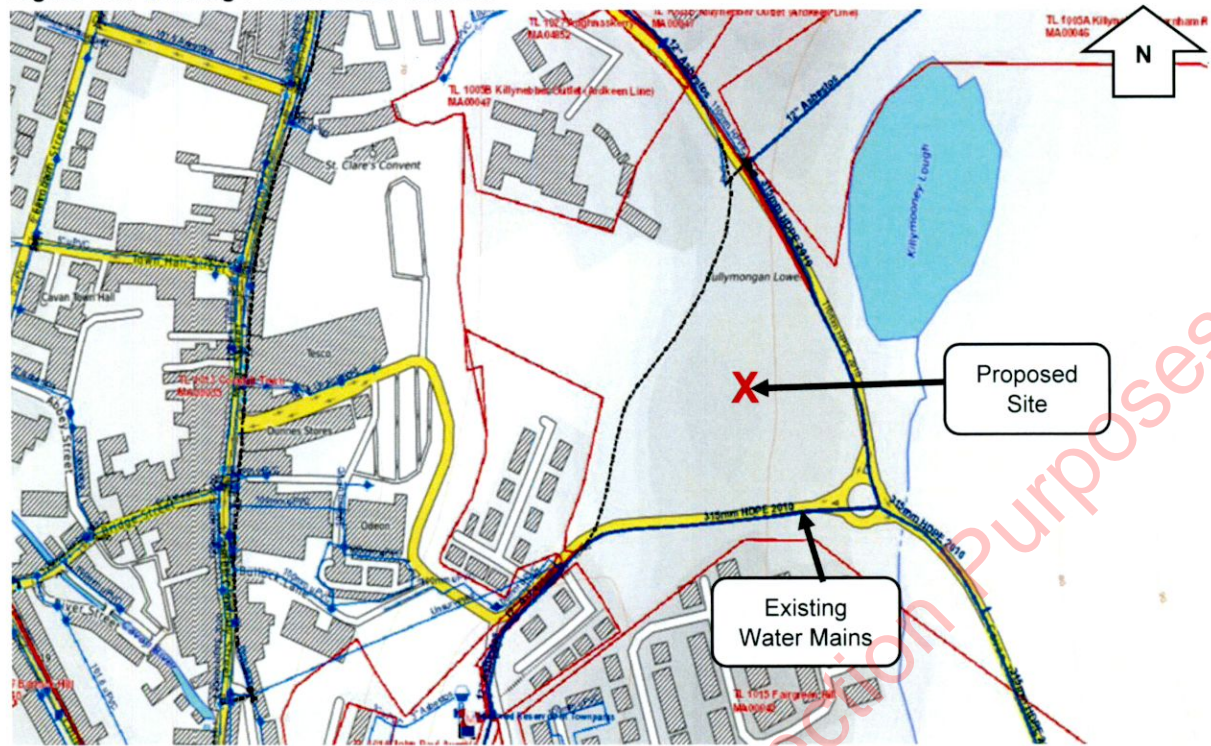
Figure 16.1 Existing Foul and Storm Water Networks



16.1.5 Potable Water Supply

There is an existing 300mm High Density Polyethylene (HDPE) public watermain line that runs along Cock Hill on the eastern and southern side of the proposed site. Based on this information there is no concern regarding potable water supply for the proposed development. This material assets will be discussed in greater detail in chapter 7 “Hydrology and Hydrogeology”. Please refer to **Figure 16.2** for an overview of the existing potable water supply network.

