Volume II - Environmental Impact Assessment Report

Proposed Residential Development

Lands at Rathmullan Road, Drogheda, Co. Meath

Trailford Ltd.

September 2019

Hughes Planning & Development Consultants

70 Pearse Street, Dublin 2

+353 (0)1 539 0710 – info@hpdc.ie – www.hpdc.ie

TABLE OF CONTENTS

10.0 MATERIAL ASSETS

CHAPTER 1.0 INTRODUCTION

1.1 Purpose of this Report

Hughes Planning and Development Consultants have been commissioned by Trailford Limited (referred to as the Applicant throughout), to prepare an Environmental Impact Assessment Report for a strategic housing development application for the proposed development of a residential scheme at Rathmullan Road, Drogheda, Co. Meath.

A full description of the proposed development lands together with a description of the proposed development is provided in Chapter 2 of this document. In summary, the proposed development includes demolition of 2 no. sets of existing farm buildings and the construction of 509 no. dwellings; 152 no. apartments, 1 no. retail unit, 1 no. café and a creche on c. 26.2 ha of land. The proposal also includes on curtilage car parking, private open space, internal roads, footpaths, cycle tracks, public open space, landscaping, boundary treatments, street lighting, SuDS drainage, piped and other services and ancillary site development works necessary to facilitate the development

The purpose of an Environmental Impact Assessment Report is to assess the likely and significant impact on the environment of the proposed development in parallel with the project design process. The potential impacts will be dependent on the nature, size and location of the proposed development.

This Environmental Impact Assessment Report has been prepared in accordance with the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (published in August 2018) and the 2017 Draft EIA Guidelines, published by the EPA in August 2017, as well as previously issued Irish and European EIA Guidelines and Guidance Documents. We would also note that the pre-application discussions with Meath County Council and An Bord Pleanála, including the Board's opinion, informed the content of the EIAR.

1.2 EIA Legislation

Environmental Impact Assessment requirements are governed by Directive 2014/52/EU, which amends the previous EIA Directive Directive (Directive 2011/92/EU). Article 2 of Directive 2014/52/EU provides that Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with the Directive by 16 May 2017. The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 transposed the provisions of Directive 2014/52/EU into Irish law by amending the Planning and Development Act 2000, the Planning and Development (Housing) and Residential Tenancies Act 2016, the Planning and Development (Amendment) Act 2018 and the Planning and Development Regulations 2001,

The objective of the EU Directive (Directive 2011/92/EU), as amended by Directive 2014/52/EU, is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for environmental impact assessment, prior to development consent being given, of public and private developments that are likely to have significant effects on the environment.

1.3 Definition of EIA and EIAR

EU Directive 2014/52/EU defines 'environmental impact assessment' (EIA) as:

'a process consisting of:

(a) the preparation of an Environmental Impact Assessment Report (EIAR) by the developer;
(b) the carrying out of consultations;
(c) the examination by the competent authority of the EIAR, any supplementary information provided, where necessary, by the developer and relevant information received through consultations with the public, prescribed bodies and any affected Member States

(d) the reasoned conclusion of the competent authority on the significant effects of the project on the environment, and
(e) the integration of the competent authority's reasoned conclusion into any development consent decision.'

The definition of EIA provides for a clear distinction between the process of environmental impact assessment to be carried out by the competent authority (in this instance An Bord Pleanala) and the preparation by the developer of an Environmental Impact Assessment Report (EIAR).

The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, defines an EIAR as:

> *'A report of the effects, if any, which proposed development, if carried out, would have on the environment and shall include the information specified in Annex IV of the Environmental Impact Assessment Directive.'*

Pursuant to Article 5(1)(a) to (f) of the Directive, an EIAR is required to provide the following information:

(a) A description of the project comprising information on the site, design, size and any other relevant features of the project;
(b) A description of the likely significant effects of the project on the environment;
(c) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
(d) A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
(e) A non-technical summary of the information referred to in points (a) to (d); and
(f) Any additional information specified in Annex IV of the Directive/Schedule 6 to the 2001 Regulations, as amended, relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

As is required by Annex IV of the 2014 Directive, this EIAR addresses matters including proposed demolition works, risks to human health, major accidents/disasters, biodiversity, climate change and cumulative effects with other existing and/or approved projects.

The EPA Guidelines state that the main purpose of an EIAR *'is to identify, describe and present an assessment of the likely significant impacts of a project on the environment. This informs the CA's assessment process, its decision on whether to grant consent for a project and, if granting consent, what conditions to attach.'*

1.4 The Need for an Environmental Impact Assessment Report (Screening)

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

Annex I of the EIA Directive 85/337/EC requires as mandatory the preparation of an EIA for all development projects listed therein. Schedule 5 (Part 1) of the Planning & Development Regulations 2001 (as amended) transposes Annex 1 of the EIA Directive directly into Irish land use planning legislation. The Directive prescribes mandatory thresholds in respect to Annex I projects.

Annex II of the EIA Directive provides EU Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of project having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA. Schedule 5 (Part 2) of the Planning and Development Regulations 2001 (as amended) the regulations, sets the following mandatory thresholds for EIA preparation for each of the Annex II projects under Class 10:

a) Industrial estate development projects, where the area would exceed 15 hectares.

b) ***(i) Construction of more than 500 dwelling units.***

(ii) Construction of a car-park providing more than 400 spaces, other than a car-park provided as part of, and incidental to the primary purpose of, a development.

(iii) Construction of a shopping centre with a gross floor space exceeding 10,000 square metres.

(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.

(In this paragraph, "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)

The subject development is not of a type or size that would require mandatory EIA under Annex I. With respect to Annex II, the subject proposal would constitute an "infrastructure project" under Class 10. Given the no. of units proposed and the size of the subject site, EIA is required under Class 10(b)(i) and Class 10(b)(iv).

1.5 The Scope of the Environmental Impact Assessment Report (Scoping)

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

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

A scoping exercise to identify the issues that are likely to be most important during the EIA process was carried out by the applicant, design team and EIAR consultants and informed the format of this EIAR. Guidance provided by Meath County Council during Section 247 pre-planning meetings

The scoping of the EIAR has also taken into consideration the proposed development with specific reference to the surrounding environment, adjoining properties and any third-party concerns, the existing planning history and ensuring amenity impacts are reduced, removed or where applicable, mitigated to an appropriate level. The EIAR prepared for the scheme has endeavoured to be as thorough as possible.

In this context the following topics/issues have been reviewed and addressed in the context of the proposed development:

- Project Description and Alternatives Examined;
- Human Beings, Population and Health;
- Biodiversity;
- Soils, Geology and Hydrogeology;
- Water;
- Noise and Vibration;
- Air Quality and Climate;
- Material Assets;
- Archaeology, Architectural and Cultural Heritage;
- Landscape and Visual Amenity;
- Interaction between Environmental Factors;
- Principle Mitigation and Monitoring Measures; and
- Non-Technical Summary.

In addition to the above a series of standalone reports have been prepared to accompany the planning application and which have helped inform the above chapters of the EIAR where relevant.

1.6 Competency and EIAR Project Team

It is a requirement that the EIAR must be prepared by competent experts. The amended EIA Directive (Directive 2014/52/EU) states the following in relation to the persons responsible for preparing the environmental impact assessment reports:

> *'Experts involved in the preparation of environmental impact assessment reports should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality'.*

For the preparation of this EIAR, the Applicant engaged Hughes Planning and Development Consultants to direct and coordinate the preparation of the EIAR and a team of qualified specialists were engaged to prepare individual chapters.

In order to outline compliance with this requirement of the amended directive and in line with emerging best practice the EIAR states the names of the environmental consultants who have prepared each element of the EIAR and lists their qualifications and relevant experience; demonstrating that the EIAR has been prepared by competent experts.

The consultant firms and their inputs are set out in Table 1.1 below. Further details of competency, qualifications and experience of the authors of each chapter and contributors to the applicable chapter are outlined in the individual chapters.

Organisation	Lead Consultant	Topics/Inputs
Hughes Planning and Development Consultants 70 Pearse Street, Dublin 2 T: 01 539 0711 E: info@hpdc.ie or margaret.commane@hpdc.ie	Mr Kevin Hughes - Director, Hughes Planning and Development Consultants – BA, MRUP Ms. Margaret Commane – Senior Planner, Hughes Planning and Development Consultants – BA, MPLAN	• Introduction and Methodology; • Project Description and Alternatives Examined; • Human Beings, Population and Health • Interactions of the Environmental Factors; • Principle Mitigation and Monitoring Measures; and • Non-Technical Summary.
Niall D Brennan Associates Architects 52 Pembroke Road, Dublin 4 T: 01 478 9009 E: greg.zakrzewski@ndba.ie	Mr. Greg Zakrzewski – Architect, NDBA Architects - B. Arch	• Project Description and Alternatives Examined
Waterman Moylan Engineering Consultants Block S, East Point Business Park, Dublin 3 T: 01 664 8900 E: j.gibbons@waterman-moylan.ie	Mr. Joe Gibbons – Director, Waterman Moylan Engineering Consultants – Chartered Engineer	• Soils, Geology and Hydrogeology; • Water; • Material Assets; and • Principle Mitigation and Monitoring Measures.
Cunnane Stratton Reynolds 3 Molesworth Place, Dublin 2 T: 01 661 0419 E: eoldroyd@csrlandplan.ie	Mr. Declan O'Leary – Managing Director, Cunnane Stratton Reynolds - B.Agr.Sc, PGD in Landscape Architecture. Ms. Emma Oldroyd – Senior Project Landscape	• Landscape and Visual Impact; and • Principle Mitigation and Monitoring Measures.

	Architect, Cunnane Stratton Reynolds - BA Hons, PG Diploma, MA in Landscape Architecture	
AWN Consulting Ltd The Tecpro Building, Clonshaugh Business & Technology Park, Dublin 17 T: 01 847 4220 E: info@scottcawley.com	Ms. Ciara Nolan – Environmental Consultant, AWN Consulting Ltd - BSC Energy Systems Engineering, MSc Applied Environmental Science	• Air Quality and Climate. • Principle Mitigation and Monitoring Measures.
	Dr. Stephen Smyth - Associate, AWN Consulting Ltd – BA, BAI, MIEI, MIOA	• Noise and Vibration. • Principle Mitigation and Monitoring Measures.
	Mr. Chonaill Bradley - Senior Environmental Consultant, AWN Consulting Limited - BSc, MSc	• Material Assets. • Principle Mitigation and Monitoring Measures.
Scott Cawley Ltd. College House, 71-73 Rock Road, Blackrock, Co. Dublin T: 01 676 9815 E: info@scottcawley.com	Ms. Aebhín Cawley - Managing Director, Scott Cawley Ltd - CEnv MCIEEM	• Biodiversity. • Principle Mitigation and Monitoring Measures.
Archaeology and Heritage Consultancy Ltd 36 Ballywillwill Road, Castlewellan, Co. Down T: +44 (0) 7977124143 E: ahcireland@gmail.com	Mr. Eoin Halpin – Operations Manager, Archaeology and Heritage Consultancy Ltd - Honours Degree in Archaeology	• Archaeology, Architectural and Cultural Heritage. • Principle Mitigation and Monitoring Measures.

Table 1.1 EIAR Specialist Consultants

1.7 Structure of Environmental Impact Assessment Report

The EIAR is sub divided into 3 no. volumes as follows:

- Volume I - Non-Technical Summary;
- Volume II - Environmental Impact Assessment Report; and
- Volume III - Appendices to Environmental Impact Assessment Report.

Volume II is presented as 14 no. chapters as outlined in the Table 1.2 overleaf.

Chapter	Chapter Title	Chapter Description
1	Introduction and Methodology	Sets out the purpose, methodology and scope of the document.
2	Project Description and Alternatives Examined	Sets out the description of the site, design and scale of development, considers all relevant phases from construction through to existence and operation together with a description and evaluation of the reasonable alternatives studied by the developer including alternative locations, designs and processes considered; and a justification for the option chosen taking into account the effects of the project on the environment.
3	Planning and Development Context	Describes the site context, the planning history of the subject site and the surrounding site and the local, regional and national policies that the proposed development will be assessed against.
4	Population and Human Health	Describes the demographic and socio-economic profile of the receiving environment and potential impact of the proposed development on population, i.e. human beings, and human health.

5	Biodiversity	Describes the existing ecology on site and in the surrounding catchment, and assesses the potential impact of the proposed development and mitigation measures incorporated into the design of the scheme.
6	Soils, Geology and Hydrogeology	Provides an overview of the baseline position, the potential impact of the proposed development on the site's soil and geology and impacts in relation to land take and recommends mitigation measures.
7	Water	Provides an overview of the baseline position, the potential impact of the proposed development on water quality and quantity and recommends mitigation measures.
8	Noise and Vibration	Provides an overview of the baseline noise environment, the potential impact of the proposed development and recommends mitigation measures.
9	Air Quality and Climate	Provides an overview of the baseline air quality and climatic environment, the potential impact of the proposed development, the vulnerability of the project to climate change, and recommends mitigation measures.
10	Material Assets	Describes the existing traffic, waste management and services and infrastructural requirements of the proposed development and the likely impact of the proposed development on material assets.
11	Archaeology, Architectural and Cultural Heritage	Provides an assessment of the site, and considers the potential impact of the proposed development on the local archaeology, architectural and cultural heritage; and recommends mitigation measures.
12	Landscape and Visual Impact	Provides an overview of the baseline position, the potential impact of the proposed development on the landscape appearance and character and visual environment, and recommends mitigation measures.
13	Interactions between Environmental Factors	Describes the potential interactions and interrelationships between the various environmental factors discussed in the above chapters.
14	Principle Mitigation and Monitoring Measures	Sets out the key mitigation and monitoring measures included in the EIAR document for ease of reference.

Table 1.2 EIAR Chapter Outline

Each chapter of this EIAR assesses the direct, indirect, cumulative and residual impact of the proposed development for both the construction and operational stage of the proposed development.

In preparing the EIAR the following regulations and guidelines were considered:

- The requirements of applicable EU Directives and implementing Irish Regulations regarding Environmental Impact Assessment;
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – DRAFT (Environmental Protection Agency, August 2017).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

In addition, specialist disciplines have had regard to other relevant guidelines, and where relevant these are noted in individual chapters of the EIAR.

1.8 Cumulative Projects

The assessment of impacts has considered the following project for their potential cumulative effects, where relevant:

Reg. Ref. LB170675 - Gallow Ash Limited.

Location: Rathmullan Road, Drogheda Co. Meath (immediately east of the subject site, on the opposite side of Rathmullan Road)

Development Approved: Demolition of an existing agricultural shed and construction of 156 no. dwelling houses, a creche and all associated ancillary development works including access, parking, footpaths, lighting, foul and surface/storm water drainage, landscaping and amenity areas.

1.9 Consultation

A dedicated website for this proposed development is established and the EIAR is available at www.rathmullanroadshd.com

Additionally, prior to lodging this application, the required information has been issued for the Department of Housing, Planning and Local Government's EIA Portal. The purpose of this tool is to inform the public, in a timely manner, of applications that are accompanied by an EIAR. The portal provides a URL link.

Extensive pre-planning consultation was held with Meath County Council in advance of lodging this application. Guidance received is integrated into the design and in turn is assessed in this EIAR.

Where relevant specialists engaged with prescribed bodies and the details of advice received is provided in the individual chapters of this EIAR.

A Notice of Pre-Application Consultation Opinion was received from An Bord Pleanála following the pre-application consultation meeting and it contained details of the prescribed bodies to be notified of the making of this application. We can confirm that the following prescribed bodies have received a copy of the application including the EIAR:

- Irish Water;
- Transport Infrastructure Ireland;
- National Transport Authority;
- Department of Culture, Heritage and the Gaeltacht;
- An Taisce-the National Trust for Ireland;
- The Heritage Council;
- Failte Ireland;
- An Comhairle Ealaionn;
- Meath County Childcare Committee;
- Louth County Childcare Committee; and
- Louth County Council.

1.10 Statement of Difficulties Encountered

No exceptional difficulties were experienced in compiling the necessary information for the proposed development. Where any specific difficulties were encountered these are outlined in the relevant chapter of the EIAR.

CHAPTER 2.0 DESCRIPTION OF PROPOSED DEVELOPMENT AND ALTERNATIVES CONSIDERED

2.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants, in conjunction with NDBA Architects. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, and Ms. Margaret Commane, Senior Planner, with Hughes Planning and Development Consultants.

Mr. Kevin Hughes of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Regional and Urban Planning (MRUP) in 2002, having previously completed a Bachelor of Arts Degree in Sociology from National University of Ireland in 1999. Kevin has over 18 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Kevin is currently the Director of Hughes Planning and Development Consultants.

Ms. Margaret Commane of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2012, having previously completed a Bachelor of Arts Degree in Geography and Legal Science from National University of Ireland in 2010. Margaret has over 7 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Margaret is currently a Senior Planner in the Practice of Hughes Planning and Development Consultants.

It provides a detailed description of the project together with details of the existing environment as well as explaining the evolution of the scheme design through the reasonable alternatives examined. In accordance with Article 5(1)(a) of the 2011 Directive, as amended by Directive 2014/52/EU, the description of the proposal should comprise *"…information on the site, design, size and other relevant features of the project*".

2.2 Site Location and Context

The subject site consists of a large parcel of land, c. 26.2 ha in size, located within the south western environs of Drogheda, Co. Meath, c. 1.7km from the centre of the town, and is situated adjacent to the Meath-Louth County Border. The site has road frontage along Rathmullan Road on the eastern boundary of the site, with this road continuing along the southern boundary of the site. The site is situated within a distance of between 25 and 70 metres of the M1 motorway on its western boundary, and the northern extent of the site is situated within a distance of between 40 and 50 metres from the southern bank of the River Boyne, with the site elevated c. 10 metres above the riverbank. The site adjoins the buffer zone which protects the monuments of Newgrange, Knowth and Dowth.

The topography of the land is undulating. The site predominantly slopes gently towards the River Boyne, with a steep embankment leading down towards the road which runs alongside the River Boyne. Due to the fall of the land, the site is set above the adjoining M1 Motorway and smaller rural road to the north adjoining the River Boyle.

The subject land is currently used as agricultural land. The site comprises 2 no. large fields and one grazing field, with associated farm buildings used for cattle. There is significant planning along the western boundary which provides an appropriate screen to the M1 Motorway.

Figure 2.1 Aerial view of subject site (red outline) in the context of the receiving environment with existing housing developments 'Riverbank' and 'Highlands' shown in blue and yellow, respectively.

Figure 2.2 View of site lands from the north-western extent of the site.

Figure 2.3 Former agricultural buildings situated to the southern extent of the subject site.

Figure 2.4 The subject site is separated from the River Boyne via a large earthen mound with extensive planting on its northern boundary. An existing boardwalk along the River Boyne provides an amenity space which takes advantage of views along the river.

Figure 2.5 The Rathmullan Road runs alongside the northern, eastern and southern boundaries of the subject site.

Figure 2.6 View along the Rathmullan Road towards central Drogheda from the eastern extent of the subject site, we note the proximity of the Riverbank housing development (left).

As illustrated in the above photograph, the site is situated within close proximity to a number of existing residential developments including 'Riverbank' and 'Highlands'. These developments feature a mix of semi-detached and terraced dwellings and duplex apartments.

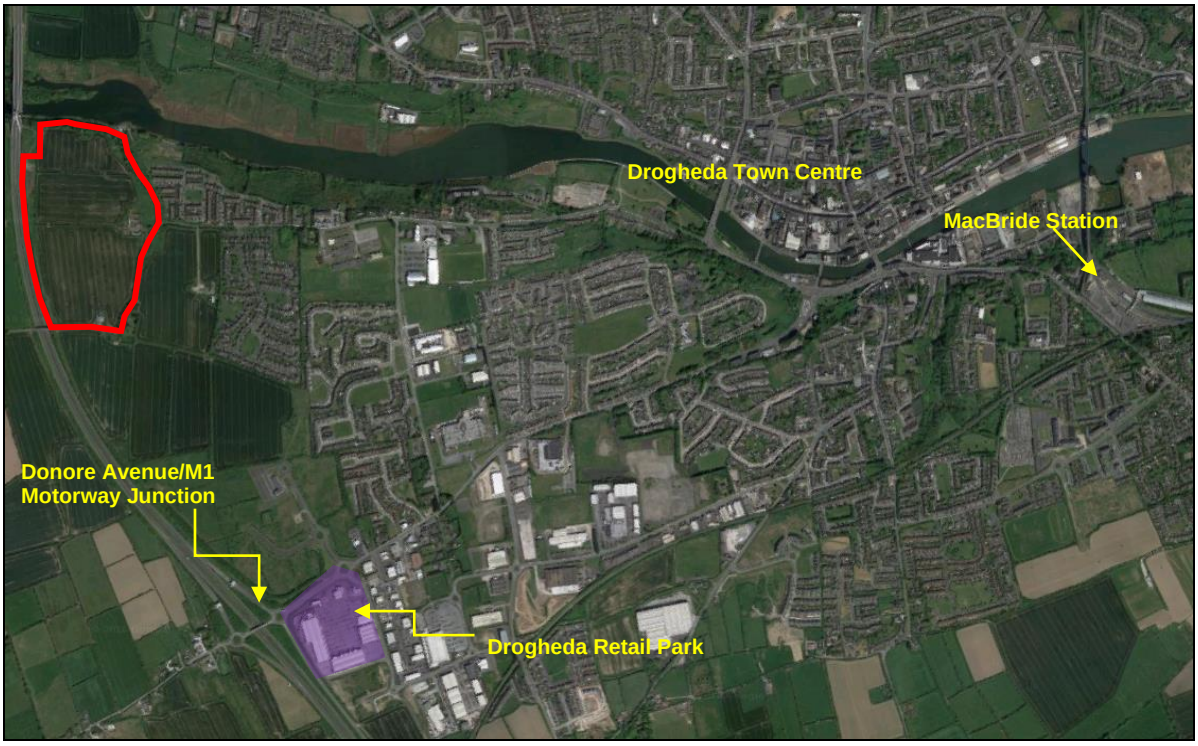


Figure 2.7 Aerial view of the subject site, red outline, within the context of wider Drogheda.

A strong feature of the site is its proximity to MacBride Train Station, which is located west of Drogheda Town Centre, approximately 3.5km from the subject site, offering a high frequency, high capacity public transport service with direct links to Dublin City Centre. It is also noted that the site is served by Drogheda Bus Station, approximately 3.7km from the subject site. The M1 Motorway, located 2.5km from the site, connects Drogheda to Dublin, while also acting as the primary road connecting Dublin to Belfast. It is considered the subject site is situated within an ideal location for residential development with numerous amenities situated within the wider area.

Drogheda Retail Park is situated 2.5km south-east of the site providing access to shopping facilities including Tesco and Aldi, whilst the centre of Drogheda Town is located 2.75km of the site providing access to numerous shopping outlets and recreational facilities. Census 2016 identified Drogheda as the fastest growing town in the country.

Characteristics of the subject site which are of particular note to the various disciplines/specialists involved in preparation of the EIAR are outlined in the individual chapters.