Figure 16.2 Existing Potable water network



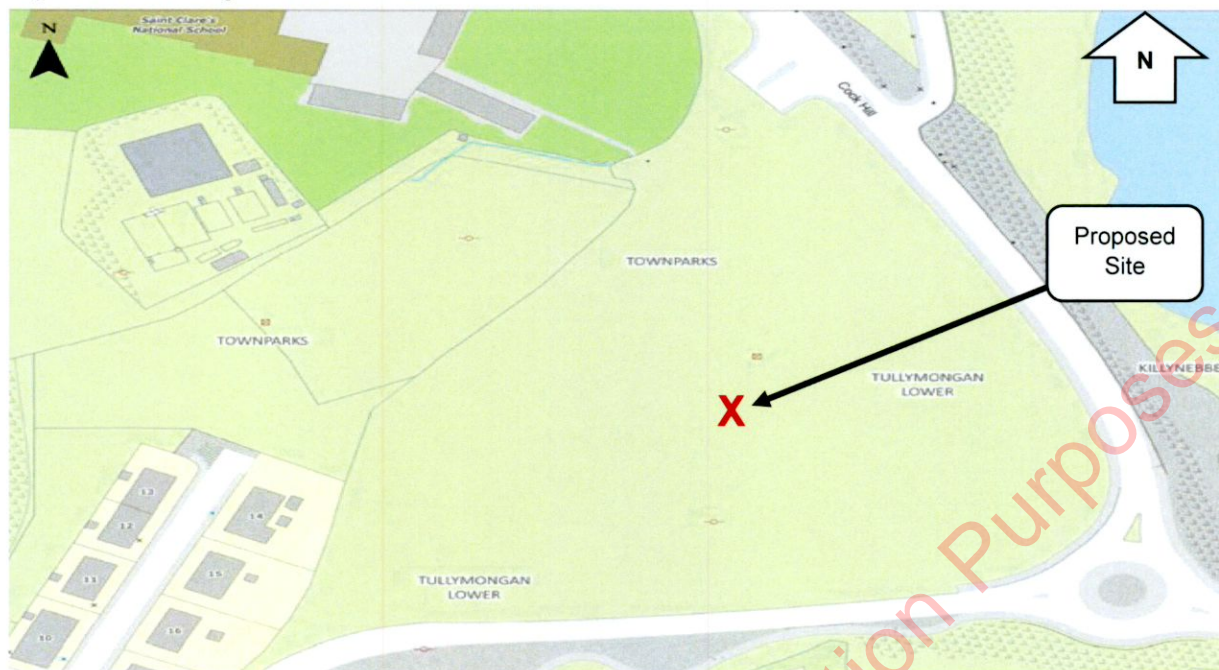
16.1.6 Transport Infrastructure

As outlined above, a full Traffic and Transport chapter has been prepared by ORS and will be submitted as part of this EIAR. The impact that the proposed development would have on the transportation infrastructure in the vicinity of the proposed development site has been fully assessed in the Traffic and Transport chapter.

16.1.7 Natural Gas Supply

Based on the information received from Gas Network Ireland (GNI), there is no existing gas supply in or around Cavan Town. The closest line is located ca. 18.3 km to the east just outside Cootehill. Please refer to **Figure 16.3** for the GNI map of the proposed site.

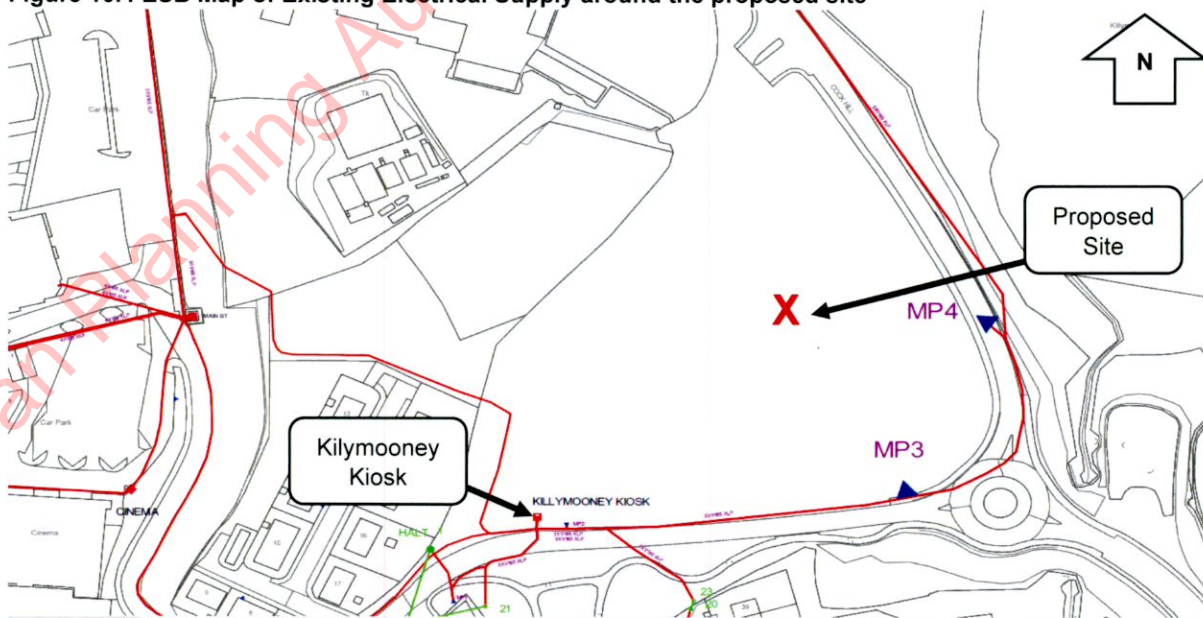
Figure 16.3 Existing Natural Gas network



16.1.8 Electrical Supply

Based on the information received from the ESB, there is an underground 100kv ESB line running along Cock Hill on the southern and eastern borders of the site. The same line branches off from the main network and runs through the land on the western side of the site and connects into an 100kv underground line in the main street of Cavan town. There is an ESB substation located on the southern side of the site known as “Kilymooney Kiosk” and three monitoring points along the southern and eastern borders. **Figure 16.4** shows the existing electrical network in or around the proposed site

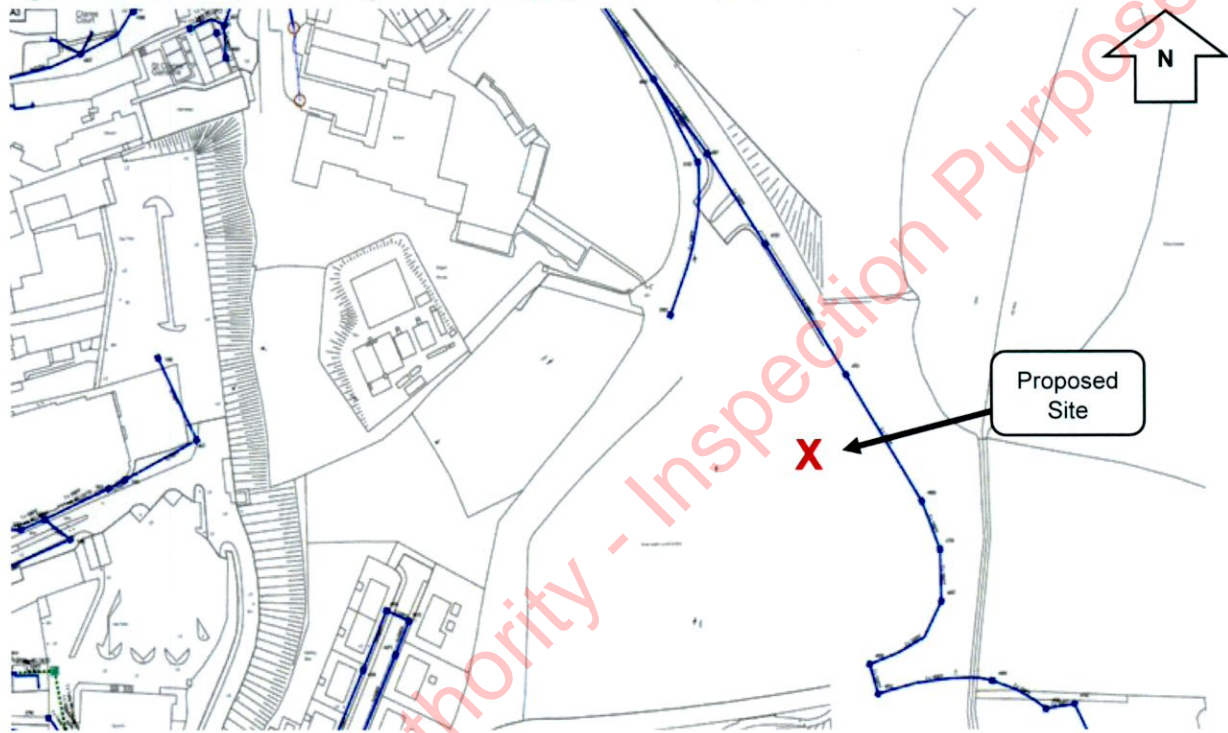
Figure 16.4 ESB Map of Existing Electrical Supply around the proposed site



16.1.9 Telecommunications

Based on the information obtained from Eir, there is an existing telecommunications network adjacent to the proposed site and a line runs within the site boundary to the north. According to the maps a 2x100PP network runs along Cock Hill on the eastern side of the proposed site, there is another 2x100PP line connected to the main line that enters the site on the north side and terminates at point 3363 close to the border with St. Clare's National School. Please refer to **Figure 16.5** below for an overview of the existing telecommunications network according to Eir.