2.3 Nature and Extent of Proposed Development

In summary, the Applicant is applying to An Board Pleanala, under the Strategic Housing Development process, for the following:

> *Demolition of existing farm buildings on the subject site and construction of a residential housing scheme comprising 509 no. dwellings, 152 no. apartments units (providing a total of 661 no. residential dwellings) and neighbourhood centre, comprising of a creche, a café and a retail unit, on the 26.2Ha site.*

Figure 2.8 Site layout plan of proposed development of 661 no. residential dwellings

The layout of the proposed development has been informed by the topography of the subject site, its proximity to the M1 motorway, the feedback received from Meath County Council and An Bord Pleanala at pre-planning stage as well as the archaeological assessment carried out by Archaeology and Heritage Consultancy Ltd and inputs from the EIAR consultants.

2.3.1 Demolition

The proposal includes for the demolition of 2 no. sets of existing farm buildings on the subject site. More specifically, a set of farm buildings adjacent to the site's southern boundary and a set of farm buildings adjacent to the site's eastern boundary.

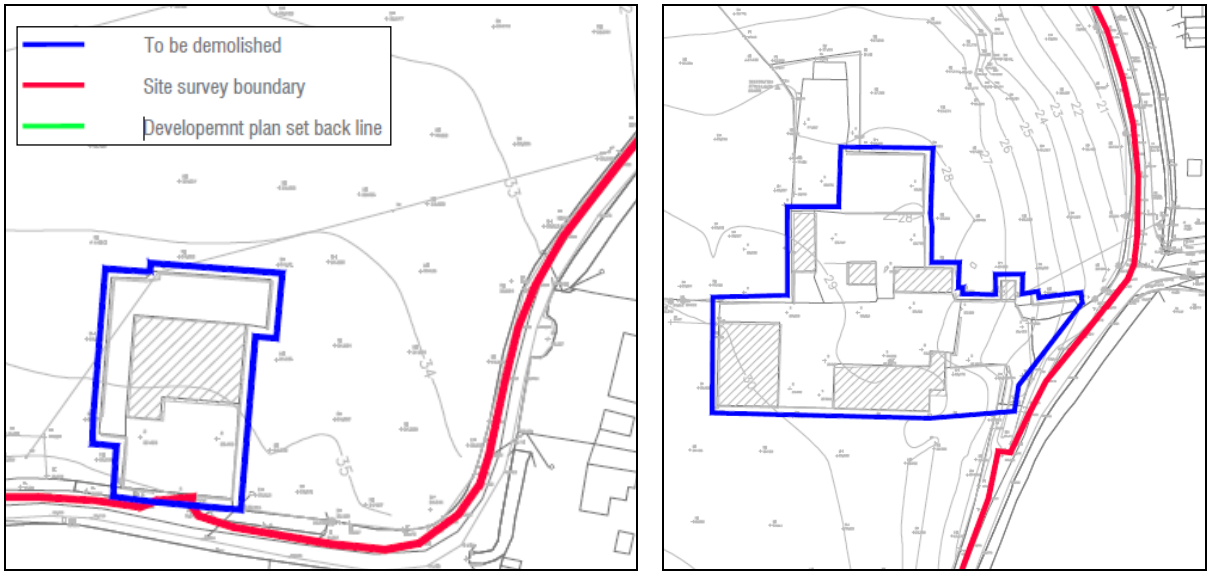


Figure 2.9 Excepts from the Site Location Map, prepared by NDBA Architects, indicating the existing farm buildings on the site's southern boundary (left) and eastern boundary (right) proposed to be demolished

2.3.2 Proposed Apartments

The development proposal will include the construction of 152 no. apartments on the application site. Apartments will be provided within 26 no. purpose-built apartment blocks scattered throughout the development. More, specifically:

Apartment Block	No. of Storeys	Total No. of Units	Type of Units.	Position on the Site
Apartment Block B1	4	20 no.	4 no. one-bed apartments 16 no. two-bed apartments	North-western corner
Apartment Block B2	4	20 no.	4 no. one-bed apartments 16 no. two-bed apartments	North-western corner
Apartment Block B3	5	25 no.	5 no. one-bed apartments 20 no. two-bed apartments	North-western corner
Apartment Block C	3 (lower ground floor occupied by retail unit)	6 no.	6 no. two-bed apartments	Adjacent to eastern boundary within the neighbourhood centre
Apartment Block D	3	9 no.	9 no. two-bed apartments	Centrally
Apartment Block E	3	12 no.	12 no. two-bed apartments	Southern corner
Apartment Blocks G (20 no. in total)	3	3 no. per Block (60 no. overall)	60 no. two-bed units	Scattered throughout

Table 2.1 Break-down of apartments featuring in the proposed development

Please refer to the Architectural Drawings and Architectural Design Statement, prepared by NDBA Architects, and the Statement of Consistency & Planning Report, prepared by Hughes Planning and Development Consultants, for further details regarding the proposed apartments.

2.3.3 Proposed Dwellings

The development proposal will include the construction of 509 no. two storey family homes on the application site. The scheme caters for growing families and those trading up from apartment living, offering 2-bedroom, 3-bedroom and 4-bedroom dwellings in various configurations. The dwelling units will be categorised in 18 no. dwelling types which can be summarised as follows:

House Types	Dwelling Type	Total No. of Units	Floorspace (sq.m.)	No. of Bedrooms
House Type 2.1	Mid-Terrace	158	94.7	2 no.
House Type 3.1	End of Terrace	119	110.2	3 no.
House Type 3.2	Semi-detached	60	109.7	3 no.
House Type 3.3	Semi-detached	6	127.8	3 no.
House Type 3.4	Semi-detached	11	126.8	3 no.
House Type 3.5	Semi-detached	8	109.7	3 no.
House Type 3.6	Semi-detached	7	109.7	3 no.
House Type 3.7	Terraced	10	139.9	3 no.
House Type 3.8	Terraced	5	137.4	3 no.
House Type 3.9	Terraced	1	137.4	3 no.
House Type 3.10	Terraced	29	122.8	3 no.
House Type 3.11	Semi-detached	4	116.8	3 no.
House Type 3.12	Detached	9	109.7	3 no.
House Type 4.1	Semi-detached	77	134.9	4 no.
House Type 4.2	Semi-detached	1	154.9	4 no.
House Type 4.3	Semi-detached	2	165.3	4 no.
House Type 4.4	Semi-detached	1	134.9	4 no.
House Type 4.5	Semi-detached	1	154.9	4 no.

Table 2.2 Break-down of dwellings featuring in the proposed development

Please refer to the Architectural Design Statement and Architectural Drawings, prepared by NDBA Architects, and the Statement of Consistency & Planning Report, prepared by Hughes Planning and Development Consultants, for further details regarding the various dwelling types and layouts.

2.3.4 Proposed Neighbourhood Centre

The proposed development features a neighbourhood centre, comprising a 486sq.m crèche, c. 63sq.m café and 318sq.m retail unit, adjacent to the site's eastern boundary immediately south of the northernmost entry to the proposed development. The building which houses the crèche and café is double storey. The retail unit occupies the lower ground floor level of Apartment Block C, with this 3-storey building sitting lower than the adjacent dwellings due to the topography of the site.

The proposed neighbourhood centre will be internally accessible from the development as well as via an external road off Rathmullan Road. The neighbourhood centre is provided with 42 no. car parking spaces in total (including disabled spaces) which are provided off Rathmullan Road and within the development which accommodate retail/cafe customers, creche/retail/cafe staff and creche drop off.

More specifically, 24 no. spaces to the north-west of the retail unit which provides parking for creche/retail staff, retail/café customers and creche drop off; and 7 no. spaces to the east of Block C which provides parking for creche/retail staff; and 11 no. to the west of the proposed creche/café which provide parking for creche staff and creche drop off.

The neighbourhood centre is also served by 34 no. bicycle parking spaces.

Figure 2.10 Plan excerpt showing the proposed neighbourhood centre and associated parking spaces

2.3.5 Access and Car/Bicycle Parking

The subject site is located between the M1 Motorway to the west and Rathmullan Road to the east. Access to the site will be via Rathmullen Road, with one located to the south of the development, and the second to the east. This will ensure that the proposed development will have adequate access into the Drogheda township located east of the site.

A total of 1,366 no. car parking spaces are proposed, including 1018 no. spaces (2 no. on curtilage spaces per dwelling) serving the proposed dwellings, 195 no. spaces serving the proposed apartments; 111 no. spaces serving visitors to the development; and 42 no. spaces serving the proposed neighbourhood centre.

The proposed development includes 188 no. bicycle parking spaces. More specifically, 154 no. bicycle parking spaces are to be provided to the proposed apartments and 34 no. bicycle parking spaces are to be provided for staff and visitors of the neighbourhood centre. Dwellings provided on site feature rear gardens and/or external storage areas capable of accommodating bicycle storage.

Pedestrian and cycle paths will be provided throughout the site and along the Rathmullan Road and Sheephouse Road frontages, as illustrated in the below movement diagram excerpt taken from the Architectural Design Statement, prepared by NDBA Architects.

Figure 2.11 Plan excerpt showing the proposed road and cycle network proposed within the development

2.3.6 Open Space and Landscaping

Public/Communal Open Space

As illustrated in the above site layout plan, the site layout provides for a considerable separation distance between the proposed residential units and the River Boyne to the north of the site as well as adopting the required 50 metre separation distance from the M1 Motorway to the west. These spaces accommodate appropriately designed communal/public open space to serve the development supplemented with additional 18 no. smaller open spaces, featuring playgrounds, kick-about spaces and landscaped areas provided throughout the development equating to an overall area of 9.15 Ha.

The proposed open spaces in the west of the site will serve to buffer the proposed development from the M1 Motorway and this area and area flanking the Boyne River provide for an excellent standard of

green infrastructure and biodiversity within the site. Existing hedgerows and trees on the site have been maintained wherever possible and links to the adjacent Boyne River boardwalk have been created in the northern part of the site.

The apartments in the scheme will be located in the north-western corner of the site, immediately adjacent to the large areas of high quality, landscaped open space provided adjacent to the sites western and northern boundaries.

Please refer to the Landscape Strategy & Design Report, prepared by Cunnane Stratton Reynolds for further information regarding open space provision.

Private Open Space

The houses proposed within the scheme provide for private open space in accordance with the standards set out within the Meath County Development Plan which require 55sq.m for two-bedroom dwellings, 60sq.m for three-bedroom dwellings and 75sq.m for four-bedroom dwellings. Many of the proposed dwellings significantly exceed these Development Plan minimums for private open space provision, with generous rear gardens provided wherever possible.

The apartments provide for private open space which complies with or exceeds the standards set out within the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities, 2018, which requires 5sq.m for one-bedroom apartments, 6sq.m for two-bedroom, three-person apartments, 7sq.m for two-bedroom, four-person apartments and 9sq.m for three-bedroom apartments.

2.3.7 Services and Proposed Infrastructure Works

Foul Sewer

It is proposed that the foul sewerage from the site will drain via a new network of gravity sewers to a new pumping station located at the low point in the north-eastern corner of the subject site. Irish Water have advised that this pumping station will be designed to accommodate the 'Riverbank' housing estate, currently served by the adjacent existing pumping station, and the new residential development granted planning permission under Reg. Ref. LB170675 which requires the construction of a foul water pumping station to serve that development.

Foul water will be pumped from the new pumping station and connect to the existing 110mm diameter rising main on Rathmullan Road to the east of the subject site. This will require c. 300m of new 110mm rising main below the internal estate roads and a section of Rathmullan Road. Ultimately, this foul water discharges to into the existing gravity sewer network on Marley's Lane c. 900 metres east of the subject site. Foul drainage eventually outfalls to the Drogheda Wastewater Treatment Plant.

The layout of the proposed foul water sewer network is shown on Engineering Drawing Nos. 18-014-P020 to P024, prepared by Waterman Moylan Consulting Engineers Limited, which accompany this planning application

Surface Water Drainage

It is proposed that the surface water from the proposed development shall drain via gravity and discharge at a restricted rate into the existing 1200mm culvert adjacent to Rathmullan Road at the north-east of the site. This culvert merges into a ditch on the opposite side of the existing road 60 m to the north of the proposed outfall location. The ditch travels for c. 120 m northwards before outfalling into the River Boyne which is tidal at this location.

The surface water network for the subject site has been divided into four separate catchments. These catchments operate in series with runoff from each flowing into the downstream catchment area at a restricted rate

Runoff will be restricted to the equivalent of the Qbar runoff rate of 3.17l/s/Ha. Surface water runoff shall be restricted via a hydrobrake installed at the outfall manhole of each surface water catchment

with excess storm water attenuated in separate underground Stormtech, or similar approved, storage systems located beneath the open space areas. The Stormtech systems will facilitate infiltration and have been sized on this basis.

Sustainable urban drainage systems have been implemented within the proposed development to ensure that the runoff quality and rate are managed in accordance with the recommendations of the Greater Dublin Strategic Drainage Scheme, GDSDS.

The layout of the proposed surface water drainage network is shown on Engineering Drawing Nos. 18-014-P020 to P024, prepared by Waterman Moylan Consulting Engineers Limited, which accompany this planning application. An overview of the four surface water catchments is shown on Engineering Drawing No. 18-014-P029, prepared by Waterman Moylan Consulting Engineers Limited.

Water Supply

Water supply to the subject site will be provided via a new proposed connection to the existing 150mm HPPE watermain on Rathmullan Road to the east of the site. All water supply details shall be in accordance with Irish Water requirements.

Details of the watermain layout are shown on Engineering Drawing Nos. 18-014-P040 to P044, prepared by Waterman Moylan Consulting Engineers Limited, which accompany this planning application.

Road/Junction Upgrades

Access to the subject site will be provided on Rathmullan Road to the east of the subject site by means of a proposed 4 arm signalised junction. The proposed position and layout of this signalised junction avoids the existing headwall and parapet wall on the drainage culvert and has been agreed with Meath County Council. An alternative site access is provided from the local access road to the south of the site by means of a proposed priority junction.

It is proposed to upgrade a section of the existing Rathmullan Road along the eastern boundary of the subject site by widening the carriageway to 6m and providing a new kerb with gullies for surface water drainage. Pedestrian access links from the proposed development and the existing footpath on Rathmullan Road will also be provided via a new 2m wide footpath which facilitates access to the River Boyne walkway. It is also proposed to implement minor upgrades to Rathmullan Road along the northern boundary of the site. This includes the widening of the existing carriageway to 6m.

The proposed development also includes upgrade works to and realignment of the section of Rathmullan Road/Sheephouse Road which flanks the sites southern boundary, more specifically the south-eastern corner.

Details of the road and footpath upgrades are shown on Engineering Drawing No. 18-014-P050, prepared by Waterman Moylan Consulting Engineers Limited, which accompany this planning application.

Electricity Supply/Telecommunications

ESB approved ducts will traverse the site and 9 no. ESB sub-stations are provided throughout the development to ensure adequate electricity provision to all units within the proposed development.

Hydrocare piping to Virgin Media and Eircom standards is provided throughout the development which allows all dwellings and apartment blocks to link in with telecommunication services.

Details of the site services pertaining to ESB supply and telecommunications are shown on Engineering Drawing No. 60-00, prepared by R.M. Breen Associates, which accompanies this planning application.

Please refer to the Engineering Assessment Report and associated drawings, prepared by Waterman Moylan Consulting Engineers Limited, and Site Services Drawing, prepared by R.M. Breen Associates, which accompany this planning application for further details regarding the above items.

2.3.8 Phasing of Development

A ten-year planning permission is being sought from An Bord Pleanála. The proposed development will be constructed in 5 no. phases. The diagram included in Figure 2.12 below indicates the phasing of the proposed development.

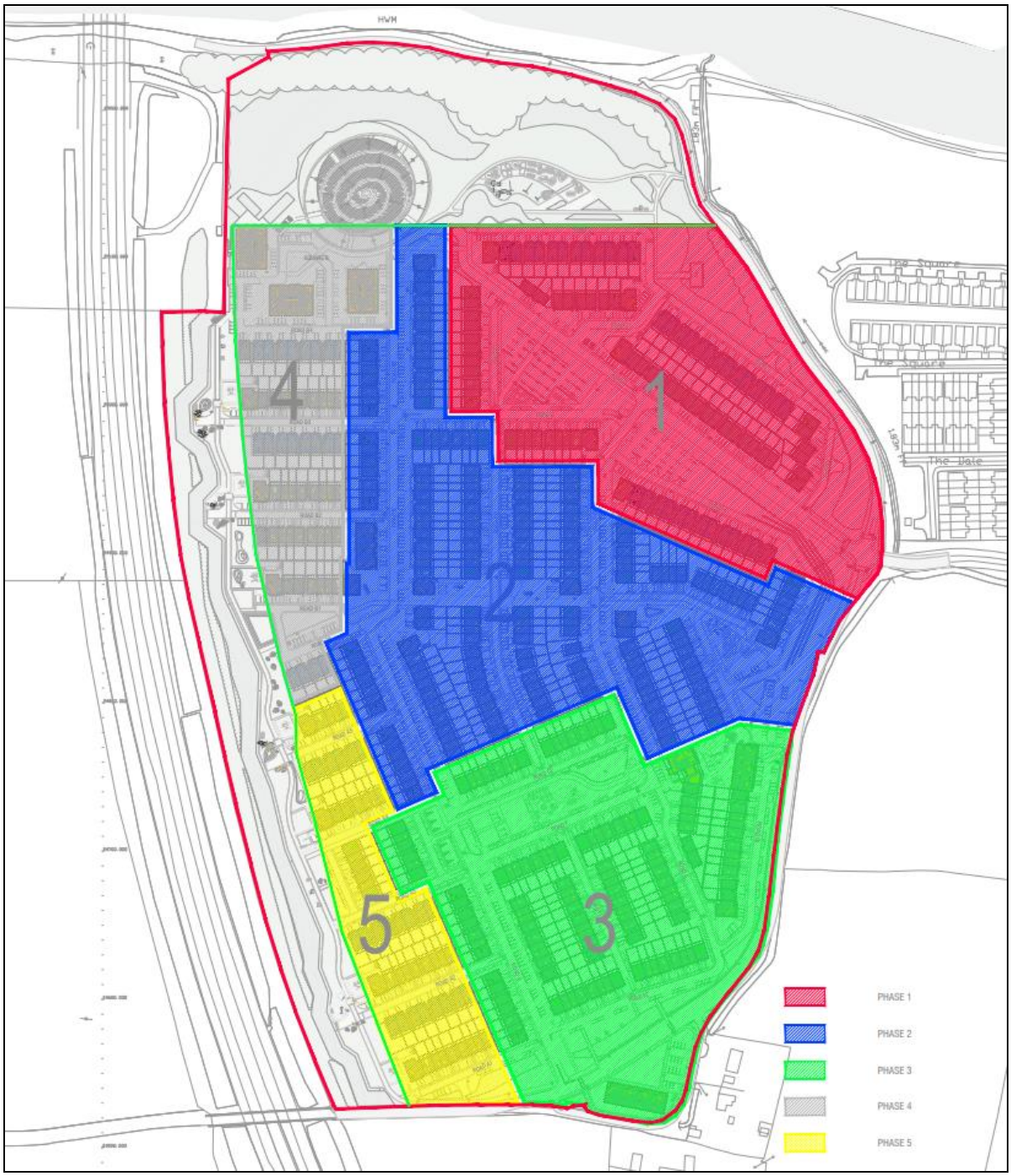


Figure 2.12 Proposed phasing of development for the proposed residential development

2.3.9 Neighbourhoods

The proposed development will feature 12 no. neighbourhood areas, as illustrated in Figure 2.13 below. The neighbourhood areas create a sense of place for future residents within the development through a combination of viewpoints, parks/open space areas, architectural/archaeological features, nearby natural elements and infrastructure and the hierarchy of streets. Please refer to the Landscape Strategy & Design Report, prepared by Cunnane Stratton Reynolds for further information.

Figure 2.13 Proposed Neighbourhood Areas within the residential development.

As illustrated above, the 12 no. Neighbourhood Areas include:

- Boyne Valley Park;
- Rath Gardens;
- Mary McAlesse Park;
- West Wood;
- Rathmullan Avenue;
- Rathmullan Mews;
- Rathmullan Centre;
- Rathmullan Green;
- South Avenue;
- Sheephouse Woods;
- Sheephouse Avenue; and
- Sheephouse Court.

2.4 Alternatives Examined

The EIA Directive (2014/52/EU) requires that Environmental Impact Assessment Reports include *'a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.'*

The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 describe alternatives as follows:-

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

Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics. The Regulations require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects to be presented in the EIAR.

This chapter provides an outline of the main alternatives examined during the design phase. It sets out the main reasons for choosing the development as proposed, taking into account and providing a comparison on the environmental effects. For the purposes of the Regulations, alternatives may be described at three levels:

i. Alternative Locations
ii. Alternative Designs
iii. Alternative Processes

2.4.1 Alternative Locations

Given the zoning of the subject site in the Meath County Development Plan 2013-2019, and having regard to the project's objectives, no reasonable alternative locations were considered. The rationale for the subject project is to provide a residential development with ancillary facilities in a landscaped setting adjacent to the River Boyne at the western outskirts of Drogheda, Co. Meath.

The proposal is predicated on the zoning applying to the majority of the site for residential development in the Meath County Development Plan 2013-2019, whereby new residential development is envisaged. In addition to the residential zoning, the subject site (more specifically, the northern and western sections adjacent to the Boyne Valley and the M1 motorway) is also the subject of an 'F1' zoning. It is within this statutory planning policy context that all alternatives have been considered.

2.4.2 Alternative Uses

In addition to residential use, there are other land uses which are permitted in principle on these lands. It is not considered that an alternative comprising one of the alternative uses would result in the best use of these lands, particularly having regard to the general acknowledged need for housing. The environs of the subject site are largely residential in nature interspersed with some commercial uses. In this context, the proposal now the subject of this application comprises appropriate land uses in accordance with the proper planning and sustainable development of the area.

2.4.3 Description of Alternative Processes

Given the zonings of the subject site, and the nature of the proposed development, no reasonable alternative processes were studied.

2.4.4 Alternative Designs/Layouts

The design approach for the proposed development is presented in the Architectural Design Statement prepared by the project architects, NDBA Architects and it should be read in conjunction with this chapter of the EIAR.

Alternative site layouts and siting progressed throughout the design process in order to minimise the impact on the receiving environment at the earliest opportunity. The initial stage involved a constraints analysis of the land within the proposed development site to identify all high-level constraints and aggregate them against the site to allow a suitable layout to be developed. These constraints included the sites topography, the M1 motorway to the west and the Boyne River to the north.

The following analyses alternatives development options considered for the site, starting with the initial layout tabled at the 1st informal pre-planning meeting had with Meath County Council on 11th May 2018, and then describing design options and changes which were incorporated into the scheme as the proposals progressed through pre-application discussions with the Planning Authority and with An Bord Pleanála and in response to input from the appointed EIAR team. The principal considerations and amendments to the design of the scheme, having regard to and comparing the key environmental issues, are set out and discussed.