Figure 16.5: ESB Map of Existing Electrical Supply around the proposed sit



16.1.10 Municipal Waste

A separate waste management chapter has been prepared as part of this EIAR along with a standalone Construction Environmental Management Plan and a standalone Operational Waste Management Plan. This includes information of the potential wastes generated from the construction and operational phases based on the nature and scale of the proposed development.

16.1.11 Cavan County Development Plan 2022-2028

A review of the Cavan County Development Plan was carried out to determine the objectives relevant to the Commercial and Retail Development within Cavan Town.

Commercial and Retail Development Objectives:

- CCR 01** Sustain and enhance the retail and services offer of Cavan Town Centre in line with the County Retail Strategy with a principle of 'town centre first' approach being prioritised.

- CCR 02** Support commercial opportunities within Cavan town centre which harnesses the potential of the town for economic growth and sustainability.
- CCR 03** Reinforce the centre of Cavan Town as the proper location for new commercial and retail development, with emphasis on quality of design, positive contribution to the existing streetscape and protection of existing heritage landscapes.
- CCR 04** Support the provision of mixed-use developments in the town centre which create opportunities to live, work and shop within the town and reduce the car-based travel.
- CCR 05** Encourage and facilitate the re-use and regeneration of derelict land and buildings for retail and other town centre uses with due cognisance to the Sequential Approach prescribed in the Retail Planning Guidelines 2012.
- CCR 06** Promote the priority of pedestrian movement in the town core.

16.2 Predicted Effects of the Proposed Development

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

16.2.1 Do-Nothing Scenario

If the proposed development did not proceed there would be no increased demand or loading on material assets of human or natural origin. However, it would not be beneficial to the local economy and may discourage companies from locating their operations in the area in the future..

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

16.2.2 Construction Phase

Potential construction phase impacts are considered in detail in **Section 16.6.2** of *EiAR Volume 2 – Main Report* and summarised in **Table 16.1**.

Table 16.1 – Severity/ Magnitude of Impact during construction phase

Asset	Potential Environmental Effects	Quality	Significance	Duration
Ownership/Access	Land disturbance Increased volumes of traffic	Negative	Moderate	Temporary
Urban Settlements	Increased Noise Levels Increased Dust Levels Increased volumes of traffic Impact on road infrastructure	Negative	Slight	Temporary
Foul and Surface Water Discharge	Connecting to the network Potential damage and subsequent repairs to the network	Neutral	Not Significant	Temporary
Potable Water Supply	Connecting to the network Potential damage and subsequent repairs to the network	Neutral	Slight	Temporary

	Potential contamination of the network			
Transportation Infrastructure	Wear and tear on the road network Accumulation of construction debris on the road infrastructure Increased HGV traffic	Negligible	Imperceptible	Unlikely
Natural Gas Supply	No impacts expected no gas supply currently in Cavan town	Negligible	Imperceptible	Unlikely
Electrical Supply	Connecting to the network Potential damage and subsequent repairs to the network	Negative	Slight	Brief
Telecommunications	Connecting to the network Potential damage and subsequent repairs to the network	Negative	Slight	Brief
Municipal Waste	Increased waste production Increased HGVs in the area for delivery's/collections Potential litter if improperly managed	Negative	Moderate to Significant	Temporary

16.2.3 Sources - Operational Phase

The operational phase effects anticipated and considered throughout the lifetime of the operation of the facility are considered in detail in **Section 16.6.3** of *EIAR Volume 2 – Main Report* and summarised in **Table 16.2**.

Table 16.2 – Severity/ Magnitude of Impact during operational phase

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Ownership/Access	Increased traffic and footfall to the area	Negative	Moderate to Significant	Long-term
Urban Settlements	Contributes to the local economy Increased activity in the area Increased demand on electricity, water, infrastructure etc.	Neutral	Moderate	Long-Term
Foul and Surface Water Discharge	Increase demand and decreased capacity on the drainage network	Negative	Slight	Long-Term
Potable Water Supply	Increased demand	Negative	Moderate	Long-Term
Transportation Infrastructure	Increased wear and tear on the roads. Increased traffic	Negative	Significant	Long-Term
Natural Gas Supply	No impacts expected no gas supply currently in Cavan town	Negligible	Imperceptible	Unlikely
Electrical Supply	Increased demand	Negative	Moderate to Significant	Long-Term
Telecommunications	Increased demand	Unlikely	Slight to Moderate,	Long-Term
Municipal Waste	Increased demand Potential litter pollution	Negative	Moderate	Long-Term

16.3 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.

16.3.1 Construction Phase

General Mitigation Measures

A Construction Environmental Management Plan (CEMP) 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 effects on the Material Assets.

Ownership and Access

The main concern from this material asset will be the access during both the construction phase and operational phase. A proposed site entrance is located on the northeast border of the lands for the construction phase. The same access point plus another on the southern border will be open to the public during the operational phase. No member of the public will have access to the site during the construction phase to control site access the following mitigation measure are proposed:

- Harris fencing will be erected around the site border to prevent access to members of the public.
- A banksman's/site security will be positioned at the proposed construction site entrance to control who enters the site.
- Only those who possess a valid Safe Pass will be authorised entry during the construction phase.
- All appropriate signage will be erected to highlight potential hazards and to deter unauthorised entry from site.

Urban Settlements

The following measures will minimise the risk to the urban settlements near the proposed site:

- Following of all best practice guidance to prevent and limit any impact to other material assets such as potable water, foul, storm, electrical and telecommunications networks and therefore the surrounding Urban Settlements.
- Staff training and toolbox talk regarding topics like water, electricity etc preservation to limit the impact on the existing networks and therefore the local urban settlements.
- Scheduled deliveries and collections to limit traffic build up on the surrounding road networks.
- Proper waste management as outlined in the CEMP to ensure no litter pollution occurs onsite or to the surrounding lands.

Foul and Surface Water Discharge

Before any excavations during the construction phase can begin all details of the location/depths etc of the existing system must be known to prevent any potential of damage to the drainage networks.

- Ensure all maps are consulted pre and during any excavations to prevent any potential damage to the existing network and avoid any system shutdowns for repairs. .
- Ensure none of the draining systems discharge into surface water to prevent any contamination to the local water receptors.

Potable Water Supply

The existing site consists of hardstanding manmade ground however the available maps indicate that the existing potable water supply is along the external border of the proposed development. A connection to the water supply will be required during the construction phase.

The same mitigation measures suggested for the Foul and Surface Water drainage systems are recommended for the Potable Water supply, aside from the demand on the network which will be slight during the construction phase before any excavations are conducted site maps must be consulted to prevent any damage to the network and avoid the unnecessary loss of treated potable water.

Transportation Infrastructure

The proposed development will result in an increased vehicle presence during the construction phase in particular with HGVs. This in turn will increase the potential of construction related debris on the local road network around the proposed site. In order to control this several mitigation factors have been recorded as follows:

- Limit any excavation and turning of soil until dryer weather.
- Have wheel wash facilities onsite near the access points.
- Have a road sweeper onsite to clean the surrounding road infrastructures during the construction phase.
- Limit the speed limit to 20km/hr. onsite during dryer periods to limit the arising of dust onsite.
- Measure detailed in Dust Management Plan

Gas Supply

There is no existing gas network in the surrounding area however it is still recommended to consult with Gas Networks Ireland to ensure without any certainty that no gas pipelines are in the vicinity of the proposed site.

Electrical Supply

A connection to the existing network will be required during the construction phase, similar recommendations apply as previously mentioned, in the event of any required excavations it is vital those involved are familiar with the most current maps and be aware of any buried cable, in order to prevent injury most importantly but potential damage to the network and widespread disruption to the network. Online platforms such as “Dial Before you Dig” can help inform construction personnel of the existing underground systems involved before commencing any works.