Option 1 – Design/Layout discussed at the Informal Pre-planning Meeting with Meath County Council in May 2018

The first design option explored by NDBA Architects in early 2018 (illustrated in Figure 2.13 overleaf), which was subsequently tabled at an informal pre-planning meeting with Meath County Council on 11th May 2018, comprised a housing layout with a grid-like road layout and linear landscaped park to the north and west of the site. The proposal included the demolition of the existing farm buildings on site and realignment of the section of Rathmullan Road flanking the southern boundary of the subject site. It achieved c. 560 no. dwelling units and a density of 29dpha.

The layout had larger urban blocks than currently proposed and less variety in unit type and size. The neighbourhood centre was situated in the south-eastern corner of the site. The design relied heavily on the linear park adjacent to the sites northern and west of the site for public open space provision for the development. The topography of the site and its implications for site and road layouts had not yet been explored. Similarly, the pedestrian and cycle links with the surrounding area had not been considered.

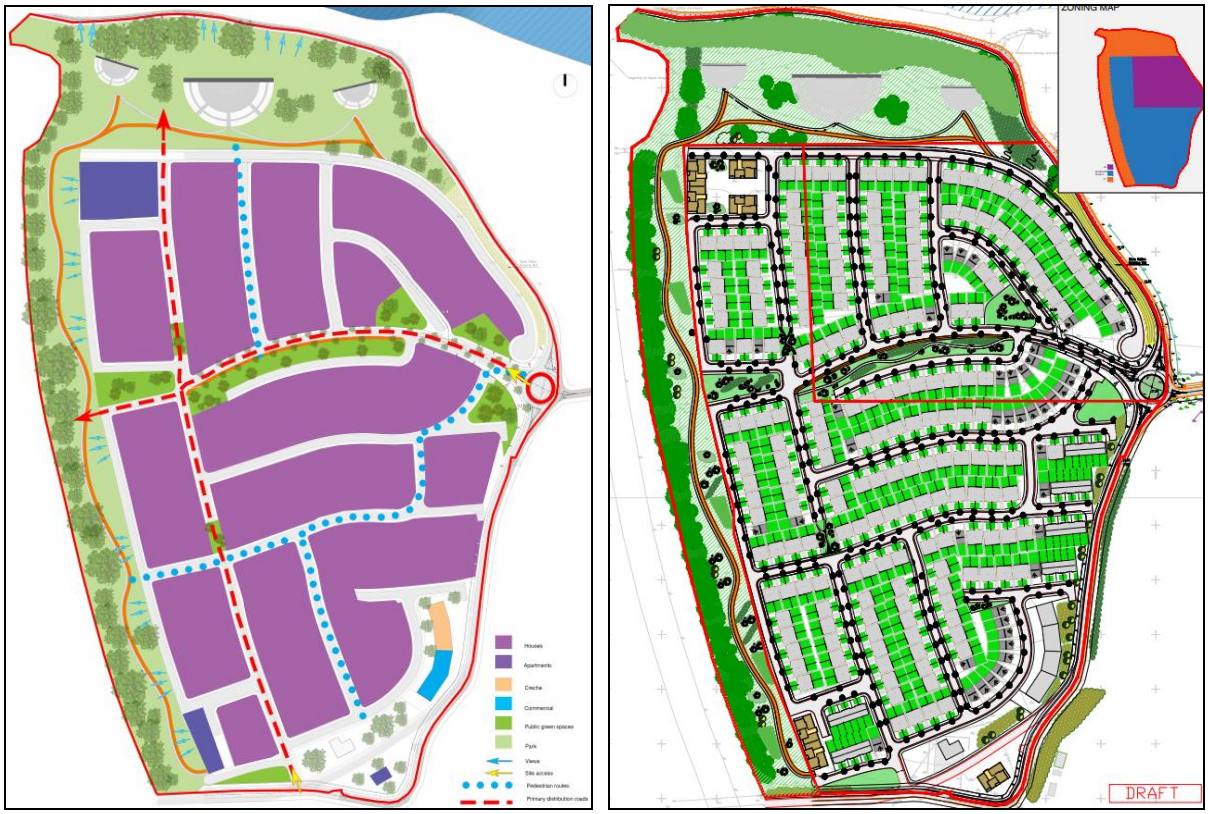


Figure 2.14 Site Strategy Plan (left) and Site Layout Plan (right) tabled at informal pre-planning meeting with Meath County Council in May 2018

Option 2 – Design/Layout discussed at the Informal Pre-planning Meeting with Meath County Council in June 2018

The second design option explored by NDBA Architects in mid-2018 (illustrated in Figures 2.14, 2.15 and 2.16 overleaf), which was subsequently tabled at an informal pre-planning meeting with Meath County Council on 21st June 2018, included the following key changes from the Option 1 design previously discussed:

- The neighbourhood centre was moved further north to facilitate external access off Rathmullan Road as well as from within the subject development.
- The mix of unit types proposed was improved, with more apartments proposed and scattered across the site, duplex units introduced and a wider array of dwelling types. This increased the overall number to 641 no. dwelling units which in turn increased the overall density of the scheme.
- The residential street/road layout within the development was amended in response to the topography of the site and the requirements of the Design Manual for Urban Roads and Streets. Further to this, the revised residential street/road layout also to encapsulate key viewpoints through the site towards the bridge to the north-west of the subject site.
- The urban blocks were made smaller to allow the provision of additional public open space areas throughout the development. These open space areas retained a number of the existing hedgerows on the site. The smaller urban blocks were repositioned to create a more active frontage along the interface with Rathmullan Road.

The revisions were prepared in consultation with Cunnane Stratton Reynolds and Waterman Moylan Consulting Engineers, and were considered to provide an appropriate solution in respect to hedgerow retention, overall/roads layout, density and permeability within the scheme.

Figure 2.15 Site Strategy Plan tabled at informal pre-planning meeting with Meath County Council in June 2018

Figure 2.16 Landscape Strategy Plan tabled at informal pre-planning meeting with Meath County Council in June 2018

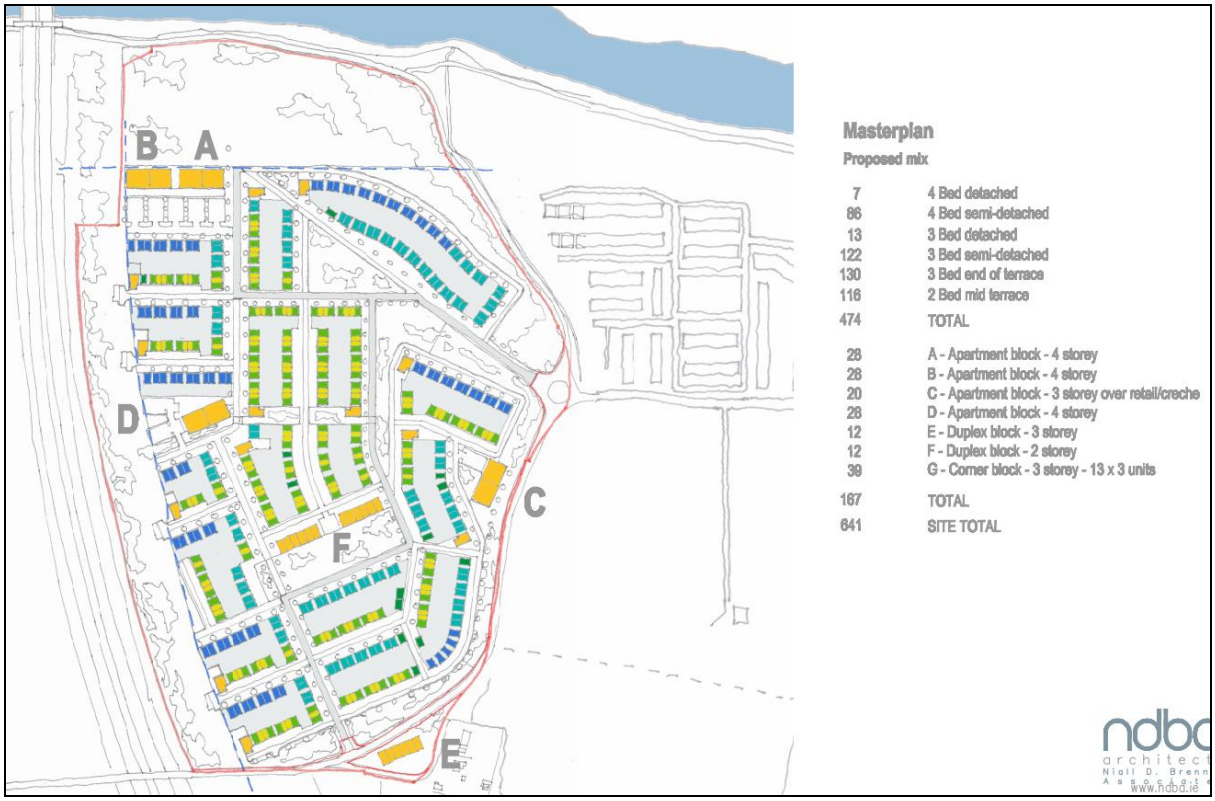


Figure 2.17 Housing Mix Plan tabled at informal pre-planning meeting with Meath County Council in June 2018

Option 3 – Design/Layout discussed at the S247 Pre-planning Meeting with Meath County Council on 25th July 2018

The third design option explored by NDBA Architects following the second informal pre-planning meeting with Meath County Council (illustrated in Figures 2.17, 2.18 and 2.19 overleaf), which was subsequently tabled at the S247 Pre-planning Meeting with Meath County Council on 25th July 2018, included the following key changes from the Option 2 design previously discussed:

- The layout of the neighbourhood centre was amended to allow for the provision of a car parking area adjacent as well as apartments at upper floor level.
- Due to tweaks to the layout and the redesign of the apartment blocks in the north-western and south-western corners of the site, the overall number of units was increased to 662 no. dwelling units which in turn increased the overall density of the scheme to 35dpha.
- A shared pedestrian/cycle path was introduced along the site's Rathmullan Road frontage as well as linking to the greenway adjacent to River Boyne, north of the subject site.
- Advanced foul water drainage, surface water drainage and water supply layouts were presented in relation to the scheme. These layouts were prepared by Waterman Moylan Consulting Engineers following consultation with Meath and Louth County Councils and Irish Water. Of particular note, is the introduction of a foul water pumping station in the north-western corner of the site in response to ongoing discussions between Waterman Moylan Consulting Engineers and Irish Water.
- The green Infrastructure network, architectural layout of the development and associated hierarchy of streets combined to create 7 no. neighbourhood areas within the scheme (Boyne Valley Parklands; The Green; West Woodland; West Street; Central Parks; Community Hub; and Sheepshouse Road).

Figure 2.18 Site Layout Plan (including breakdown of housing mix) tabled at S247 Pre-planning Meeting with Meath County Council on 25th July 2018

Figure 2.19 Foul Water Drainage Layout Plan tabled at S247 Pre-planning Meeting with Meath County Council on 25th July 2018

Figure 2.20 Neighbourhoods Plan tabled at S247 Pre-planning Meeting with Meath County Council on 25th July 2018

Option 4 – Design/Layout discussed at the pre-planning consultation with An Bord Pleanála on 20th February 2019

The fourth design option explored by NDBA Architects following the S247 pre-planning meeting with Meath County Council (illustrated in Figures 2.20 and 2.21 below and overleaf), which was subsequently tabled at the pre-planning consultation with An Bord Pleanála 20th February 2019, included the following key changes from the Option 3 design previously discussed:

- The apartment blocks in the north-western corner of the site were redesigned on the advice of the Project Archaeologist to maintain an archaeological feature (an enclosure) identified immediately north of it.
- The proposed foul water pumping station was moved from the north-western corner of the site to the north-eastern corner following further discussions between Waterman Moylan and Irish Water.
- The layout of the neighbourhood centre and the overall development was altered slightly while refining the proposal but the overall number of units remained at 662 no. dwelling units which maintained a density of 35dpha.
- The refinement of the layout resulted in the no. of neighbourhood areas being increased from 7 no. to 13 no. (Boyne Valley Parklands; Rathmullan View; Boyne Bridge Park; Boyne Bridge Courtyard; West Wood; Rathmullan Avenue; Rathmullan Mews; Main Street; Rathmullan Centre; Rathmullan Green; South Avenue; Sheephouse Woods; and Sheepshouse Court).
- The units proposed to satisfy the development's Part V requirement were identified, the applicant having liaised with Meath County Council's Housing Department regarding this item during preparation of the application.
- A phasing proposal for the subject development was introduced.

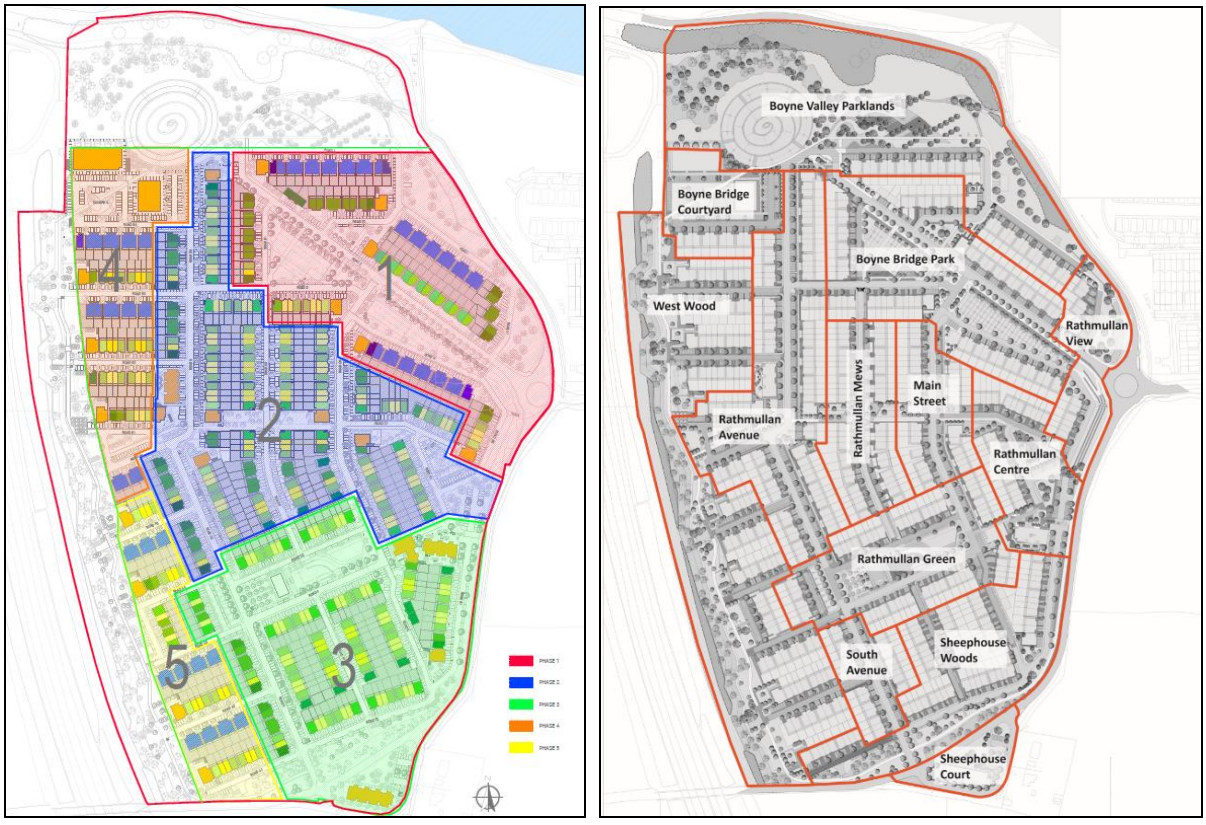


Figure 2.21 Phasing Plan (left) and Neighbourhood Area Plan (right) tabled at pre-planning consultation with An Bord Pleanála on 20th February 2019

Figure 2.22 Site Layout Plan tabled at pre-planning consultation with An Bord Pleanála on 20th February 2019

Option 5 - Final Scheme Submitted to An Bord Pleanála

As noted above, following the receipt of detailed feedback from An Board Pleanála, as well as Meath County Council, during the course of the pre-application consultation, and following receipt of the opinion of the Board which advised on further consideration relating to aspects of the proposed development, the applicant and design team have made amendments to the design of the development proposal which are reflected within the final submission now set out. These include the following:

- The previously proposed roundabout at the Rathmullan Road has been replaced with a signalised junction.
- The previously proposed shared cycle/pedestrian path along the Sheephouse Road frontage was replaced by a separate cycle/pedestrian path.
- Upon review of the photomontages prepared in conjunction with the apartment blocks in the north-western corner of the site were redesigned to better respond to the topography of the site and the adjacent bridge. The previously proposed 4, 5 and 6 storey blocks were replaced with 2 no. 4 storey blocks and 1 no. 5 storey block in the same location.
- In response to feedback received from the National Monument Services at a meeting with Project Archaeologist, in July 2019, the landscaping treatment to the enclosure in the north-western corner of the site was revised.
- The layout of the neighbourhood centre was revised to improve access/parking arrangements and facilitate the provision of an outdoor playspace adjacent to the creche.
- The alterations to the layout of the neighbourhood centre, the apartment blocks in the north-western corner and the overall development, discussed above, resulted in a slight reduction in unit nos. The overall number of units resulting is 661 no. which maintained a density of 35dpha.
- The refinement of the layout resulted in the no. of neighbourhood areas being reduced from 13 no. to 12 no. (Boyne Valley Park, Rath Gardens, Mary McAlesse Park, West Wood, Rathmullan Avenue, Rathmullan Mews, Rathmullan Centre, Rathmullan Green, South Avenue, Sheephouse Woods, Sheephouse Avenue and Sheephouse Court).
- The refinement of the layout resulted in minor amendments to the phasing proposal for the subject development.

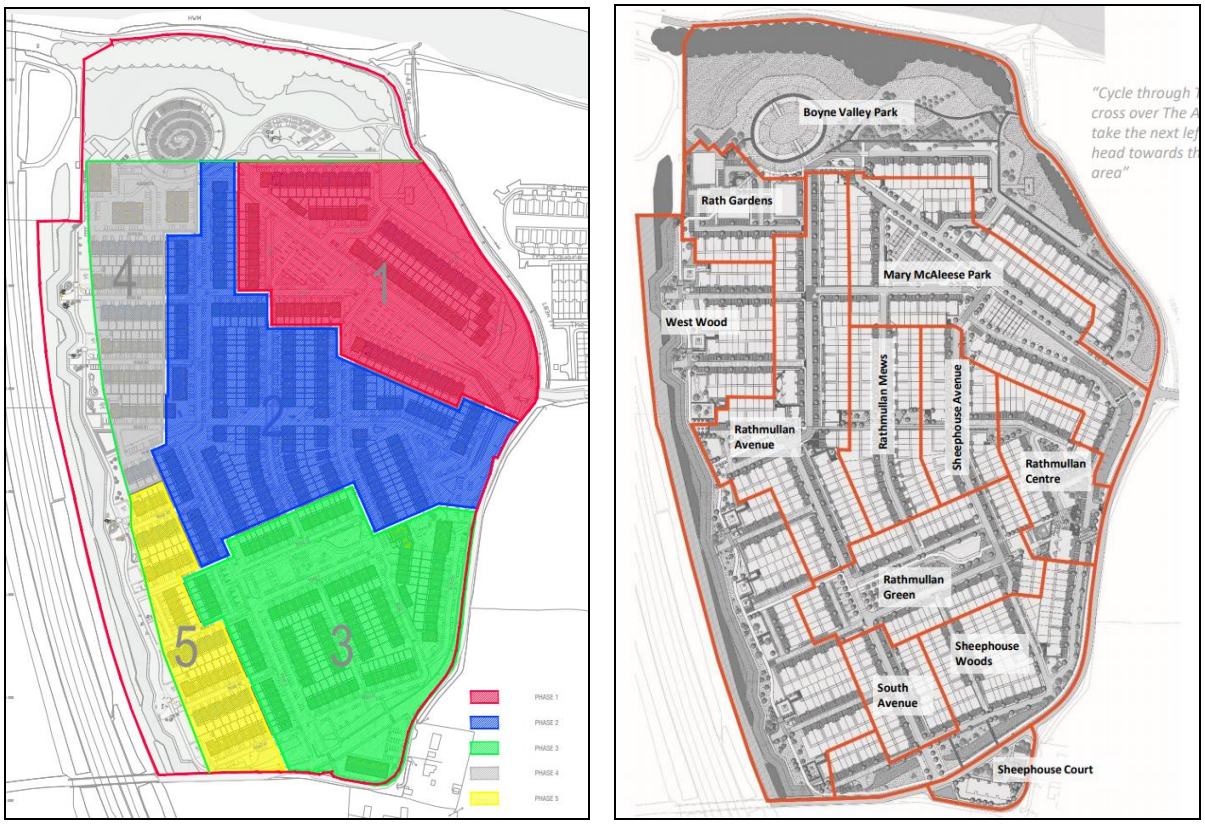


Figure 2.23 Phasing Plan (left) and Neighbourhood Area Plan (right) included with this application

Figure 2.24 Site Layout Plan included with this application

2.5 "Do Nothing" Alternative

In the event of the 'do-nothing' scenario, the current use of the site is likely to continue, whereby the lands would remain in use for grazing along with the agricultural use of the existing farm buildings on site. A "do-nothing" scenario was considered to represent an inappropriate, unsustainable and inefficient use of these residential zoned lands. In addition, the additional demand / support for local

infrastructure, services, and businesses would not be generated by any new population on site; nor would local housing demand be catered for.

Further to this, in a 'do nothing' scenario it is unlikely that the southern section of the Rathmullan Road would be realigned or the northern section of the Rathmullan Road would be upgraded and so the existing traffic issues would continue.

In terms of pedestrian/cyclist movement, in a 'do nothing' scenario the section of Rathmullan Road immediately east and south of the subject site would remain narrow and devoid of footpaths/cyclepaths and so the existing vehicular / pedestrian conflict in this location would continue.

In terms of landscape and visual impact, the site would continue to have an agricultural character, with intermittent visibility and would continue to be well-screened by mature planting along the M1 motorway interface.

2.6 Conclusion

Having examined various reasonable alternative designs, it is considered that the proposed design is a preferable option in terms of the sustainable development of the subject site insofar as it achieves 661 no. units and a net residential density of 35 no. units per hectare. The provision of the neighbourhood centre will assist in the place-making of the proposal and will also improve the amenity of the residents in the immediate surrounds. Further, the inclusion of the proposed pedestrian/cyclist connection along the Rathmullan Road interface, as well as throughout the development, will facilitate sustainable transport modes whilst also fostering strong connections between the new population on site and the wider community. The current design achieves a strong mix of housing types, sizes, and designs and the introduction of apartments throughout the site has resolved the difficulty of achieving a critical mass of housing in this constrained location whilst also providing adequate open space and achieving a strong urban edge and passive surveillance.

CHAPTER 3.0 PLANNING AND DEVELOPMENT CONTEXT

3.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, and Ms. Margaret Commane, Senior Planner, with Hughes Planning and Development Consultants.

Mr. Kevin Hughes of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Regional and Urban Planning (MRUP) in 2002, having previously completed a Bachelor of Arts Degree in Sociology from National University of Ireland in 1999. Kevin has over 18 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Kevin is currently the Director of Hughes Planning and Development Consultants.

Ms. Margaret Commane of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2012, having previously completed a Bachelor of Arts Degree in Geography and Legal Science from National University of Ireland in 2010. Margaret has over 7 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Margaret is currently a Senior Planner in the Practice of Hughes Planning and Development Consultants.

It outlines the statutory planning context and the previous planning history for the subject site.

3.2 Statutory Planning Context

The subject lands are subject to national, regional and local objectives and planning policies. The following outlines the key planning documents of relevance to the future development of the subject lands. This section will not address the detailed policies and objectives contained in the various plans which are relevant to the proposed residential development at Rathmullan Road, as these are addressed the Statement of Consistency and Planning Report, prepared by Hughes Planning and Development Consultants, which accompanies the planning application.

National

- Project Ireland 2040 – National Planning Framework (2018).
- National Development Plan 2018—2027.
- Urban Development and Building Heights - Guidelines for Planning Authorities, December 2018.
- Rebuilding Ireland – Action Plan for Housing and Homelessness, July 2016.
- Quality Housing for Sustainable Communities – Guidelines for Planning Authorities (2007).
- Sustainable Residential Development in Urban Areas – Guidelines for Planning Guidelines (2009).
- Urban Design Manual – A Best Practice Guide, 2009.
- Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (2018).
- Design Manual for Urban Roads and Streets (2013).
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009).
- Guidelines for Planning Authorities on Childcare Facilities (2001).
- Smarter Travel: A Sustainable Transport Future - A New Transport Policy for Ireland (2009).

Regional

- Regional Spatial & Economic Strategy for the Eastern and Midland Regional Assembly, 2019.

County

- Meath County Development Plan 2013-2019.
- Southern Environs of Drogheda Local Area Plan 2009-2015.
- Planning Strategy for Greater Drogheda Area, 2007.

The Meath County Development Plan 2013-2019 sets out the planning policy context for future development in Meath County up to 2019. It details land use and development objectives, settlement hierarchy, development control standards and policies and objectives for the protection of the built and natural environment of the County. It is the most relevant document pertaining to the future development of the subject lands.

According to the zoning objectives contained within the Meath County Development Plan 2013-2019 the proposed development site is subject to two zoning objectives. The majority of the site is zoned 'A2', the objective of which is to:

> *'Provide for new residential communities with ancillary community facilities, neighbourhood facilities and employment uses as considered appropriate for the status of the centre in the Settlement Hierarchy'.*

The remainder of the site (northern and western sections adjacent to the Boyne Valley and the M1 motorway, respectively) is subject to 'F1' zoning, the objective of which is to:

> *'Provide for and improve open spaces for active and passive recreational amenities'.*

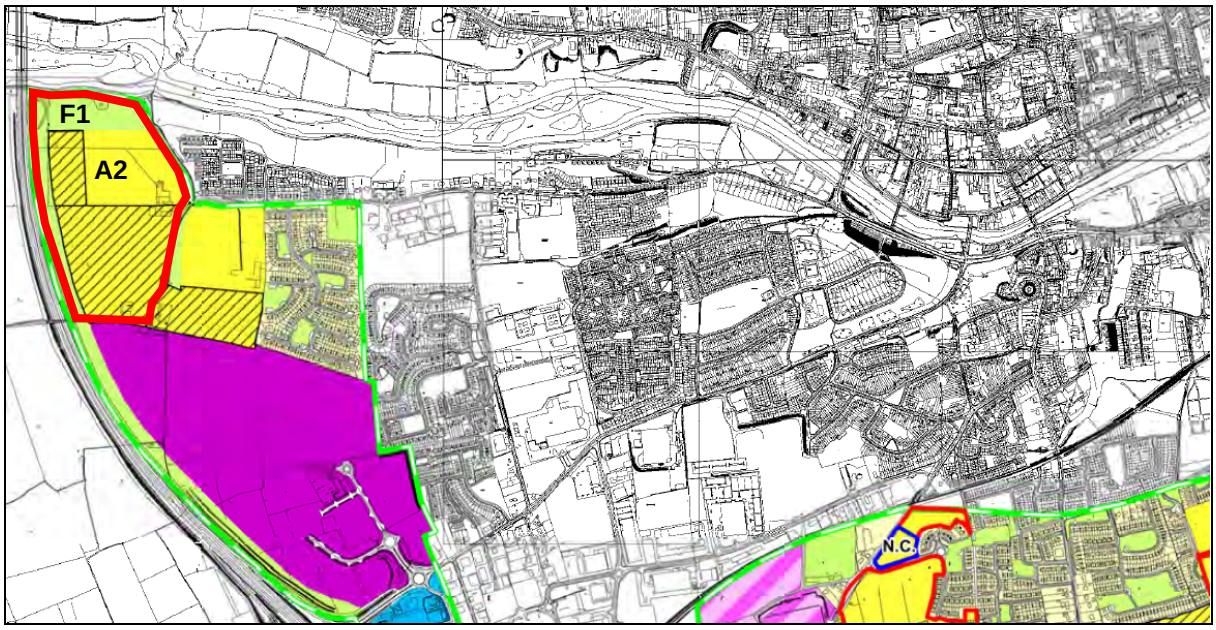


Figure 3.1 Extract from Drogheda Southern Environs Land Use Zoning Objectives Map included in Volume 5 of the Meath County Development Plan 2013-2019, with the development site (red outline)

The majority of the A2 zoned land (section featuring black diagonal lines) is zoned for 'Residential Phase II (post 2019)' development. Discussion on the appropriateness of 'Residential Phase II (post 2019)' lands inclusion in the subject application is provided in the Statement of Response to Pre-Application Consultation Opinion - Timing and Phasing, prepared by Hughes Planning and Development Consultants.

3.3 Planning History

A review of Meath County Council Planning Register has found a number of applications relating to the subject site. They are as follows:

Reg. Ref. SA40471 A planning application for demolition of existing structures on site and construction of 750 no. dwellings and crèche was lodged on 30th November 2004.

This application was subsequently withdrawn on 1st February 2005.

Reg. Ref. SA40472 A planning application for a mixed-use development on part of the site (0.81 ha) was lodged on 20th November 2004. The proposed development comprised a retail food store (1023sq.m), 6 no. retail units (982sq.m.) and café/ restaurant, with offices at second floor level.

This application was subsequently withdrawn on 2nd February 2005.

Reg. Ref. SA60260 Planning permission granted by Meath County Council on 20th July 2007 for 683 no. houses and apartments, a creche (650m2) with associated outdoor play area; a 3.13ha neighbourhood park addressing the River Boyne and a 1.6ha linear park bounding the M1 motorway; related open space and landscape works; traffic and carriageway improvements and reconfiguration to Rathmullan Road and to Sheephaven Road (CR315) including the provision of new vehicular access points to the site at Rathmullan Road (via a new roundabout) and at Sheephaven Road; associated site development and services works including water well compound and secondary borehole facility.

Further Information

On foot of a Further Information Request from Meath County Council, a number of changes were made to the site layout including:

- The removal of a number of taller apartment buildings;
- Changes to various public open spaces; and
- The reorganisation of the crèche site and its associated access arrangement.

Clarification of Further Information

On foot of a Clarification of Further Information Request from Meath County Council, a number of further changes were made to the site layout including:

- Changes to various public open spaces; and
- The reorganisation of the crèche site and its associated access arrangement.

Figure 3.2 Site layout submitted at application stage (left) in response to the Request for Further Information (centre) and following the Clarification of Further Information (right). Red shading depicts units omitted to allow for the construction of a national school on-site.

Decision to Grant

Following the submission of Clarification of Further Information, a Decision to Grant was issued by Meath County Council on 20th July 2007. The Decision to Grant contained conditions requiring the omission of 34 no. units (683 no. units granted) and reservation of land for a national school.

An Bord Pleanála

The above development was subsequently appealed to An Bord Pleanala by third parties, under An Bord Pleanala Ref.: PL 17.224875. Revised plans were submitted as part of the response submission made by the Applicant.

Figure 3.3 Landscape Masterplan submitted with response to An Bord Pleanala Ref.: PL17.224875

Figure 3.4 Site layout plan submitted with response to An Bord Pleanala Ref.: PL 17.224875

We note the following commentary from the Inspector's Report, dated 13th March 2008, in relation to the reservation of land for the purpose of providing a national school on-site:

> *'Should the Board be minded to grant permission, I recommend that the crèche, together with units 7-25 and 107-121 should be omitted. I note that the terms of Condition 2 of the planning Authority's decision to grant permission also requires the omission of these units. This would allow the applicant to prepare an overall plan which would inform subsequent applications for the crèche, school or residential development, and retail centre'.*

Following the recommendation of the Inspector to grant permission, the decision of Meath County Council was upheld by An Bord Pleanala on 31st October 2008 with revised conditions. These revised conditions included the following amendments to the proposal approved by Meath County Council:

- Reduced the development to 556 no. units, comprising 370 no. houses and 186 no. apartment/duplex units;
- The crèche building was omitted from the scheme and a separate application for a crèche requested to be lodged under a separate heading;
- The area occupied by omitted unit Nos. 241-266, 320-367, 483-491, and 505-508 (inclusive) were replaced by an area of public open space; and
- Noise mitigation requirements were set out for houses nearest the M50.

It is noted, with regards to the revised conditions, that the recommendation of Inspector, in respect of the omission of units 7-25 and 107-121, was not pursued by the Board. Moreover, following the conditions outlined in the Board's Order to grant permission contained no further reference to the provision of a national school on the application site.

A comparison of the subject proposal for the site and that previously put forward under An Bord Pleanala Ref.: PL17.224875 is included in the Statement of Consistency and Planning Report, prepared by Hughes Planning and Development Consultants, which accompanies this planning application.

CHAPTER 4.0 POPULATION AND HUMAN HEALTH

4.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, and Ms. Margaret Commane, Senior Planner, with Hughes Planning and Development Consultants.

Mr. Kevin Hughes of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Regional and Urban Planning (MRUP) in 2002, having previously completed a Bachelor of Arts Degree in Sociology from National University of Ireland in 1999. Kevin has over 18 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Kevin is currently the Director of Hughes Planning and Development Consultants.

Ms. Margaret Commane of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2012, having previously completed a Bachelor of Arts Degree in Geography and Legal Science from National University of Ireland in 2010. Margaret has over 7 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Margaret is currently a Senior Planner in the Practice of Hughes Planning and Development Consultants.

According to European Commission's Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (2017), human health is:

> *"a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."*

This section of the EIAR assesses the impact of the proposed development on the human environment in the general area of the subject site at Rathmullan Road, Rathmullan, Drogheda, Co. Meath, in terms of population levels, impact on employment, commercial activity, community infrastructure and social facilities.

This chapter addresses potential impacts of the proposed development of a residential scheme at Rathmullan Road, Drogheda, Co. Meath, on population and human health. Potential impacts of this proposal on population and human health arising from traffic and transportation, air quality and climate, noise and vibration, visual amenity and material assets: utilities and the risk of major accidents and/or disasters. are dealt with in the specific chapters in this EIAR dedicated to those topics.

4.2 Methodology

At the time of writing there is no guidance from the EU Commission on the 2014 EIA Directive to indicate how the new term 'Human Health' should be addressed. Therefore, this chapter of the EIAR document has been prepared with reference to recent national publications which provide guidance on the 2014 EIA Directive including Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 2017.

To establish the existing receiving environment / baseline, several site visits were undertaken to appraise the location and likely and significant potential impact upon human receptors.

Further to this, a desk top study of a number of relevant policy documents and data sources was carried out, including: Central Statistics Office Census data; the ESRI Quarterly Economic Commentary; the Regional Planning Guidelines for the Greater Dublin Area 2010-2022; the Draft RSES for the Eastern and Midlands Regional Assembly; the Planning Strategy for Greater Drogheda Area, 2007; and the Meath County Development Plan 2013-2019.

4.3 Population

4.3.1 Receiving Environment (Baseline Scenario)

On the ground, population to the north, south and west of the site is minimal due to the rural nature of the landscape. To the east, residential development is prominent as the town of Drogheda continues to grow in population and size.

The subject site at Rathmullan Road is located within the Electoral Division of St. Mary's (Part Rural) (Electoral Division No. 11047), which, according to the Census had a population of 11,864 no. persons in 2016. This represents a population percentage change of 10.1% or an actual population increase of 1,095 no. from the 2011 Census figures. The subject site also located within the Small Area of 167082008, the boundary of which is illustrated in Figure 4.1 below. According to the Census had a population of 498 no. persons in 2016, an increase on 1 person from the 2011 Census figures.

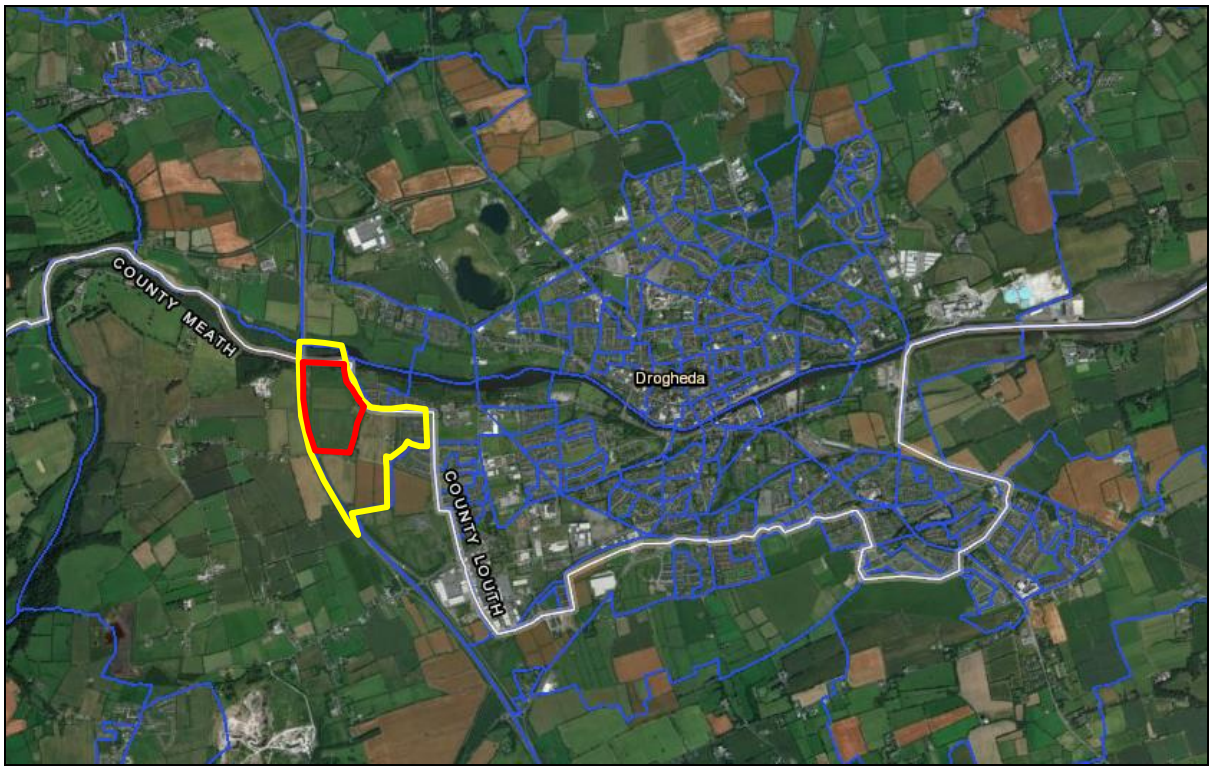


Figure 4.1 The small area (167082008) outlined in yellow, inclusive of the subject site outlined in red, with the settlement of Drogheda located to the east.

Although the subject site is located within the Meath Local Authority Area, given the subject sites proximity to Drogheda it is considered necessary to consider the subject site in the context of this settlement.

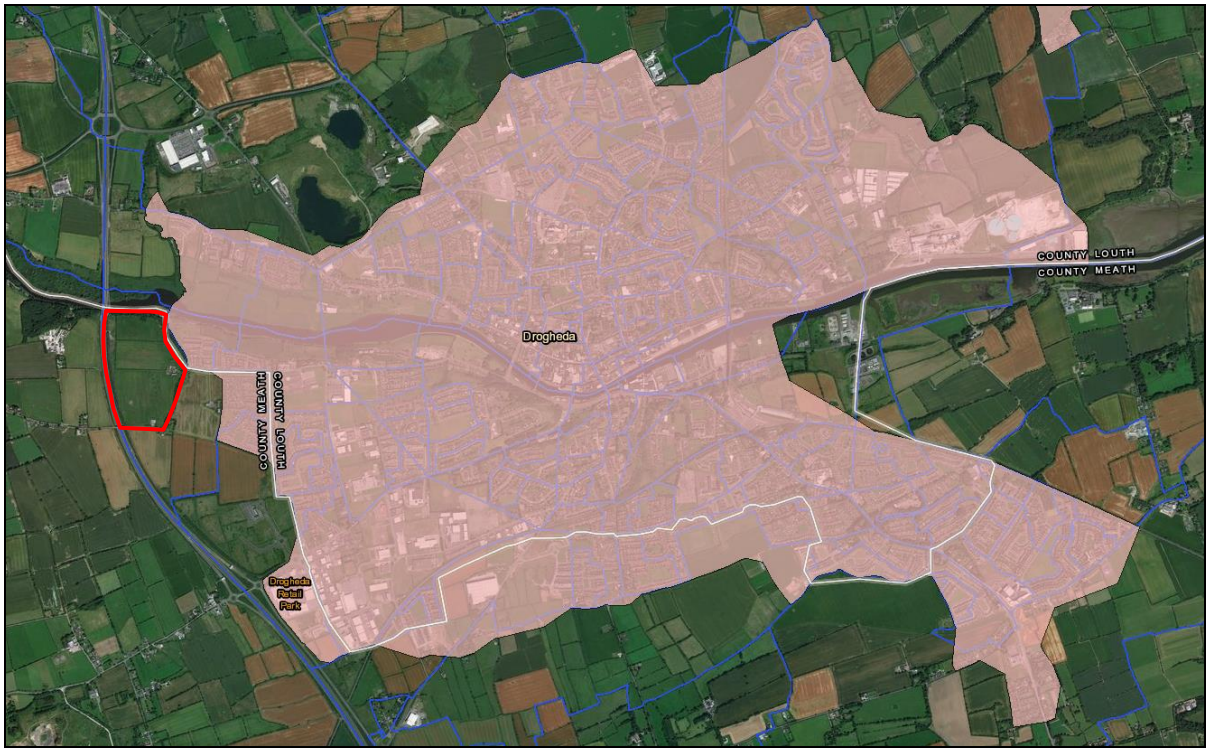


Figure 4.2 The settlement of Drogheda and the subject site outlined in red.

Population characteristics for the broader Drogheda area have been obtained from the Central Statistics Office Census of Population, 2016. From the census figures it can be gathered that the population in the vicinity of the proposed development has increased over recent intercensal periods. Within the catchment area the population growth levels have been very disparate, however, Table 4.1 shows the population growth within the applicable small area, Co. Meath, the settlement of Drogheda and Ireland as a whole. Parts of the Drogheda catchment are within Meath County.

Settlement/Province	2006	2011	2016	% Change		
				2006-11	2011-16	2006-16
Ireland - State	4,239,848	4,588,252	4,761,865	8.2	3.8	12.3
Co. Meath	162,831	184,135	195,044	13.1	5.9	19.8
Settlement of Drogheda	28,333	38,578	40,956	3.6	6.2	44.6
Small Area 167082008	N/A	497	498	N/A	0.2	N/A

Table 4.1 Population Trends 2006-2016

The above table identifies the significant population growth that the settlement of Drogheda has experienced in comparison to Ireland and the wider County of Meath. The CSO data outlines that Ireland has seen a 3.8% increase in population from 2006 to 2016, whilst during the same period, Drogheda has experienced a 44.6% growth.

The population within the settlement of Drogheda has increased and is projected to continue to increase due to its proximity to Dublin and Belfast, the M1 motorway and McBride Train Station connecting Drogheda to Dublin and the M1 motorway connecting Drogheda to Belfast.

With regards to population profile, the populations of the settlement of Drogheda and the population of the settlement of Drogheda as a whole are younger in comparison to the State average.

Approximately 29% of the Drogheda population is under 18 years of age, compared to 26% of the state population. Similarly, approximately 11% of the Drogheda population are over the age of 65

years in comparison to over 13% of the State population. The Dependency Ratio (i.e. those not in the workforce – aged 0-18 and over 65) can therefore be said to be approximately 40%.

Age Cohort	% Population in each Age Cohort			
	State	Co. Meath	Settlement of Drogheda	Small Area 167082008
All Ages	4,761,865	195,044	40,956	498
0-4	331,515	15,734	3,212	45
5-12	548,693	27,198	5,331	107
13-18	371,588	16,807	3,307	53
19-24	331,208	11,556	2,527	27
25-44	1,406,291	57,254	12,895	184
45-64	1,135,003	45,705	9,104	77
65-69	211,236	7,398	1,480	4
70+	426,331	13,390	3,100	1

Table 4.2 Population Profile 2016

4.3.2 Potential Impact of the Proposed Development

'Do Nothing' Scenario

Were the development to not proceed, the present agricultural use of the subject site would remain. The majority of the subject site has been zoned for residential development. As such, a 'do nothing' scenario would mean that this objective of the Development Plan would not be met, and some 661 no. households would remain uncatered for.

As such, the impact of the development not proceeding on population profile and trends in the area would be negative.

Construction Phase

The construction phase of the proposed development should not have any direct impact on the population of the area as no additional persons will be housed on site.

The construction phase will generate a greater number of people within the area on a temporary basis, as the construction will see construction workers and delivery drivers arriving and leaving the site at the start and end of each day. However, the implications of this are not considered to have significant effects to the surrounding community due to the location of the site on the outskirts of the Drogheda settlement.

Operational Phase

The provision of up to 661 no. quality homes within the proposed development will have a significant permanent positive impact on the population of Drogheda, contributing to the settlement's growth in a compact manner. With a total of 661 no. residential units proposed to be built, the anticipated increase in population for the site can be expected to be c. 1800 no. This is based on average household numbers for one, two, three and four bedroom residential units. The impacts of an increase in the population within the site will be gradual given the development will be completed in phases. The population of the development will not significantly impact the surrounding area due to the existing boundary treatments of the M1 Motorway to the west, the River Boyne to the north and existing agricultural land located to the south and south east of the development site.

The new community resulting on the subject site is considered significant and positive, particularly in the context of current housing demand.

4.4 Employment and Economic Activity

4.4.1 Receiving Environment (Baseline Scenario)

The CSO's quarterly Labour Force Survey (Q4 for 2018) indicated an annual increase of 2.3% (50,500) in employment at national level, bringing total employment to 2,281,300. This compares with an annual increase of 3.1% or 66,800 in the year to Q4 2017, 3.0% or 66,700 in employment in the previous quarter and an increase of 3.8% or 79,200 in the year to Q4 2016.

Unemployment steadily declined by 10.5% (15,200) for the 2018 Q4, bring the total unemployment number to 128,800 people. This is a significant statistic, given this is the twenty sixth quarter in succession where unemployment has declined on an annual basis.