Telecommunications

As stated above no excavations should proceed before first consulting the most recent maps to avoid injury and damage to the existing networks.

Municipal Waste

There will be a significant amount of construction related waste generated during the project, the following are several recommended mitigation measures to help reduce the impact from waste during the construction phase:

- Inform staff through toolbox talks/training etc on the relevance and importance of correct waste segregation and management.
- Ensure waste receptacles available for the different identified waste streams to ensure proper and efficient segregation of waste onsite
- Install signage to promote and encourage proper waste segregation, recycling etc.
- Ensure bins/skips are not allowed to overflow to prevent litter build-up onsite.
- Ensure all bins have lids and skips are covered when be removed offsite to prevent littering elsewhere.
- Ensure waste is collected by a registered vendor and disposed off at a facility licenced to take said waste.
- Maintain good waste records onsite to ensure all is accounted for.

16.3.2 Operational Phase

General Mitigation Measures

An Environmental Operating Plan (EOP) will be prepared and implemented by the management company during the operational phase. This is a practical document will include detailed procedures to address the things like water and energy usage, waste management etc. Mitigation factors for the protection of the surface water receptors are also discussed in the accompanying engineers planning report, it is intended Storm water attenuation measures will be incorporated into the project.

16.4 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 material assets.

16.4.1 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 16.3.** in Chapter 16 of the **EIAR Volume 2 – Main Report.**

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

16.4.2 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 16.4.** in Chapter 16 of the **EIAR Volume 2 – Main Report.**

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

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17.0 Risk Management

17.1 Introduction

This chapter sets out an assessment of the potential significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters.

17.2. Consultation

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

17.3 Risk Assessment

'A National Risk Assessment for Ireland 2020' provides guidance in relation to the carrying out of a risk assessment. A consolidated list of national hazards for Ireland identified in the document are identified in Table 17.1.

Table 17.1 Consolidated List of Key Risks

<p>Hazard: Civil</p> <ul style="list-style-type: none"> • Large Crowd Event • Pandemic • Water supply Distribution and Contamination • Food Chain Contamination • Animal Disease • Terrorist Incident 	<p>Hazard: Natural</p> <ul style="list-style-type: none"> • Storm • Snow and Ice (Including prolonged low temperature) • Flooding (Including pluvial, fluvial and coastal)
<p>Transportation</p> <ul style="list-style-type: none"> • Maritime Incident • Air Incident • Transport Hub (Includes Airports, Ports and Rail Stations) 	<p>Technological</p> <ul style="list-style-type: none"> • Structural Collapse (including Dam, Tunnel, Building and Bridge) • Nuclear Incident (Abroad) • Cyber Incident • Disruption to Infrastructure and Utilities (including oil, gas, electricity and communications)

Source: A National Risk Assessment for Ireland (2020) Department of Defence) pg 19.

The risk assessment methodology for this chapter has been supported by general risk assessment methods. Hazard analysis and risk assessment are accepted internationally as essential steps in the process of identifying the challenges that may have to be addressed by society, particularly in the context of emergency management. Mitigation as a risk treatment process involves reducing or eliminating the likelihood and/or the impact of an identified hazard. Table 17.2 sets out the Classification of National Likelihood Criteria contained in the 'A National Risk Assessment for Ireland 2020' document.

Table 17.2 Classification of National Likelihood Criteria

National Likelihood Criteria		
Rating	Classification	Average Recurrence Interval
1	Extremely Unlikely	100 or more years between occurrences
2	Very Unlikely	51 - 100 years between occurrences
3	Unlikely	11 – 50 years between occurrences
4	Likely	1 - 10 years between occurrences
5	Very Likely	Ongoing/Less than one year between occurrences

Source: 'A National Risk Assessment for Ireland (2020) Department of Defence) pg 21.

17.4 Construction Phase

The Construction Environmental Management Plan (CEMP) prepared by ORS outlines a number of potential hazards during the construction stage including inter alia: pollution, noise and vibration, hazardous and contaminated materials, traffic, and contamination/disturbance from dust and dirt. The Flood Risk Assessment (FRA) also prepared by ORS outlines a number of potential flood risk categories including, tidal, fluvial, pluvial, and groundwater. Other relevant potential risks at construction stage relate to traffic accidents, mechanical failure, explosions, fire and building/scaffold collapse.