The total number of persons in the labour force for 2018 Q4 was 2,410,100 which represents an increase of 1.5% over the year (35,300). The economic sectors which saw 10 of the 14 sectors have an increase in employment numbers. The largest of these was the administration and support service activities sector which increased by 12.6%, followed by Construction sector which increased by 7.9%.

The above sources demonstrate that the national economy and employment levels are expected to improve beyond into 2019, with the Government faced with the challenge of sustaining economic activity and competitiveness during a period of likely full employment. This in turn results in increased demand for residential dwellings particularly within the Dublin region, including Meath, Louth, Kildare and Wicklow. Further to this, a number of large corporations have premises within close proximity to the subject site. These premises include BD (a global medical technology company) located in Lagavooren, approximately 2.4km to the south-east of the subject site.

4.4.2 Potential Impact of the Proposed Development

'Do Nothing' Scenario

Were the current agricultural land use to continue on the subject site, the current levels of employment required to maintain this activity would remain steady and the subsequent impact on employment would be neutral.

In a 'do nothing' scenario, the economic investment arising from a large scale construction project would not be availed of, and this strategically located, zoned site would remain in use for farming and grazing. This would represent a lost opportunity in economic terms.

Construction Phase

The construction phase of the proposed development will likely provide a positive improvement to the to the economy and employment prospects within Drogheda and the surrounding area more broadly.

The construction of 661 no. residential dwellings will provide a substantial level of construction related employment for the duration of the development. Whilst it is difficult to place a total number on the employment for the proposed development, the extent of work and varying construction related industries required for the residential development will provide a variety of employment phased over the course of the development.

The construction phase will also have secondary and indirect 'spin-off' impacts on ancillary support services in the area of the site, such as retail services, together with wider benefits in the aggregate extraction (quarry) sector, building supply services, professional and technical professions etc. These beneficial impacts on economic activity will be largely temporary but will contribute to the overall future viability of the construction sector and related services and professions over the phased construction period

Whilst there will be some negative impacts felt to the wider community during the construction phase by way of noise, dust and traffic, this is unlikely to be significant. These issues and appropriate mitigation measures are addressed in Chapters 8, 9 and 10 of the EIAR, in the Traffic and Transportation Assessment, Construction Environmental Management Plan and the Preliminary

Construction and Waste Management Plan, all prepared by Waterman Moylan Consulting Engineers, which accompany the application.

Operational Phase

The operational phase of the proposed development will result in the provision of 661 no. residential units, a neighbourhood centre, including a café and retail unit, community facility, and a childcare facility, all with associated open space. This will provide accommodation for up to 1800 people, based on 13 no. 1-bedroom units, 297 no. of 2-bedroom units, 269 no. of 3-bedroom units and 82 no. of 4-bedroom units. In addition to this, employment opportunities will be created by the childcare facility, café and retail unit proposed on site.

This increase in population in the area will enhance local spending power and will assist with the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities. This will play a role in the future growth of Drogheda and the improvement of local amenities and infrastructure.

4.5 Land Use and Settlement Patterns

4.5.1 Receiving Environment (Baseline Scenario)

The subject site is a greenfield site that has been earmarked for future residential development. The subject site is now located on the periphery of similar residential developments on the western outskirts of Drogheda.

The lands surrounding the subject site to the north and south are predominantly greenfield in nature and under agricultural use. The sites western boundary is flanked by the M1 motorway, with the land further west of this also greenfield in nature and under agricultural use. To the east of the subject site are 2 no. established residential developments, known as 'Riverbank' and 'Highlands, as well as the site of a recently approved residential development (Reg. Ref. LB170675) comprising 156 no. dwelling houses.

A similar development has been approved by both Meath County Council (Reg. Ref. SA60260) and An Bord Plenèala (Ref: PL17.224875) for 556 no. residential units on the subject site. Whilst the subject site and immediately adjoining lands (located east of the M1 Motorway) have predominantly operated as agricultural land, present zoning reflects changing land use patterns for this area, west of the town of Drogheda. The zoning of the land provides an opportunity for Drogheda to increase its population and employment opportunities.

As Figure 4.3 overleaf outlines, the subject site is zoned both A2 and F1. The objective for A2 zoned land is *'providing for new residential communities'* whilst the objective for F1 zoned land *'provides for and improves open spaces'*. This is reflective of the former application highlighted above, along with the subject application which proposes residential development with open space located within the F1 zoned land. Adjoining land to the south (purple) is zoned E1, which relates to the *'high technology and major campus style office-based employment'.*

The former greenfield site and surrounding land uses are, similar to surrounding land, becoming more connected to the Drogheda township through residential and commercial development and the public transport routes servicing the town.

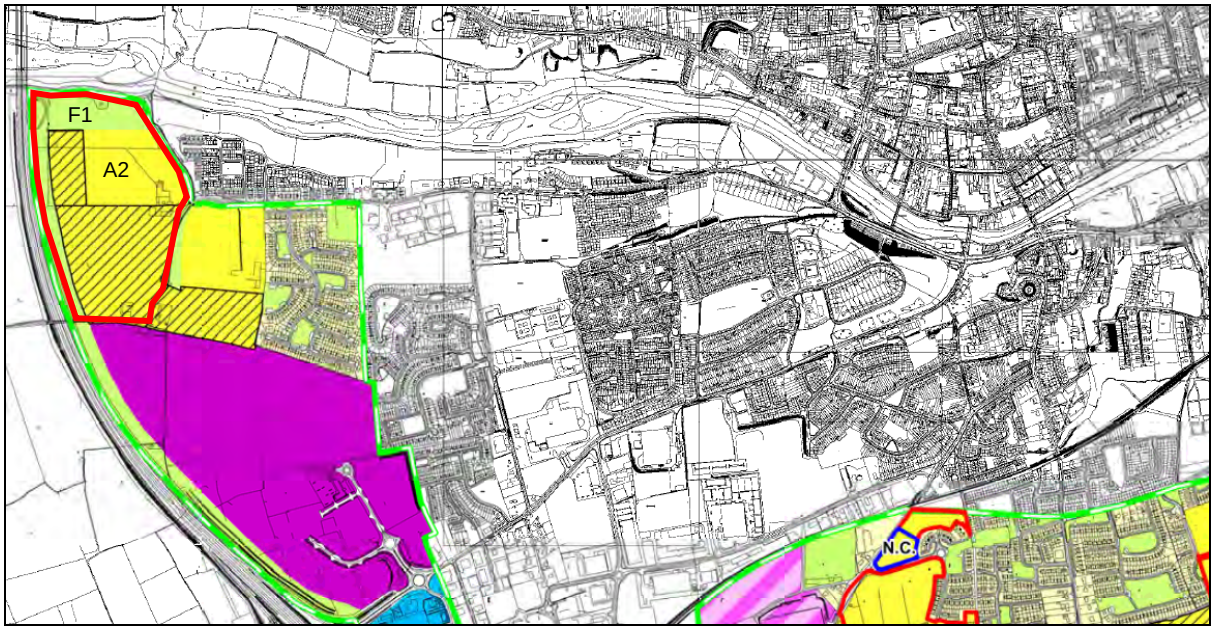


Figure 4.3 Extract from Drogheda Southern Environs Land Use Zoning Objectives Map, contained within the Meath County Development Plan 2013-2019, with the development site (red outline) situated within lands zoned 'A2'

Drogheda has been identified in the Meath County Development Plan 2013-2019 as a 'Large Growth Town 1', and as such, specific policies and objectives relating to the growth of population and economic development of the town have been identified. The Development Plan includes the following policy:

> *'**The policy is to promote them as economically active towns supporting the surrounding area and maximising their location on multi modal corridors.** The functions of these towns are to include acting as regional economic drivers in the GDA whilst also supporting and servicing a wider local economy. **They will accommodate significant new investment in transport, in economic and commercial activity and in housing.** Planning for Navan and Drogheda Environs should take cognisance of accommodating an ultimate population of 50,000 persons in those towns. **This is critical as it will contribute to achieving critical mass in these centres'.***

The proposed development is in keeping with the policies and objectives for the township of Drogheda and is consistent with the identified land uses applied to the site, and appropriately responds to the existing settlement pattern and residential densities of nearby developments.

4.5.2 Potential impact of the Proposed Development

'Do Nothing' Scenario

Were the development to not proceed, the present agricultural use of the subject site would remain. As discussed in Section 4.3.2 above, a do-nothing scenario would mean that the objectives of the Development Plan would not be met, and some 661 no. households would remain uncatered for.

Construction Phase

The construction phase of the development will see site works comprising site clearing, excavation, infrastructure works in preparing the road and drainage infrastructure and construction works. It has the potential to impact adversely and result in the temporary degradation of the local visual environment on a short-term basis. Construction works are likely to take place on a phased basis, which will moderate the potential impacts on adjoining land use. The Construction Environmental Management Plan, prepared by Waterman Moylan Consulting Engineers, addresses these issues in more detail.

As the development is on greenfield land, the demolition works are limited to the existing farm buildings, which will not cause any significant disturbance to the adjoining properties given the nature of the work and the generous setbacks to adjoining properties.

There will be an increase in population on the site during construction as a result of the proposed development. Given the location and size of the subject site, the rise of employment numbers on-site is not considered to negatively impact the surrounding community. There may be some increase in traffic on Rathmullan Road from the east and west to access the site, however, this is considered to be within reason, and will be managed in accordance with the Traffic Management Plan.

Operational Phase

The operational phase will see former farming land transformed into a residential land use which in keeping with planning policy, helps address the growing population and housing shortage across Ireland and Dublin in particular. The proposed development will include a neighbourhood centre, including a childcare facility, retail unit and café, which will serve the residents of the subject site as well as the area more broadly. This is given its positioning adjacent to the site's eastern boundary and the provision of an entrance to the neighbourhood centre off Rathmullan Road.

The development will include 8.78 hectares of land for public open space to be utilised by the surrounding community. The public open space located along the northern boundary will provide accessible views towards the River Boyne and will contribute to the community.

4.6 Housing

4.6.1 Receiving Environment (Baseline Scenario)

Housing completions across the country plummeted after the recession occurred in 2007/2008 with completions declining from almost 90,000 no. per year in 2007 to approximately 11,000 no. in 2014. In light of this, the Government published the 'Rebuilding Ireland - Action Plan for Housing and Homelessness' policy document which includes the following central objective:

> *"to double the completion level of additional homes in the next four years to deliver the 25,000 homes or more required annually".*

According to the CSO Q3 New Dwelling Completions Report, 12,582 new dwellings were completed in 2018. This is almost 50% below the target set in the 'Rebuilding Ireland - Action Plan for Housing and Homelessness' policy document.

The National Planning Framework - Ireland 2040 requires delivery of a baseline of 25,000 homes annually to 2020, followed by a likely level of 30-35,000 annually up to 2027. Within this output 112,000 households are expected to have their housing needs met in a social housing home over the next decade. To achieve the objective of compact growth, 40% of future housing delivery is to be delivered within and close to the existing footprint of built-up areas

The Meath County Development Plan 2013-2019 identifies Drogheda as a 'Large Growth Town I' and 'Primary Economic Centre'. The Core Strategy contained therein indicates that an increase of population of up to 50,000 should be planned for in Drogheda. The part of Drogheda falling within the remit of Meath County Council was assigned a household allocation of 857 for 2013-2019 in the Meath Core Strategy while the remaining area of Drogheda (which falls within the remit of Louth County Council) is earmarked for an increase in population to 37,944 by 2021 in the Core Strategy contained within the Louth County Development Plan 2015-2021.

Further to the above, the Draft Regional Spatial and Economic Strategy for the Eastern and Midland Region (Draft RSES), published in October 2018, identifies Drogheda as a 'Regional Growth Centre'. Regional Growth Centres are defined as:

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

The vision for Drogheda in the RSES is that Drogheda will act as a Regional Growth Centre with a population target in the region of 50,000 by 2031. Compact and focused growth in the Regional Growth Centres of Drogheda and Dundalk, growing them to a city scale, is also outlined as one of the growth enablers for the Dublin Belfast Corridor.

4.6.2 Potential impact of the Proposed Development

'Do Nothing' Scenario

There are currently no persons residing on the subject lands (the existing buildings on site comprising farm buildings). The site is in a greenfield state and is used for grazing associated with the existing farm use on site. Were the development not to proceed, this scenario would continue and the site would remain in its current use.

The impact of a 'do nothing' scenario would be negative in terms of housing in the Drogheda area as the subject site would fail to realise the development potential afforded by its residential zoning.

Construction Phase

As discussed in Section 4.3.2 previously, the construction phase of the proposed development will see no additional persons will be housed on site.

Operational Phase

The proposed development will result in the addition of 661 no. units to the supply of housing in the Drogheda area. These will be a mixture of 1, 2, 3 and 4 bedroom residential units.

The addition of these proposed units will contribute to the housing unit target outlined for Drogheda's southern environs in the Meath Development Plan 2013-2019, as well as the Planning Strategy for Greater Drogheda Area, 2007.

4.7 Community Infrastructure and Social Facilities

4.7.1 Receiving Environment (Baseline Scenario)

The Meath County Development Plan 2013-2019 identifies a long-standing history of community organisations, *'reflected in the presence of voluntary agencies and community initiatives that continue to play a central role in contributing to the delivery of a wide variety of local social services'.*

Drogheda contains a wide range of community infrastructure including education facilities; facilities associated with social service provision; health and medical centres; nursing homes; childcare facilities including private nurseries; community facilities; libraries, religious buildings; and cemeteries.

The subject site is located on the periphery of the Drogheda town centre. The spread of the population is contained to the north, north east and east of the subject site. The population is sparse west of the site, which is predominantly rural in nature.

There are a number of recreational and sporting facilities within proximity to the site. To the east of the lands along Rathmullan Road is St Oliver's Community College, Aura Drogheda Leisure Centre, St Nicholas GFC, Drogheda Boys FC and St Johns National School all within 1km of the subject site.

There is a full range of community facilities located within Drogheda (2.5km from the subject site) including schools, churches, library services and health services. Drogheda is also well provided for in terms of active community recreation facilities, including playing fields, parks and sports facilities. There are also passive recreation facilities including public houses, restaurants, cinemas etc.

4.7.2 Potential impact of the Proposed Development

'Do Nothing' Scenario

There are no social services currently located on the subject site, therefore there would be a neutral impact in a 'do nothing' scenario.

Construction Phase

The construction of the proposed development will unlikely have any significant implications to the existing community infrastructure and social facilities. The immediate effects of the construction phase will be centred around the subject site. The construction phase will have some impacts on the surrounding environment through noise and increased traffic. There are however no foreseeable short-term construction impacts that will impact negatively on the community infrastructure or social facilities.

Operational Phase

The population growth that will occur as a result of the proposed development will provide a positive impact to the Drogheda environs and will contribute to the existing social and community infrastructure. The new residents of the development would likely lead to increased funding and patronage of existing services and facilities. The overall size of the development and population growth will not be of vast proportions that the existing community and social infrastructure cannot cope with the demand. In addition, the critical mass generated by the proposal would likely create demand for new facilities and services, which would indirectly benefit the wider area.

The retail unit, café and childcare facility featuring within the proposed development, due to the proposed positioning and access arrangements, will serve both residents of the subject development and the surrounding area more broadly. This will improve community infrastructure and social facilities to the west of Drogheda.

Further to this, the inclusion of a landscaped public open space, including cycle and pedestrian paths, adjacent to the River Boyne significantly impact the social amenities of the town in a positive manner. It will enable more residents and visitors to gain access to the boardwalk and connect to existing green and social infrastructure in the town, improving residents' ability to lead a healthy lifestyle. This will be a significant positive impact of existing and future residents.

The previous planning permission for the subject site (Reg. Ref. SA60260) included space for the provision of a school. The subject proposal does not provide for a school, however given the number of existing schools at both secondary and primary level, schools constructed in the interim and the documented growth, providing a school as part of the proposed development was considered to be an over-supply. The topic of school provision is discussed in the School Capacity Assessment, prepared by Hughes Planning and Development Consultants which accompanies this application.

4.8 Health and Safety

4.8.1 Receiving Environment (Baseline Scenario)

The subject site is situated south of the River Boyne and east of the M1 Motorway. The site was formally greenfield land used for agriculture with the majority of the land grazed paddocks. The site is not on any former industrial land and has not been contaminated from any former industrial uses, therefore the site is not considered to pose any significant health or safety risk.

4.8.2 Potential impact of the Proposed Development

'Do Nothing' Scenario

The site is in a greenfield state and is used for grazing associated with the existing farm use on site. Were the development not to proceed, this scenario would continue and the site would remain in its

current use with only health and safety risks associated with the lands agricultural use to contend with.

Construction Phase

As with all construction, there will be inherent health and safety risks at this stage of the development. The construction of the proposed development will give rise to a number of short-term impacts regarding include noise, dust and an increase in traffic flow arising from site workers, deliveries etc. These items are dealt with separately in the relevant chapters of this EIAR. The construction of the proposed development will be done in accordance with the Construction Environmental Management Plan and Preliminary Construction and Waste Management Plan which will ensure that the works do not pose an adverse risk to the health and safety of both the surrounding properties/community and the workers on-site.

Operational Phase

Similarly, the operation of the proposed development is unlikely to create any significant health or safety risks to residents of the development, or adjoining the site. The proposed development has been designed to provide for a safe environment for future residents and visitors alike. The design and layout of the proposed development has been designed in such a way to ensure that footpaths are well lit and passive surveillance occurs. The paths, roadways and public areas have all been designed in accordance with best practice and the applicable guidelines. Likewise, the proposed residential units and childcare facility accord with the relevant guidelines and will meet all relevant safety and building standards and regulations, ensuring a development which promotes a high standard of health and safety for all occupants and visitors.

4.9 Risk of Major Accidents and Disasters

The 2018 EIA Guidelines state that an EIAR must include the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project.

There are two key factors that could contribute to a 'major accident or disaster' occurring on the subject site. The first being the proximity of the M1 Motorway to the subject site and the second being potential flooding. With regards to the M1 Motorway, due to the slope of the land increasing from the M1 Motorway to the subject site, the 50 metre separation distance that is provided and the extent of vegetation planted along the boundary (see Figure 4.4 below), it is considered that no major vehicle accident on the M1 motorway will pose a risk to the residential development.

Figure 4.4 Imagery of the M1 Motorway looking north with the SHD site located on the right, with the embankment and boundary planting evident along the length of the western property boundary

4.9.1 Receiving Environment (Baseline Scenario)

With regards to potential flooding, the subject site has been identified as having mottled flooding occurring across the site (originating at the southern boundary of the site and flowing northwards) on the Catchment Flood Risk Assessment and Management (CFRAMS) map for this area, an extract of which is presented in Figure 4.5, below. However, the construction of the M1 Motorway has significantly altered the topography of the natural catchment of the former watercourse to which this flooding related. The CFRAM study has not been amended to accurately reflect the resultant interception of the former watercourse and incorporation of its flows into the M1 Motorway surface water drainage network. As a result of the M1 Motorway construction, none of the former overland flow or flows which previously affected the site are now able to cross the M1 Motorway. Therefore, the mottled flooding previously identified as occurring across the site will not in fact occur.

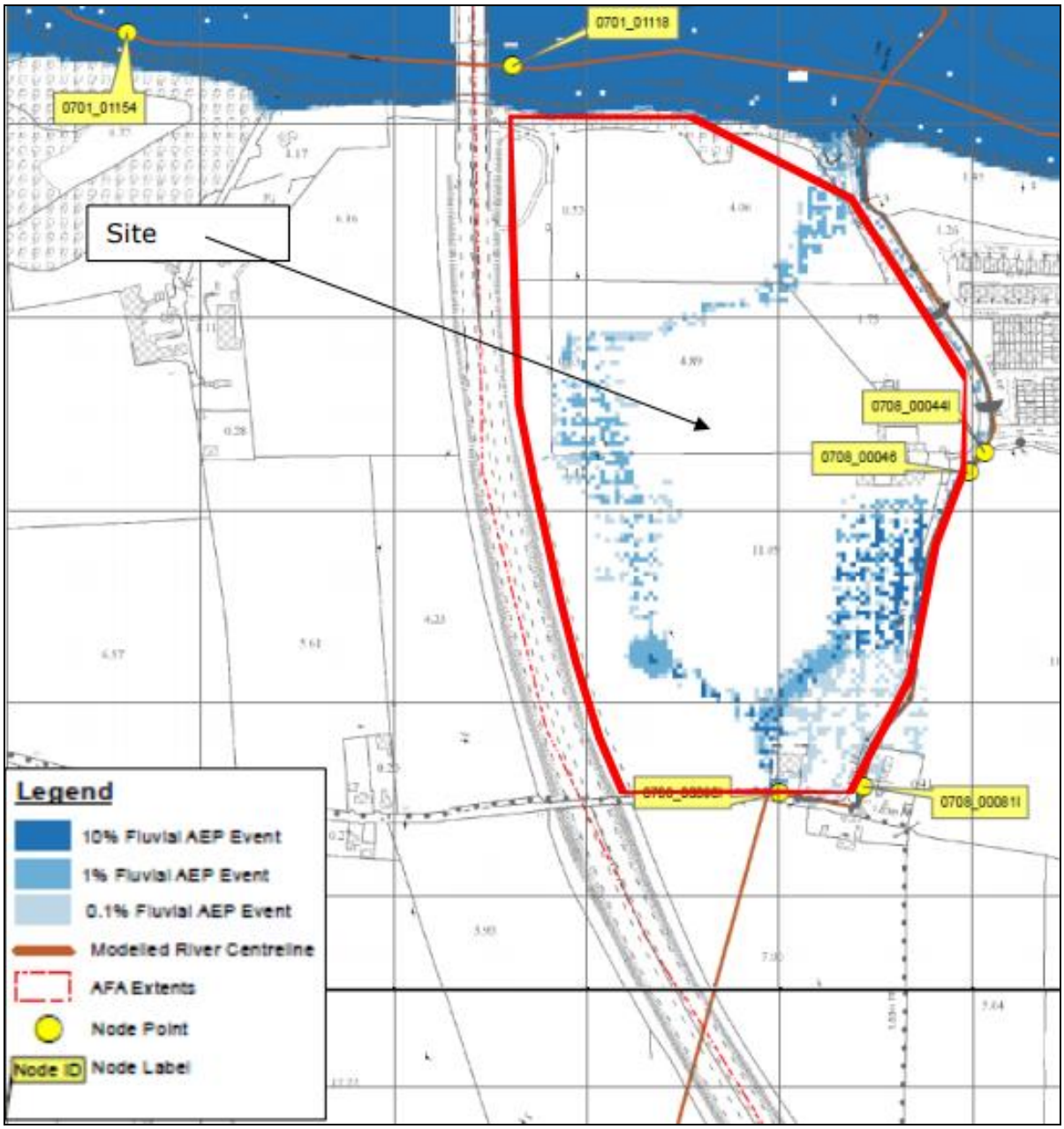


Figure 4.5 Excerpt taken from Eastern CFRAM Fluvial map.

For further information with regarding the matter of flooding, please refer to the Flood Risk Assessment, prepared by JBA Consulting, included at Appendix 4.1.

4.9.2 Potential impact of the Proposed Development

'Do Nothing' Scenario

Were the development not to proceed, risk from the M1 motorway would be low given the embankment and boundary planting that features adjacent to the sites western boundary. Similarly, the risk of flooding on the subject site would be low as a result of the alterations to the former watercourse having resulted from the construction of the M1 Motorway.

Construction Phase

The construction of the proposed development will be done in accordance with the Construction Management Plan to manage the day to day proceedings, and to ensure that the movement of water and dust from the site do not create an unsafe environment. The construction traffic entering and existing the site will be managed appropriately through the Traffic Management Plan. Therefore, there is not expected to be any major accidents or disasters on the M1 as a result of the construction of the residential development.

The site will not require access onto the M1 Motorway during construction which will significantly reduce the likelihood of any major accidents with vehicles or large trucks attempting to exit the M1 Motorway into the subject site. All access will be via Rathmullan Road located to the South and east of the site.

With regards to flooding, a number of temporary cut off trenches along the northern development boundary introduced in advance of stripping topsoil will restrict the flow of water across the site and towards the River Boyne.

Operational Phase

The operation of the residential development similarly will not negatively impact the surrounding population or increase the likelihood of a major accident or disaster. It is acknowledged that the proposed development is within proximity to the M1 Motorway, sharing a common boundary to the west of the subject site. As outlined in Figure 4.4 above, there is an existing embankment and boundary planting that protects the subject site from the M1 Motorway. This will help to ensure that any major accidents that occur on the Motorway do not have any impacts to the residential development adjoining the Motorway. There will also be no proposed access from the subject site onto M1 Motorway which will also alleviate any traffic related accidents as a result of the proposed development. All vehicle access will be via Rathmullan Road.

The site sits well above the River Boyne, as well as the section of Rathmullan Road that is located within the designated Flood A Zone. The design of the development will ensure that residents will enter/exit the subject site to the south and east of the site, situated outside of the Flood A Zone. Any existing flooding issues will be addressed with the required upgrade in drainage infrastructure for the residential development.

It is therefore considered that the operation of the site will not increase the risk to residents of any major accidents or disasters due to the surround environment.

4.10 Cumulative Impacts

The cumulative effects of the development on the surrounding population and human health have taken into consideration the existing surrounding environment, and in particular the established developed lands located west of Drogheda on the southern side of the River Boyne.

The development of the site will likely have a positive cumulative impact on the township of Drogheda in helping the town accommodate the projected growth which has been projected to be near 50,000 people for the Large Growth Town I. The economy will benefit both during the construction phase and operation phase increasing the economic activity within the town. The site is well connected with access into Drogheda via Rathmullan Road, and is within proximity of the M1 Motorway via Donore Road.

There are not considered of be any significant adverse cumulative impacts to the population and human health either during construction or operation phase of the Rathmullan Road residential development.

4.11 Mitigation Measures

Construction Phase

All standard Safety and Health procedures will be implemented at every stage of this project. The Main Contractor for the project is responsible for the method in which the demolition and construction works are carried out and to ensure that best practices and all legal obligations including Local Authority requirements and Health and Safety legislation are complied with. Further to this, Building Regulations will also be adhered to during the construction phase.

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics discussed under each. These measures seek to ensure that any likely significant adverse environmental impact on humans during the construction phases are either ameliorated to have an acceptable level of impact or avoided altogether. Included in these measures is the requirement that a detailed construction traffic management plan be prepared by the Contractor and agreed with Meath County Council as the Road Authority prior to commencing works on the public road. This Construction Traffic Management Plan will include restrictions on deliveries and access to the construction site, typically both will be via Rathmullan Road to avoid use of the River Road to the north of the site or the local Road to the south of the site. Further, measures with regards to noise and dust abatement covered elsewhere within this EIAR will be implemented during construction and will limit impacts on population and human health.

Further to the above, working hours on site will be as such that the residential amenity of adjacent residences is not unreasonably impacted upon. They will be agreed with the Council in full as part of the required construction management plan.

As a result of the implementation of the abovementioned measures, the impacts of the construction phase of the development on population and human health are not anticipated to be significant. Furthermore, all impacts will be temporary in nature.

Operational Phase

The mitigation measures relating to the operation phase of the development concerning traffic, transport, noise, vibration, water, air and dust quality and landscaping as set out in this EIAR (and listed in Chapter 14.0) will be carried out in full to minimise impacts on residents of the development, adjacent residents and human health.

4.12 Monitoring

There is no other ongoing monitoring required in relation to the effect of the proposed development on the population and human health.

CHAPTER 5.0 BIODIVERSITY

5.1 Introduction

Scott Cawley Ltd. was commissioned by Trailford Ltd. to assess the impacts of a proposed residential development (herein referred to as “the project”) in a greenfield site on Rathmullan Road, located west of Drogheda Town in Co. Meath (herein referred to as “the subject lands”) on the biodiversity within the receiving environment.

Details of the project design are detailed within Chapter 2.0 of this EIAR.

5.1.1 Quality Assurance

This report was written by Laura Higgins and was reviewed by Colm Clarke ACIEEM of Scott Cawley Ltd. The final report was approved by Aebhin Cawley, Director of Scott Cawley.

Laura Higgins holds a first class honours degree in Zoology from Trinity College Dublin. Laura has a range of fieldwork experience in Ireland including habitat, invasive species and protected species surveys. She has surveyed a wide range of mammal, bird and invertebrate species in terrestrial and aquatic habitats in Ireland. Laura has a great interest in ecology and is continually improving her professional skills through training courses and volunteer work. Since joining Scott Cawley, her work has included the collection of ecological data, data analysis and preparing Appropriate Assessment reports and Ecological Impact Assessments for residential and infrastructural projects across the country.

Colm Clarke holds an honours degree in Natural Sciences and a Masters degree in Biodiversity and Conservation, both awarded by Trinity College Dublin. He is an Associate member of the CIEEM, and has professional experience working in Australia and New Zealand, as well as more recent experience in Ireland and the UK. Prior to joining Scott Cawley, Colm was involved in the completion of Ecological Impact Assessments of numerous renewable energy and quarrying projects. Since joining Scott Cawley, Colm has been project manager on ecological assessments that include EIA, EcIA and AA. These have included complex projects such as bridge repair works in European Sites, linear infrastructure projects, and the assessment of large outdoor music events. His area of expertise is botanical surveying; however, he has a wide range of ecological experience including bat surveys, protected mammal surveys and survey for crayfish. Colm coordinated events for the Botanical Society of Britain and Ireland (BSBI) in the Dublin area.

Aebhín Cawley is Director with Scott Cawley. She holds an honours degree in Zoology and a postgraduate Diploma in Physical Planning, both from Trinity College Dublin. She is a Chartered Environmentalist (CEnv) with the Society for the Environment (Soc Env) and a Full Member of the CIEEM. Aebhin Cawley is an experienced ecological consultant with extensive experience in public and private sector projects including renewable energy, ports and other major infrastructural developments. Aebhín has been undertaking Ecological Impact and Appropriate Assessment work in Ireland since 2002 and regularly provides Appropriate Assessment training to local authorities and other public sector organisations. She authored guidelines on Appropriate Assessment for the EPA and delivered training on its application to its inspectorate.

5.1.2 Terms of reference

The terms of reference of this assessment are to:

- Establish baseline ecological data for the proposed development site;
- Determine the ecological value of the identified ecological features;
- Assess the impact of the proposed development on ecological features of value (biodiversity);
- Apply mitigation measures to avoid, reduce, remedy or compensate impacts; and
- Identify any residual impacts after mitigation.

5.2 Research Methodology

5.2.1 Legislative and Policy Context

The following international legislation is relevant to the proposed development: - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended); hereafter "the Habitats Directive"; and Directive 2009/147/EEC; hereafter "the Birds Directive".

The following National legislation is relevant to the proposed development:

- Wildlife Act, 1976 and Wildlife (Amendment) Act (2000) (as amended). Hereafter collectively referred to as the "Wildlife Acts". The Wildlife Acts are the principal pieces of legislation at national level for the protection of wildlife and for the control of activities that may harm wildlife. All bird species, 22 other animal species or groups of species and 86 species of flora are protected under these pieces of legislation.
- Flora (Protection) Order, 2015. This lists species of plant protected under Section 21 of the Wildlife Act, 1976.
- The Planning and Development (Amendment) Act 2010 (as amended). This piece of legislation is the basis for Irish land use planning. Under the legislation, development plans (usually implemented at local authority level) must include mandatory objectives for the conservation of natural heritage and for the conservation of European Sites.
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011 (as amended); hereafter the "Birds and Habitats Regulations". This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule).

The local authority, in this instance Meath County Council, includes policies relating to biodiversity within the *Meath County Development Plan 2013-2019* (Meath Dev Plan, 2013). The *Draft Meath County Development Plan 2019-2025* (Meath Draft Dev Plan, 2019) is currently at review stage[1], and will be placed on public view in the second half of 2019. The *Draft Meath County Development Plan 2019-2025* will include policies relating to biodiversity and will supersede the existing development plan.

5.2.2 Consultation

A formal consultation letter was submitted, by Scott Cawley, to the Development Applications Unit (DAU) of the Department of Culture, Heritage and the Gaeltacht by email on 10th October 2018 to request any information on the subject lands that is not available through their online database. A response was received on the 22nd November 2018. All recommendations from the DAU were given consideration in the preparation of this chapter. The recommendations included the following:

- Ecological surveys for biodiversity, flora, fauna and habitats must be carried out by suitably qualified persons;
- Baseline data on flora and fauna must be collected from various online sources;
- Impacts of the development on flora, fauna and habitats should be assessed with regard to the relevant legislation;
- Loss of biodiversity associated with the proposed development should be mitigated for;
- Measures should be taken to avoid the spread of alien invasive species;
- Hedgerows should be maintained where possible and if removed they should be mitigated by suitable planting of native species;
- If bat roosts are found to be present in trees or buildings onsite, suitable mitigation measures should be implemented. Lighting in woodlands and ecological corridors should be avoided;
- If a watercourse will be impacted by the development, it should be surveyed for protected species. Construction work should not be allowed to impact on water quality and measures should be detailed in the EIAR to prevent sediment and/or fuel runoff into watercourses;
- Ground and surface water quality should be protected during the construction and operation of the proposed development;
- The EU Green Infrastructure Strategy should be taken into consideration; and,

[1] Based on a desk review of the Meath County Council website countydevelopmentplanreview.meath.ie Accessed 30/05/2019

- A Construction Management Plan must be prepared to allow an adequate assessment to be undertaken.

5.2.3 Zone of Influence

The zone of influence is a distance within which the project could potentially affect key ecological receptors (KERs)[2]. There is no set recommended distance for the zone of influence of a project, and it is likely to vary according to the KER in question. The potential zone of influence of the project is regarded to be relatively limited and less than 1km from the subject lands' perimeter in most cases (with the exception of designated sites).

5.2.4 Desk Study

A desk study was undertaken on 3rd October 2018 to collect any available information on the local ecological environment. The desk study was reviewed again in May 2019. The following resources assisted in the production of this report, in addition to those listed in the Reference section of this report:

- Ordnance Survey Ireland mapping and aerial photography available from OSI online GeoHive mapping resource (Ordnance Survey Ireland, 2018);
- Data on protected species and European sites, available for download and interrogation from the National Parks and Wildlife Service (NPWS) maps and data page (National Parks and Wildlife Service, 2018);
- Spatial information relevant to the planning process including land zoning and planning applications from Department of Housing, Planning, Community and Local Government web map portal (Department of Housing, Planning, Community and Local Government, 2018);
- Data on waterbodies, available for download and interrogation from the Environmental Protection Agency (EPA) web map service (Environmental Protection Agency, 2018);
- Information on soils, geology and hydrogeology in the area available for download and interrogation from the Geological Survey Ireland (GSI) online Spatial Resources service (Geological Survey Ireland, 2018);
- Information on the location, nature and design of the proposed development supplied by the applicant's design team;
- Information on the status of EU protected habitats and species in Ireland (National Parks & Wildlife Service, 2013a & 2013b);
- Information on the conservation status of birds in Ireland (Colhoun & Cummins, 2013);
- Environmental Impact Statement chapter 7 Flora and Fauna. (Robertson & Associates, 2006). An Bord Pleanála, 20017 Planning reference: PL17 .224875 SA 60260; and
- Ecological Impact Assessment of adjacent development at Rathmullan Road. (Scott Cawley, 2007).

5.2.5 Field surveys

Habitats within the subject lands were surveyed on 25th September 2018 by Laura Higgins and Colm Clarke of Scott Cawley. A follow-up habitat survey was carried out on 26th March 2019 to survey lands that may be affected as a result of the road upgrade proposed as part of this project. All habitats were classified using the *Guide to Habitats in Ireland* (Fossitt, 2000), recording dominant species, indicator species and/or species of conservation interest; with the Fossitt category codes given in parentheses. Plant nomenclature follows the *BSBI's List of Accepted Plant Names* (BSBI, 2007). Relevé data was collected for areas of oak-ash-hazel woodland in the northern part of the subject lands. The 20m x 20m relevés were analysed using the Engine for Relevés to Irish Communities Assignment (ERICA) V4.0[3], and assigned to their respective Irish Vegetation Communities. The relevés were also analysed against definitions of the EU Annex I habitat [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alnos-Padion*, *Alnion incanae*, *Salicion albae*), set out within the *Interpretation Manual of European Union Habitats* (European Commission, 2013) and within *The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments* (NPWS, 2013).

[2] In accordance with *National Roads Authority guidelines* (2009) KERs are within the Zone of Influence of the development and are '*both of sufficient value to be material in decision making and likely to be affected significantly*'.
[3] ERICA vegetation classification tool is available online at www.biodiversityireland.ie. Accessed 30th May 2019.

Fauna surveys encompassed a multidisciplinary survey for the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats on the subject lands were assessed for signs of usage by protected/red-listed fauna species, and potential to hold these species.

A bat survey was completed on 29th August 2018 by Aebhin Cawley of Scott Cawley. An emergence survey was carried out at dusk to determine the presence of roosting bats. This was followed by a transect to identify the species present and the areas bats use for foraging within the subject lands.

The assessment criteria outlined in Table 5.1 below are derived from Collins (2016)[4], and are used for the assessment of the subject lands in terms of its suitability for commuting and foraging bats, and where relevant, the suitability of roosting habitats for bats. An inspection of the external areas of structures and trees within the subject lands involved a search for evidence of bats such as:

- Dead specimens;
- Bat droppings;
- Urine splashes;
- Fur-oil staining;
- Squeaking noises;
- Feeding remains (moth wings);
- Bat-fly (*Nycteribiid*) pupal cases; and/or
- Odour.

Suitability	Description of Roosting Habitat	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats	Negligible habitat features on site likely to be used by commuting or foraging bats
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[5] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats in a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub, hedgerows. Linked back gardens, river valleys, streams and woodland edge. Habitat that is connected to the wider landscape that could be used by foraging bats such as trees scrub, grassland or water. Site is close to and connected to a known roost.

[4] Based on our professional experience and understanding, a category of "*moderate suitability*" is not included in the assessment criteria as it is felt that this category overlaps significantly with the categories "*low suitability*" and "*high suitability*".
[5] For example in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

Table 5.1 Assessment criteria for potential suitability of proposed development sites for bats, derived from similar criteria in Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).

5.2.6 Limitations

The initial habitat surveys took place during winter months which is outside of the optimal survey season for habitats and flora. Nonetheless, this did not impose a limitation on the ability to classify habitats to their equivalent in *A Guide to Habitats in Ireland* (Fossitt, 2000).

No dedicated breeding bird surveys were carried out as part of this assessment. The initial survey was carried out in September which is outside of the breeding bird season (February-August). Birds were recorded during the additional site-walkover in the afternoon of the 26th March 2019. This limitation was overcome through interrogation of NBDC (National Biodiversity Data Centre) and NPWS records for bird species in the locality, and the survey of buildings and assessment for potential nesting habitat, which is not seasonally constrained.

5.2.7 Ecological Evaluation and Impact Assessment

The basis of assessment of ecological value and significance of the subject lands for habitats and species follows *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) and is consistent with *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal and Marine* (CIEEM, 2018).

In accordance with *National Roads Authority guidelines* (2009), impact assessment is only undertaken of '*key ecological receptors*' (KERs). KERs are within the zone of influence[6] of the project and are "*both of sufficient value to be material in decision making and likely to be affected significantly"*. To qualify as KERs, features must be of local ecological importance (higher value) or higher. Features falling below this threshold are not assessed.

Impacts are described as being either significant or not significant. Broadly, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution) (CIEEM, 2018).

5.3 Receiving Environment

5.3.1 General Site Overview

The subject lands are a greenfield site, centred on Irish grid reference O 06135 75054, and are comprised of several habitats. The proposed development site itself is dominated by horticultural land and is dissected and bordered by hedgerows, dry meadows and grassy verges and recolonising bare ground habitats. No watercourses were identified within the subject lands, however, the River Boyne is located directly north of the proposed development site and is separated from the lands by the Rathmullan Road. To the west, the subject lands are bounded by the M1 motorway. Agricultural land is present south and south-east of the subject lands and an existing residential development occupies the lands adjacent to the north eastern part of the subject lands.

5.3.2 Designated Sites

Special Areas of Conservation (SAC) are designated under the EC Habitats Directive (92/43/EEC), as amended, which is transposed into Irish law through a variety of legislation including the Birds and Habitats Regulations and the Planning and Development Acts. The legislation enables the protection of certain habitats (listed on Annex I of the Directive) and/or species (listed on Annex II). Special

[6] In accordance with National Roads Authority (2009) guidelines, the zone of influence is an important term to define the receiving environment for the activities associated with the project and the biophysical changes that are likely to occur. The zone of influence is the 'effect area' over which change is likely to occur. This differs for different species and habitats due to varying sensitivities to potential impacts.

Protection Areas (SPAs) are designated under the Birds Directive (2009/147/EC). This allows for the protection of protected bird species listed on Annex I of the Directive, regularly occurring populations of migratory species (such as ducks, geese or waders), and areas of international importance for migratory birds. Collectively SACs and SPAs are referred to as European sites.

The River Boyne and Blackwater SAC (002299), the River Boyne and Blackwater SPA (004080), The Boyne Coast and Estuary SAC (001957), The Boyne Estuary SPA (004080) and Boyne River Islands pNHA (01862) are considered to fall within the project's potential zone of influence in light of:

- The location of the proposed development directly adjacent to the River Boyne; and,
- The proposed development is located within the catchment of the Boyne River, and is upstream from the aforementioned designated sites.

The boundary of the River Boyne and Blackwater SAC (002299), overlaps with the northern boundary of the subject lands, it has been designated for two qualifying interest habitats: [7230] alkaline fens; and, [91E0] alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion alba*), two fish species: [1099] river lamprey *Lampetra fluviatilis*; and, [1106] salmon *Salmo salar*, as well as [1355] otter *Lutra lutra*. The River Boyne and Blackwater SPA (004080) *c*. 100m north-west, has been designated for [A229] kingfisher *Alcedo atthis*. No habitats or species for which either European site has been designated were noted within the subject lands during the survey.

The European sites within the Boyne Estuary are also considered to fall within the project's potential zone of influence considering their location within the Boyne catchment downstream of the proposed development. The Boyne Coast and Estuary SAC (001957) is located *c*. 5.7km from the subject lands and has been designated for a range of coastal and marine habitats. The Boyne Estuary SPA (004080) is located *c*. 4.4km from the subject lands and has been designated for a range of wetland bird species. All other European sites are considered to fall outside of the potential zone of influence of the project in light of the lack of any identifiable source-pathway-receptor between the project and all other European sites. A Natura Impact Statement to allow the competent authority to undertake Appropriate Assessment has been included within Appendix 5.1 of this report.

National Heritage Areas (NHAs) are designations under the Wildlife Acts in order to protect habitats, species or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with Natura 2000 sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning legislation which requires that planning authorities give recognition to their ecological value[7]. Accordingly, Meath County Council includes several policies and objectives for the protection of these NHAs within the Meath Development Plan 2013-2019 (Meath Dev Plan, 2013).

The potential zone of influence of the project in relation to NHAs is considered to be the same as for European sites, *i.e.* it extends to European sites immediately downstream of the proposed development, within the Boyne Estuary. There is one pNHA in this area:

- Boyne River Islands pNHA *c.* 219m to the north. This is a chain of three islands and is designated for its example of Alluvial Woodland (an Annex I habitat). All three islands are covered by dense woodland with a diversity of willow species *Salix sp.* There are few similar examples of Alluvial woodland left in Ireland.