17.4 Operational Phase

The operational phase of the proposed scheme will comprise a mixed retail development with an anchor retail unit, a drive thru café and petrol filling station. The main potential risks associated with the operational phase of the proposed development are fire, adverse weather events, flooding and building collapse. The FRA prepared by ORS addresses a number of potential flood risk categories including, tidal, fluvial, pluvial and groundwater. The increase in traffic movements associated with the operational phase of the proposed development has the potential to increase the risk of traffic accidents on the surround road network. The proposed uses include an anchor retail unit with associated facilities. These uses are considered normal hazard fire risks as would be encountered in most developments and do not include any hazards which would be regarded as presenting an exceptional environmental fire hazard.

17.5 'Do Nothing' Scenario

The potential risk of Major Accidents at the subject site in a 'do nothing' scenario would be very low due to the undeveloped nature of the site and the lack of potential receptors.

Subject to the implementation of mitigation measures set out in this EIAR, there are no identified potential major accidents and/or disasters that present a sufficient degree of risk resulting in significant negative effects and/or environmental effects deriving from its vulnerability to such major accidents and/or disasters.

18.0 Interactions and Cumulative Effects

18.1 Introduction

This chapter of the EIAR assesses the interactions between the environmental factors as described throughout the various chapters of the EIAR and provides a summary of the likely significant effects of the proposed development on the environment as a result of cumulative effects.

18.2 Consultation

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

18.3 Description of Significant Interactions

The assessment of potential interactions between the various environmental factors is set out in the sections to follow, while a summary of all potential interactions is provided at Table 18.1.

18.3.1 Population and Human Health

There are interactions of Population and Human Health with Air Quality and Climate, Noise and Vibration, Traffic and Transportation, Landscape and Visual Impact and Waste Management which are predicted to arise during construction and operational stages.

18.3.2 Biodiversity

There are interactions of Biodiversity with Hydrology and Land and Soils - Geology and Hydrogeology during construction and operational stages.

18.3.3 Material Assets – Site Services

There are interactions of Material Assets – Site Services with Traffic and Transportation, Hydrology, Waste Management.

18.3.4 Traffic and Transportation

There are interactions of Traffic and Transportation with Noise and Vibration and Air Quality and Climate.

18.3.5 Micro-Climate (Wind)

There is an interaction of Micro-Climate (Wind) with Lands and Soil – Geology and Hydrogeology.

18.3.6 Landscape and Visual Impact

There are interactions of Landscape and Visual Impact with Population and Human Health and Archaeology, Architectural and Cultural Heritage.

18.3.7 Lands and Soil – Geology and Hydrogeology

There are interactions of Land and Soils – Geology and Hydrogeology with Hydrology and Biodiversity.

18.3.8 Hydrology

There are interactions of Hydrology with Land and Soils – Geology and Hydrogeology and Biodiversity.

18.3.9 Waste Management

There are interactions of Waste Management and Population and Human Health and Air Quality and Climate.

18.3.10 Air Quality

There are interactions of Air Quality and Climate and Waste Management and Land and Soils – Geology and Hydrogeology.

18.3.11 Noise and Vibration

There is an interaction of Noise and Vibration with Traffic and Transportation.

18.3.12 Archaeology, Architectural and Cultural Heritage

There is an interaction of Landscape and Visual Impact with Cultural and Architectural Heritage.

18.3.13 Risk Management

The risk of major accidents and/or disasters has the potential to have interactions with Population and Human Health, Air Quality and Climate, Land and Soils – Geology and Hydrogeology, Material Assets – Site Services and Traffic and Transportation.

18.4 Cumulative Effects

Cumulative effects may be assessed by taking account of the baseline environment and the predicted impacts of the construction/operation of the proposal in combination with other existing, planned and permitted projects in the vicinity of the proposed development site. No significant adverse effects have been identified as a result of the proposed development in combination with other existing, planned and permitted developments, subject to the implementation of identified mitigation measures. Therefore, it is evident that the potential for any cumulative effects to arise have been fully considered and detailed in the various chapters of this EIAR.