[7] Source: National Parks and Wildlife Service Website. Available online at www.npws.ie/protected-sites/nha (Accessed 12/10/18)

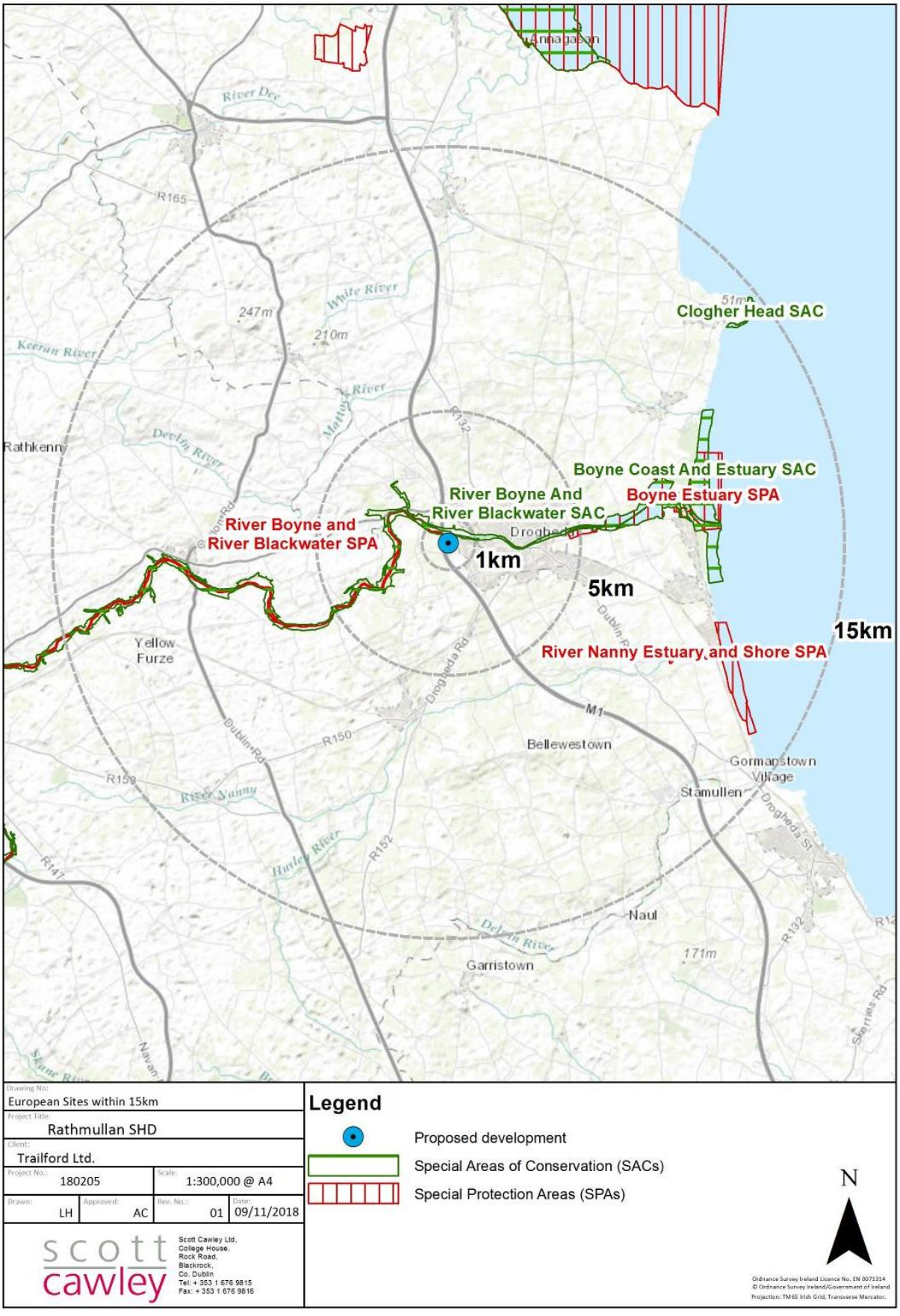


Figure 5.1 European sites within 15km of the proposed development

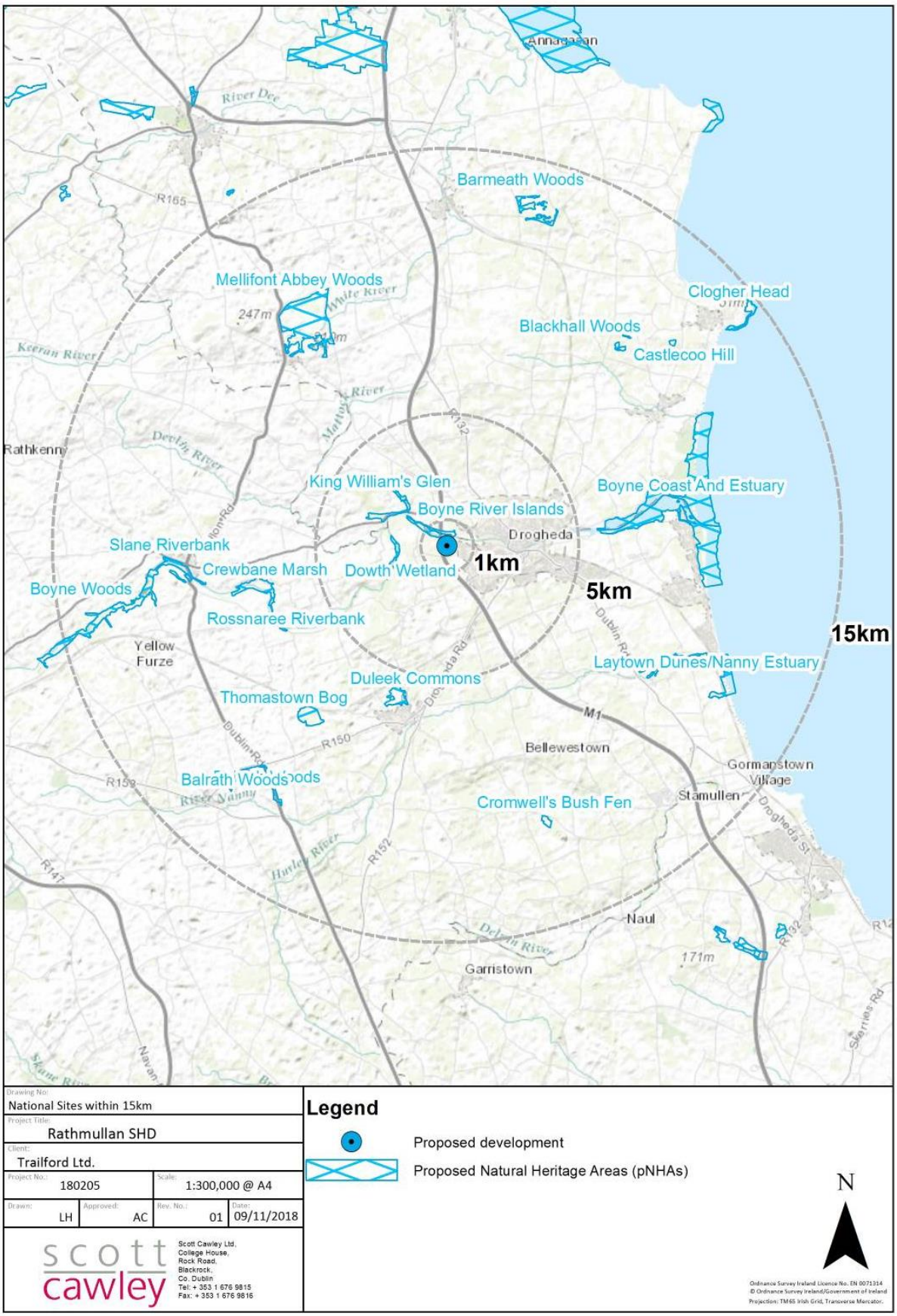


Figure 5.2 Nationally designated sites within 15km of the proposed development

5.3.3 Habitats and Flora

No records of protected or important flora were returned within 2km of the subject lands. Four invasive species subject to restrictions under Section 49 of the Birds and Habitats Regulation were returned from the database search, including Canadian pondweed *Elodea canadensis*, giant hogweed *Heracleum mantegazzianum,* Japanese knotweed *Fallopia japonica,* Himalayan balsam *Impatiens glandulifera.*

No invasive species subject to restrictions under the Birds and Habitats Regulation were identified during field surveys carried out by Scott Cawley in 2004, 2006 or 2018 however sycamore *Acer pseudoplatanus* and butterfly bush *Buddleja davidii* were present within the subject lands. Winter heliotrope *Petasites fragrans* was recorded along Rathmullan Road, adjacent to where road widening works are proposed. There is a stand of Japanese Knotweed located adjacent to the River Boyne on the far side of the road bounding the north of the site,

The following habitat types were identified within the subject lands and surroundings and are mapped in Figure 5.3. Lists of species identified within the following habitats are listed within Appendix 5.2 of this chapter.

- Horticultural land (BC2)
- Dry meadows and grassy verges (GS2)
- Oak-Ash-Hazel Woodland (WN2)
- Hedgerows (WL1)
- Treelines (WL2) and Ornamental and non-native shrub (WS3) mosaic
- Recolonising bare ground (ED3) with patches of Spoil and bare ground (ED2)
- Tall-Herb Swamps (FS2)/ Wet Willow-Alder-Ash Woodland (WN6)

Horticultural land (BC2) comprises much of the subject lands. This habitat appeared to have been sprayed with herbicide during the initial visit in September 2018 and as such, is species poor. It is dominated by broadbean crop *Vicia faba* with some weedy species present including red clover *Trifolium pratense,* spear thistle *Cirsium vulgare*, willowherb species *Epilobium sp.,* lesser burdock *Arctium minus* and wheat *Triticum vulgare*. The horticultural land provides habitat for foraging bird species such as pheasant *Phasianus colchicus* and goldfinch *Carduelis carduelis*.

A mosaic of 'Spoil and bare ground' and 'Recolonising bare ground' (ED2/ED3) is found in 4 areas within the proposed development site. These habitats were dominated by weedy herbaceous species such as herb-Robert *Geranium robertianum*, common nettle *Urtica dioica*, common ragwort *Senecio jacobaea* and common groundsel *Senecio vulgaris*. Also present were grass species including perennial rye-grass *Lolium perenne*, false oat-grass *Arrhenatherum elatius* and cock's foot *Dactylis glomerata* and invading scrub species such as bramble *Rubus fruticosus agg.*, common ivy *Hedera helix* and rose species *Rosa sp.* See Appendix 5.1 for full species lists.

Dry meadows and grassy verges (GS2) were present along the margins of the horticultural land. Dominated by grass species such as common couch *Elytrigia repens* and Yorkshire fog *Holcus lanatu*, herbaceous species such as common nettle *Urtica dioica*, cleavers *Galium aparine*, willowherb species *Epilobium sp.* and meadow buttercup *Ranunculus acris*. Invading scrub and tree species include gorse *Ulex europaeus* and eared willow *Salix aurita*.

Oak-Ash-Hazel Woodland (WN2) was present in the north-eastern section of the subject lands on a steep hill sloping down to the road. This is the most important habitat on the subject lands as it is suitable habitat to support mammal species such as deer, badgers and foxes. This habitat is dominated by ash *Fraxinus excelsior,* hazel *Corylus avellana* and English elm *Ulmus procera*. Other tree species present include pedunculate oak *Quercus robur,* beech *Fagus sylvatica*, sycamore *Acer pseudoplatanus*. The understorey comprises elder *Sambucus nigra*, hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus agg.* The canopy cover was heavy resulting in a diminished ground flora dominated by mosses, ferns and common ivy *Hedera helix.* The ferns present included soft shield-fern *Polystichum setiferum* and Hart's tongue *Asplenium scolopendrium*. Habitat surveys carried out for the previous application in 2007 identified the mosses *Plagiomnium undulatum* and *Thuidium tamariscinum* on the floor of the habitat, *Mnium hornum* and *Neckra complanata* on the bases of the trees and *Bryum argentums* on rocks. Ground flora identified during this survey in 2007

included opposite leaved golden saxifrage *Chrysosplenium oppositifolium*, meadow buttercup *Ranunculus acris*, primrose *Primula vulgaris*, honeysuckle *Lonicera periclymenum* and lords and ladies *Arum maculatum.* Cow parsley *Anthriscus sylvestris* and ground elder *Aegopodium podagraria* were noted within the habitat closer to the road. Based on analysis of relevé data for this habitat using the ERICA vegetation classification tool (analysed relevé data is presented within Appendix 5.2 of this report), this habitat corresponds to the Irish Vegetation Community WL2C *Fraxinus excelsior-Acer pseudoplatanus* woodland, which is a relatively species-poor woodland type. Analysis of the relevé data against definitions of EU annex I habitats determined that the woodland does not correspond to [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*), due to the absence of typical species for the habitat. Although no signs were noted, this habitat has the potential to support protected mammal species such as badger and pine marten.

There are semi-natural hedgerows (WL1) within the proposed development area running north to south of the subject lands and east to west, separating fields (See Figure 8.2). By examining a variety of features, they were evaluated as being of moderate value (Local importance- higher value). These hedgerows are classified as important for several reasons including their dense ground cover, their role as a wildlife corridor connecting the woodland in the north of the lands with other habitats in the surrounding environment, the fact they are composed of mainly native species, and their advanced age[9]. Tree and shrub species present in the hedgerow include hawthorn *Crataegus monogyna*, elder *Sambucus nigra*, ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus* and bramble *Rubus fruticosus agg.* Ground flora present includes common nettle *Urtica dioica*, greater burdock *Arctium lappa*, cock's foot *Dactylis glomerata* and cleavers *Galium aparine*.

A mosaic of 'Treelines' and 'Ornamental and non-native shrub' (WL2/WS3) is present along the western boundary of the proposed development site. The species present are immature and characteristic of motorway planting and include white poplar *Populus alba*, rowan *Sorbus aucuparia*, silver birch *Betula pendula*, bramble *Rubus fruticosus agg.*, grey alder *Alnus incana* and sycamore *Acer pseudoplatanus*.

A mosaic of 'Tall herb swamps' (FS2) and 'Wet willow-alder-ash woodland' (WN6) was identified on the bankside of the river, located adjacent to the north of the subject lands. The species present are typical of riparian banksides and include bulrush *Typha latifolia*, common reed *Phragmites australis*, marsh marigold *Caltha palustris* and yellow iris *Iris pseudacorus.* Adjacent to the road, the species present are more typical of roadside vegetation and include common nettle *Urtica dioica*, Great willowherb *Epilobium hirsutum* and common valerian *Valeriana officinalis.* Where willow species *Salix sp.* are colonising this bank, the woodland is classified as Annex I '91E0- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)'.* Japanese knotweed *Fallopia japonica* was noted adjacent to the roadside, north of the subject lands. No works are scheduled adjacent to the infested area as part of the proposed development.

[9] The hedgerows along the eastern and southern boundaries, and those crossing the lands are illustrated on Ordnance Survey Ireland Historic 6 inch maps (1837-1842), based on a review of OSi GeoHive Maps at map.geohive.ie/mapviewer.html. Accessed 30th April 2019

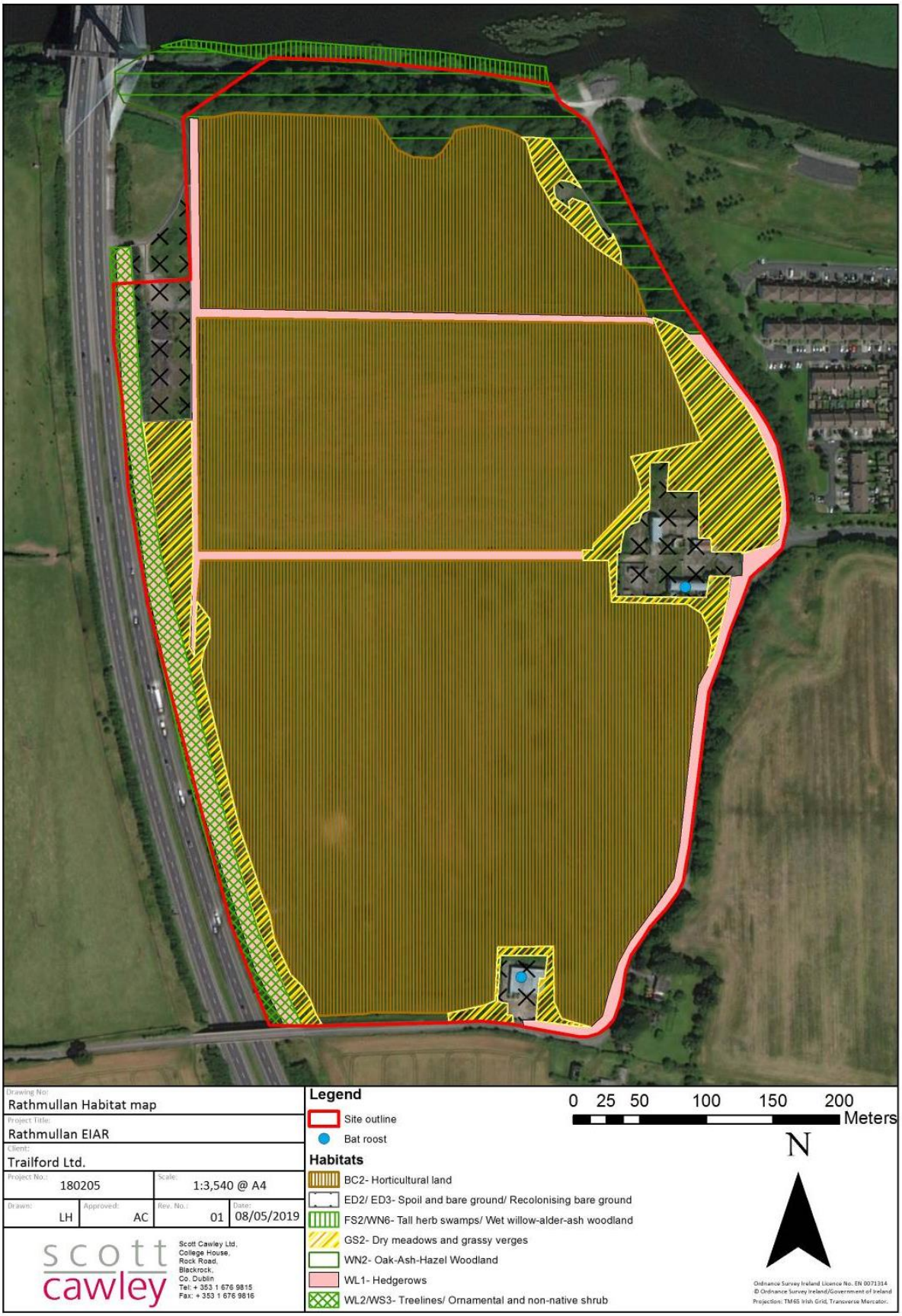


Figure 5.3 Habitats in the vicinity of the subject lands.

5.3.4 Fauna

Based on interrogation of NBDC records, six of Ireland's nine bat species have been recorded within the 2km of the subject lands: Daubenton's bat *Myotis daubentonii*, Leisler's bat *Nyctalus leisleri*, brown long-eared bat *Plecotus auritus*, Natterer's bat *Myotis nattereri*, common pipistrelle bat *Pipistrellus pipistrellus*, and soprano pipistrelle bat *Pipistrellus pygmaeus*. The lands contain suitable foraging habitat for a range of bat species. In Ireland, most bat species are associated with woodland habitats and remnant woodland such as hedgerows (Roche *et al.*, 2014). The mixed broadleaved woodland, treelines and hedgerows within the lands constitute suitable foraging and commuting habitat for bats. A dusk survey confirmed the presence of a small number of roosting common pipistrelles in two of the derelict farm buildings within the subject lands.

Mammal tracks were found in the west of the subject lands. These tracks are likely to be used by a range of species, including fox *Vulpes Vulpes*. No evidence of either badger *Meles meles* or otter *Lutra lutra* was noted within the lands during surveys in September 2018. A female fallow deer *Dama dama* was encountered during the bat survey on the 29th August 2018 in the north-eastern section of the middle field. A second deer was seen in the north-western corner of the site on 26th March 2019. There are NBDC records of badger*,* red squirrel *Sciurus vulgaris*, otter, pine marten *Martes martes*, red deer *Cervus elaphus,* hare *Lepus timidus hibernicus*, stoat *Mustela erminea Hibernica* and hedgehog *Erinaceus europaeus* within 2km of the proposed development. It must be noted that records for red squirrel and stoat are historical and imprecise (recorded at a precision of 10km). Red squirrel are unlikely to occur within woodland at the site due to the presence of the non-native invasive grey squirrel *Sciurus caroliniensis*, which tends to out-compete red squirrel in deciduous woodland (Lawton *et al.,* 2015). The nearby records of all other protected mammal species are separated from the subject lands by the M1 motorway. Although no signs were noted, the woodland within the site has the potential to support mammal species such as pine marten and badger. The invasive species grey squirrel *Sciurus caroliniensis* and American mink *Mustela vison* have also been recorded within the vicinity of the subject lands.

A range of common garden bird species were encountered within the lands in September 2018 and March 2019 and were identified either visually or by their song or call. Species noted included chiffchaff *Phylloscopus collybita,* goldfinch *Carduelis carduelis*, pheasant *Phasianus colchicus*, woodpigeon *Columba palumbus* and buzzard *Buteo buteo.* All the aforementioned species are included within the green list of species in *Birds of Conservation Concern in Ireland* (Colhoun & Cummins, 2013), and are of lowest conservation priority. Amber-listed species recorded on the lands include swallow *Hirundo rustica* robin *Erithacus rubecula*, blackbird *Turdus merula* and greenfinch *Carduelis chloris.*

The habitats within the subject lands are considered to be suitable for nesting and overwintering birds, particularly dry meadows and grassy verges, hedgerows, treelines, and woodland.

5.3.5 Summary of Key Ecological Features

All KERs have been assessed as potentially at risk of being affected by the project, based on the outcomes of the desk study and field surveys and are identified as follows and in Table 5 2.

Designated sites are KERs as the project is within the Boyne Catchment and therefore hydrologically connected to European sites in the Boyne River and Estuary and to the Boyne River Islands pNHA. In light of the nature of the project, which will involve the generation of silts and sediments during construction which could potentially enter the downstream receiving surface water environment, and its location upstream of several designated sites, designated sites have been included as KERs.

All habitats within the subject lands with the exception of the artificial habitats- recolonising bare ground (ED3), spoil and bare ground (ED2) and the horticultural land (BC2), are considered to be KERs in light of their ecological importance and the potential for construction-phase impacts from the project.

Bats are considered to be KERs as the subject lands contain suitable foraging habitat and confirmed pipistrelle roosts. There is therefore a risk for construction and operation-phase impacts on these legally protected species. Other terrestrial mammals were not identified within the subject lands

however, due to the presence of suitable habitat and mammal tracks, they are also considered to be KERs.

Birds are considered to be KERs, due to the presence of suitable breeding bird habitat (e.g. hedgerows, woodland and treelines) across the subject lands. A variety of species were identified during the surveys including a pair of buzzards which may indicate the presence of a breeding territory within the subject lands. There is potential for construction and operation phase impacts.

Habitat / Species	Highest Ecological Valuation Level	Key Ecological Receptor?
Designated Sites		
European sites	International	Yes
pNHAs and Nationally Designated Sites	National	Yes
Habitats & Flora		
Horticultural land (BC2)	Local importance (Lower value)	No
Dry meadows and grassy verges (GS2)	Local importance (Higher value)	Yes
Oak-ash-hazel woodland (WN2)	County importance	Yes
Hedgerows (WL1)	Local importance (Higher value)	Yes
Treelines (WL2) and Ornamental and non-native shrub (WS3) mosaic	Local importance (Higher value)	Yes
Recolonising bare ground (ED3) with patches of Spoil and bare ground (ED2)	Local importance (Lower value)	No
Fauna		
Bats	Local importance (higher value)	Yes
Other terrestrial mammals	Local importance (higher value)	Yes
Birds	Local importance (lower value)	Yes

Table 5.2 Ecological evaluation of ecological resources within the subject lands. Those resources that constitute a key ecological receptor are highlighted in grey

5.4 Characteristics of the Proposed Development

A detailed description of the project is included within Chapter 2.0 of this EIAR. This section describes the potential key sources of ecological impact arising from the project.

5.4.1 Construction Phase

The following stages of construction have the potential to interact with ecological features within and connected to the subject lands:

- The demolition of existing sheds within the subject lands;
- The destruction of hedgerows running east to west across the subject lands and portions of the eastern hedgerow;
- The construction of 661 housing units including detached, semi-detached and terraced houses as well as apartment buildings;
- The stockpiling of spoil within the lands, and the operation of machinery within the lands; and
- The construction of new infrastructure and all ancillary facilities.

5.4.2 Operational Phase

The following elements of the operational phase of the proposed development have the potential to interact with ecological features within and adjacent to the subject lands:

- The installation of artificial lighting in a previously unlit area;
- Increased human presence in a previously uninhabited area;
- Foul/ process water and surface water emissions from the subject lands;
- Airborne emissions from operations; and
- Fire water runoff in the event of a fire onsite.

5.5 Potential impacts of the Proposed Development and Reductive Measures

5.5.1 Designated Sites

Potential Impacts

Potential impacts of the project on European sites are considered in full within the Natura Impact Statement that accompanies this report. Potential impacts have been summarised within this report.

In the absence of mitigation, the possibility of significant effects cannot be ruled out with regards to the European sites within the Boyne river and estuary: River Boyne and Blackwater SAC (002299), River Boyne and Blackwater SPA (004080), Boyne Coast and Estuary SAC (001957), Boyne Estuary SPA (004080) and for Boyne River Islands pNHA (01862). The proposed development is connected to these designated sites as it is directly adjacent to the River Boyne SAC however there are no surface water drains onsite. The Stragrennan stream is culverted through the lands. During the construction phase of the project, there is potential for sediments and pollutants such as oils and other hydrocarbons to be mobilised to the surface water network outside of the lands and discharge to designated sites within the Boyne River and estuary. A potential pollution event would be most likely during or after a storm event involving prolonged heavy rainfall and would be significant at a local level.

There is no possibility of any other significant effects on European sites in light of the distance and large estuarine and marine water buffer separating the project from designated sites. The lands do not contain habitats for which European sites or pNHAs in the zone of influence have been designated, and therefore there is no risk of loss of *ex situ* habitats arising from the project. No qualifying interest or special conservation interest species for which any European sites have been designated are known to occur within the subject lands, and they are not considered to be an *ex situ* site with respect to any European sites.

Mitigation

Specific mitigation measures for the construction and operation phases are outlined in full within the Construction Environmental Management Plan (CEMP), prepared by Waterman Moylan Consulting Engineers. that accompanies this report. In summary, during construction the River Boyne will be protected from surface water run off by a series of cut off trenches which follow existing contours, fitted with check dams and/ or straw bales and a final settlement pond. A suitably qualified person will inspect this system during construction works to ensure it is functioning properly and that excessive silt does not reach the River Boyne. Construction will involve a range of appropriate mitigation measures such as the use of drip trays, bunding and emergency response measures for spills. No permanent works are proposed north of the development plan set back line i.e. within ~140m of the SAC boundary (as illustrated on the architect's site plan). Temporary works during the construction phase are required to capture, attenuate and filter surface water run-off from the construction site. The existing culvert running along the southern site boundary will be replaced by a larger one at the start of construction works to reduce the possibility of flooding on the subject lands.

During operation, SUDS measures are proposed for the treatment of all surface waters arising from the subject lands. These include a series of underground storm tech and hydobrake facilities which will attenuate run-off to greenfield rates and will provide first flush settlement of silts and hydrocarbons and some level of percolation to ground. A hydrocarbon interceptor will be provided at the last stage prior to exiting the development site. Treated and attenuated surface waters will be routed off the proposed development site at the north eastern site boundary into an existing surface water pipe. These waters will flow into an open ditch and ultimately discharge into the River Boyne.

5.5.2 Habitats

Construction Phase Impacts

The project involves the construction of 661 no. residential units and the widening of the Rathmullan Road to the east of the subject lands. The site plan details that hedgerows, treelines and woodland will be retained where possible around the perimeter of the subject lands. Approximately 1,260m of

hedgerow (WL1) and 16,000 sq. m of dry meadows and grassy verges (GS2) grassland will be permanently lost from the subject lands during the construction phase of the project and replaced by buildings and artificial surfaces and various types of planting as outlined in the landscape management plan accompanying this report. Approximately 400m of existing hedgerow will be removed and replaced by new planting at a later date. Without compensation, the loss of these habitats will have a significant impact on wildlife at the local scale by removing wildlife corridors and nesting sites.

In the absence of any mitigation, there is potential for damage to treelines and hedgerows within the subject lands, arising from machinery strikes and/or inappropriate stockpiling of materials within their root protection zones. This impact would be significant at a local geographic scale.

In the absence of mitigation, there is potential for pollutants such as sediments and hydrocarbons to mobilise to the surface water network and affect water quality within the receiving surface water network, namely the River Boyne. While any such impact would be temporary it would be considered significant at a European scale due to the fact that the river is a designated site.

Operational Phase Impacts

The woodland to be retained within the subject lands will be subject to increased human traffic. This may result in negative impacts such as damage to trees, litter and trampling of ground flora.

Mitigation

The following measures will be undertaken to reduce and avoid potential damage to habitats within the lands during construction:

- All hedgerows and immature woodland marked for retention will be fenced off at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree (National Roads Authority, 2005-2011). In general, the RPA covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees);
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it. It will still be necessary to ensure that the area within the RPA is not used for vehicle parking or the storage of materials (including oils and chemicals);
- Soil will not be placed within the Root Protection Area of trees or within 5m of hedgerows;
- The woodland will not be lit during the construction or operational phases of the development; and
- The construction compound will be located a minimum of 50m from watercourses.

Measures to prevent pollution of watercourses is outlined above within Section 5.5.1 and in detail within the Construction Environmental Management Plan.

Compensation[11]

The following measures will be undertaken in order compensate for the loss of habitats during construction:

- Mixed native woodland planting is proposed along the boundaries of the proposed development site, as outlined in the landscape management plan; Tree planting is proposed in green spaces and along the streets throughout the site;

[11] Compensation describes measures taken to offset residual effects resulting in the loss of, or permanent damage to, ecological features despite mitigation (CIEEM, 2018). It is important to note that the reference to compensatory measures in this EIAR are not compensatory measures in the context of the requirements of Article 6(4) of the Habitats Directive, as they are not compensating for an impact that would adversely affect the integrity of any European site. Rather, for the reasons set out in detail in the NIS, it is concluded that the proposed development will not result in such an adverse effect on any European site.

- Upon completion of the construction phase, meadow planting is proposed in several areas, as outlined in the landscape management plan. Following soil testing, a suitable commercial wildflower mix will be chosen. The wildflower mix will be of Irish provenance, to ensure against the introduction of non-native seeds;
- Local native seed mixes will be supplied by "Design by Nature"[12], which is a supplier of local native seed mixes. Specific seed mixes, containing only the desirable plant species indicative of grassland habitat suited to the climate and main soil conditions of the receptor site, can be made up to order to help ensure the successful creation of this habitat type;
- To yield best results, it is recommended that seeds are sown in August or September time (i.e. late summer to early autumn) as it will allow the plants sufficient time to become established during the winter ready for vigorous growth the following spring (National Roads Authority, 2006); and,
- The wildflower mix will be managed in accordance with details provided by Design by Nature. The long-term management of the compensatory habitat will be under a single annual mow regime, to be undertaken in September-October each year.

5.5.3 Fauna

Construction Phase Impacts

In the absence of mitigation, the loss of habitats arising from the construction phase of the proposed development has the potential to affect local fauna.

The permanent loss of dry meadows and grassy verges and hedgerow habitat within the proposed development site will result in loss of suitable foraging, commuting and nesting habitat for mammals and birds. Most Irish bat species are closely associated with woodland and hedgerow habitats (Roche *et al*., 2014). Bats are known to use linear habitats such as hedgerows to commute between roosting sites and foraging sites, and therefore these habitats act as important connecting features for these protected mammals. For this reason, removal of hedgerow habitat has the potential to negatively affect local bat populations through the loss of commuting and foraging habitat. Impacts would be significant at a local geographic scale.

In the case of birds, the loss of grassland and scrub habitat, while it may affect bird species locally, is not considered to be significant in this instance. This is because the subject lands were found to contain a range of common bird species. All species encountered are frequently encountered in urbanised areas of the country, and it is anticipated that they will either adapt to the new habitats within the subject lands or be displaced to similar habitat present in nearby farmland. As a pair of buzzards *Buteo buteo* was identified flying over the lands, it is possible that there may be a buzzard territory located within the woodland to the north of the subject lands.

The construction phase of the project has the potential to result in the disturbance, or in a worst-case scenario, the mortality of bats and birds. In the case of bats, these effects could arise during the demolition of the sheds and removal of trees. In the absence of mitigation, it is likely that demolition works to the sheds on the subject lands will result in the mortality of bats as they have been proven to provide shelter for a small number of roosting common pipistrelle bats. The mortality of a bat or loss of a roost would be significant in light of the legal protection afforded to bats through the Wildlife Acts and the Birds and Habitats Regulations. Nonetheless, the impact would be highly localised and would not affect the conservation status of any species at any level.

With regards to birds, there is potential for mortality or disturbance of nesting birds if cutting or clearance of grassland and hedgerow vegetation were to occur during the nesting season (1st March to 31st August, inclusive). While the effect on local bird populations would be localised, a disturbance/mortality impact would be significant considering the legal protections afforded to birds, their nests, eggs and unfledged young through the Wildlife Acts. Increased noise and human activity during construction could result in the displacement and reduction of breeding success of birds within the subject lands.

[12] Design by Nature website: http://www.wildflowers.ie/

No other mammal species protected by the Wildlife Acts were identified on the subject lands during the survey however, noise and light pollution as well as physical disturbance during the construction phase has the potential to displace any other fauna that may be present in the proposed development site.

Operational Phase Impacts

Operation of the proposed development will result in lighting being installed in an area that was previously largely unlit. In the absence of mitigation, lighting near hedgerow and woodland habitat may negatively impact bat species. Bats are known to be sensitive to lighting of their foraging habitats. Most Irish bat species avoid light sources when foraging (Bat Conservation Ireland, 2010). Light sources may attract insects from the surrounding areas and effectively reduce the available food resource to foraging bats locally.
During operation of the project, it is anticipated that noise, light and human presence, will increase over the existing baseline for the subject lands. This has the potential to result in birds permanently abandoning territories within the subject lands however, they are likely to become tolerant to increased levels of disturbance providing suitable habitat remains.

Mitigation

The following measures will be undertaken to reduce the potential impacts on fauna and to ensure compliance with legislation protecting bats and their roosts and birds, their nests, eggs, and unfledged young: A derogation licence application (a copy of which is included at Appendix 5.3) has been submitted to the NPWS in order to permit removal of bats from the farm buildings onsite and mitigate for the loss of any roosts; The mitigation measures for bats as outlined in the derogation licence application are as follows:

- It is proposed that demolition works of these sheds be undertaken during the shoulder seasons for bat activity between maternity roosting and hibernation roosting. This corresponds to the periods September to early November and March until mid-May. This corresponds to periods when bats are likely to be active, but when potential impacts from disturbance are lowest.
- An emergence/re-entry survey will be undertaken at each shed the night preceding demolition works by a suitably experienced ecologist. The timing of the survey will depend on the suitability of weather for bat activity, i.e. it will only take place if weather conditions are considered to be suitable for bat activity. In general, this corresponds to dusk temperatures above 8°C, with relatively light winds and dry weather.
- Where no bats are recorded emerging from/returning to the buildings, demolition works will proceed unhindered. Where bats are noted returning to or emerging from the buildings, the ecologist will note the location of the roost. Bats will be retrieved by hand from the roost and transferred to a bat box prior to demolition of the buildings. The bat box will be deployed on a tree in woodland to the north of the lands.
- Clearance of tall vegetation (woody or herbaceous) to facilitate construction works will be undertaken outside of the breeding bird season (1st March to 31st August, inclusive), or where this seasonal constraint cannot be adhered to, the area of proposed clearance will be checked for nesting birds by a suitably qualified ecologist. If birds are encountered, clearance works will be suspended in the relevant area until nesting has finished;
- A pre-construction check must be carried out to confirm whether nesting buzzards are present within the woodland. If nesting is confirmed, appropriate mitigation to minimise disturbance will be agreed with the local NPWS ranger and subsequently implemented.

Compensation

The following measures will be undertaken to compensate for potential negative impacts on fauna within the proposed development site:

- A single panel-type bat box, of type Schwegler Bat Tube 1FR[13], Schwegler Bat Access Panel 1FE[14], or Bat Wall System 3FE[15], will be built into two apartment blocks on the northern edge

[13] Bat Tube 1FR (see http://www.schwegler-natur.de/portfolio_1395072079/fledermaus-fassadenroehre-1fr/?lang=en)

of the proposed development. The boxes will be installed on the eastern wall of these buildings at a height above 3m above ground level. The entrance to the boxes will not be artificially illuminated and have been located with respect to proximity to suitable foraging habitat: Retained woodland in the north of the proposed development; and to minimise light spill from apartment units and street lights.; and,

- Compensatory habitat will be created as outlined above in Section 5.5.2.

Enhancement

- Lighting proposals for the development will be reviewed by a qualified bat ecologist

5.6 Predicted Residual Impacts of the Proposed Development

5.6.1 Residual Impacts - Designated sites

Following the implementation of measures to prevent construction-related pollutants entering the receiving surface water network, the risk of pollutants reaching downstream European sites and nationally designated sites will be reduced substantially. Residual impacts on designated sites will therefore be reduced to levels deemed not to be significant.

5.6.2 Residual Impacts - Habitats

Following the implementation of measures to ensure the protection of hedgerows, treelines, and compensatory measures for the replacement of lost habitat, residual impacts on habitats are considered to be reduced, but will remain significant at a local level. This is because there will be a net loss of semi-natural habitat within the lands.

5.6.3 Residual Impacts - Fauna

Following the implementation of measures to prevent the accidental destruction of a bat roost or birds' nests, or the mortality of these protected species, construction phase impacts on fauna have been reduced to levels not deemed significant. Adherence to the measures outlined will ensure compliance with legislation protecting birds and bats.

5.7 Monitoring and Supervision

A suitably qualified and experienced ecologist will be appointed to undertake an Ecological Clerk of Works role during the construction phase of the project. The ecologist will be responsible for the supervision, monitoring and reporting of compliance with mitigation set out within this chapter and will report to the competent authority on these matters.

Item	Schedule	Aims & Objectives	Outputs
Undertakes pre-construction checks for protected species, reviews method statement of contractor to ensure that it incorporates all aspects of CEMP. Provides tool box talks and other training, and ensures understanding by all involved of all mitigation measures. Assesses effectiveness of mitigation, checks weather forecast and site conditions where trigger levels are required, checks for adequacy of infiltration where water is being pumped, undertakes weekly water-quality monitoring.	During Construction Weekly visits during the construction phase of the proposed development	Prevent construction phase impacts	N/A
Tree inspection surveys will be undertaken by a licenced bat worker to assess whether the trees marked for felling have any suitability to support	Prior to Construction One visit to	Prevent disturbance to and mortality	N/A

[14] Bat Access Panel 1FE (see http://www.schwegler-natur.de/portfolio_1395072079/fledermaus-einlaufblende-1fe/?lang=en)
[15] Bat Wall System 3FE (see http://www.schwegler-natur.de/portfolio_1395072079/fledermaus-wandsystem-3fe/?lang=en)

roosting bats. If the trees are confirmed to have potential roosting features, these trees must be inspected at height for roosting bats the day prior to felling works. Once surveyor is satisfied that bats are not present within potential roosting features, the tree will be felled. If bats are encountered during any works at the site the relevant works will be suspended until the advice of a suitably qualified and licenced bat ecologist is sought. A derogation licence may need to be sought from NPWS in order to permit removal of bats and mitigate for the loss of any roosts on the site.	assess suitability for roosting bats. If trees are found to be suitable for bats, follow up surveys are required	of bats	
All tall woody and herbaceous vegetation in worked areas should be removed outside of the breeding bird season (1st March to 31st August, inclusive) to avoid the destruction of nests or disturbance of breeding birds If this is not possible, trees will be inspected by a qualified ecologist immediately prior to removal. If it is found that breeding birds are present, felling works must be suspended immediately and cannot recommence until chicks have fledged and the nest has been abandoned.	Prior to Felling	Prevent disturbance to and mortality of birds	N/A
All hedgerows and woodland marked for retention will be fenced off at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree (National Roads Authority, 2005-2011). In general, the RPA covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees); Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it. It will still be necessary to ensure that the area within the RPA is not used for vehicle parking or the storage of materials (including oils and chemicals) Soil will not be placed within the Root Protection Area of trees or within 5m of hedgerows; The woodland will not be lit during the construction or operational phases of the development; and, The construction compound will be located a minimum of 50m from watercourses.	Prior to and during Construction	Protection of hedgerows and trees marked for retention	N/A
Bat boxes	Post-Construction: 1, 3, 5 years after completion	Checks of the bat boxes to assess success of the mitigation	Production of a short report outlining the success of the bat boxes
Landscape plan Success of their mitigation measures i.e. wildflower meadow, woodland planting etc	Post-Construction: 1, 3, 5 years	Record diversity along fixed transects	Production of a short report

	after completion	using standard methodology. Record success of tree establishment.	outlining the success of the planting.

Table 5.3 Ecological Clerk of Works schedule of supervision and monitoring works

5.8 References

Bat Conservation Ireland (2010). *Guidance Notes for: Planners, engineers, architects and developers*. Bat Conservation Ireland, Virginia, Cavan.

Botanical Society of Britain and Ireland (2007). *BSBI's List of Accepted Plant Names.* Revised in 2007. Available online from the BSBI website www.bsbi.org/resources (Downloaded 18/12/2017).

Chartered Institute of Ecology and Environmental Management (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland*. Council of the Institute of Ecology and Environmental Management, Hampshire, UK.

Colhoun, K., and Cummins, S. (2013). *Birds of Conservation Concern in Ireland 2014-2019*. Irish Birds 9:523-544.

Collins, J. (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition).* The Bat Conservation Trust, London.

Department of Housing, Planning, Community and Local Government (2018). *Myplan.ie national planning database*. Available online at www.myplan.ie Accessed 1st March 2018. Department of Housing, Planning, Community and Local Government

Environmental Protection Agency (2018). *EPA mapviewer resource*. Available online at www.epa.ie Accessed October 2018. Environmental Protection Agency, Ireland.

European Commission (2013). *The Interpretation Manual of European Union Habitats*. April 2013.

Fossit, J. (2000). *A Guide to Habitats in Ireland.* The Heritage Council, Dublin, Ireland.

Lawton, C., Flaherty, M., Goldstein, E.A, Sheehy, E. and Carey, M. (2015). *Irish Squirrel Survey 2012.* Irish Wildlife Manuals, No. 89. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

Meath Dev Plan (2013). *Meath County Development Plan 2013-2019*.

Geological Survey Ireland (2018). *GSI Mapviewer resource*. Available online at www.gsi.ie Accessed October 2018. Geological Survey Ireland

National Parks and Wildlife Service (2018). NPWS Mapviewer mapping resource. Available online at www.npws.ie Accessed October 2018.

National Roads Authority (2006). A Guide to Landscape Treatments for National Road Schemes in Ireland. National Roads Authority, Dublin, Ireland.

National Roads Authority (2009*).* *Guidelines for Assessment of Ecological Impacts of National Roads Schemes.* National Roads Authority, Dublin, Ireland.

Ordnance Survey Ireland (2018). *Geohive mapping resource*. Available online at www.geohive.ie Accessed October 2018.

National Parks and Wildlife Service (2013a). *The Status of EU Protected Habitats and Species in Ireland*. Species Assessments Volume 2, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

National Parks and Wildlife Service (2013b). *The Status of EU Protected Habitats and Species in Ireland*. Species Assessments Volume 3, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Roche, N., Aughney, T., Marnell, F., and Lundy, M. (2014*).* *Irish Bats in the 21st Century.* Bat Conservation Ireland, Ulex House, Drumsheel, Lisduff, Virginia, Co. Cavan.

CHAPTER 6.0 SOILS, GEOLOGY AND HYDROGEOLOGY

6.1 Introduction

This section of the Environmental Impact Assessment Report describes the natural characteristics of the proposed residential development at Rathmullan, Drogheda, Co. Meath, in terms of bedrock geology, drift geology, and hydrology.

The impact of the proposed development on the soils, geology and groundwater of the subject site is assessed, and mitigation measures where necessary are proposed to reduce the impact of any development.

This chapter was prepared by Joe Gibbons. Joe is a Director with Waterman Moylan Consulting Engineers for the past 15 years and has over 33 years' experience in the design and delivery of large-scale building projects. Joe spent 8 years working for Waterman Group in London before joining Waterman Moylan in Dublin in 1994. Joe is a Chartered Engineer and has acted in lead roles in civil/structural teams on a wide range of infrastructure and building projects throughout Ireland and the UK. Joe has extensive experience in the preparation of Civil Engineering designs for large scale residential and commercial developments in Ireland. Joe has also prepared and overseen the preparation of the technical engineering sections for numerous Environmental Impact Assessments for large scale residential and commercial developments and has given evidence at Oral Hearings in support of same.

6.2 Assessment Methodology

In determining the impact of the proposed development on the prevailing geological and groundwater conditions, key sources of information were consulted, including the Map of the Bedrock Geology of Ireland, produced by the Geological Survey of Ireland and the National Bedrock Aquifer Map, produced by the Geological Survey of Ireland, both available on www.gsi.ie. Guidance on relevant assessment methods is obtained from "Geology in Environmental Impact Statements – a guide", September 2002, published by the Institute of Geologists of Ireland.

An extensive site investigation was carried out within the proposed development site. Trial pits and bore holes were excavated and logged. Soil samples were taken and laboratory testing carried out. The results of the site investigation have been compiled in a report prepared by IGSL (Report Job Number: 21345).

Laboratory testing was undertaken on selected soil samples collected during the investigation. Testing focused on mechanical properties primarily, with some samples also tested for pH, chlorides and sulphates. The pH testing carried out indicate relatively neutral levels with values ranging from 7.9 to 8.4. Sulphate (acid soluble) tests returned values ranging from <0.010 % to 0.048 which are considered to be negligible. These results indicate a low risk of contamination having occurred on the site.

6.2.1 Assumptions and Technical Limitations

No assumptions were made during the assessment. The description of existing conditions was based on desk study information and a ground investigation undertaken by IGSL in November 2018 (Report Job Number: 21345). The associated report can be found at Appendix 6.1.

6.2.2 Desk Study

The existing conditions within the site and study area have been interpreted from desk study information comprising publicly available information, historic site investigation data and commissioned ground investigations. The desk study review included the following sources of information:

- Geological Survey of Ireland (GSI) maps and databases;
- National Parks and Wildlife Services online maps;

- Ordinance Survey of Ireland (OSI) existing and historical maps.

6.2.3 Ground Investigation

Waterman Moylan commissioned Ground Investigation Ireland in November 2018 to carry out a Site Investigation to establish the ground conditions and the depth of bedrock through observation and lab testing.

6.3 Baseline Environment

The proposed development consists of 661 no. residential units, a crèche, a café and a retail unit. The site is located on Rathmullan Road in Drogheda, Co. Meath. The site is situated approximately 2.5 km west of Drogheda town centre.

The subject site is bounded to the north by the River Boyne, to the east by existing residential and agricultural areas, to the south by agricultural lands, and to the west by the M1 Dublin to Belfast Motorway.

The site area is c 26.2 hectares and is currently used for agricultural purposes. The lands generally slope from south-west to north-east towards the River Boyne with existing ground levels of between 38.0 m and 3.5 m OD Malin. The site is currently accessed via an existing entrance off Rathmullan Road.

6.3.1 Drift Geology

A ground investigation contractor, IGSL, carried out an investigation at the proposed development to establish the prevailing ground conditions in terms of material properties. A number of trial pits were excavated using a mechanical digger as well as several boreholes using a shell and auger drill with rotary core follow on to establish the profile of the rock-head and provide information on the rock quality.

The exploratory holes showed the proposed development to be underlain predominately from firm brown sandy gravelly CLAY. The gravelly CLAY stratum increases in strength to stiff below circa 1.20 metres with holes continuing to between 5.80 and 8.50 metres. Angular and sub-angular cobbles and boulders were noted at varying depths on the site.

The ground conditions encountered reflect a typical description of the boulder clays deposited during the last glacier movement in the region and are common along the mid-eastern area of Ireland. Locally, peats reflect decay of organic materials over a significant period of time, while some fluvial glacial materials may also be encountered as a result of the water flowing from melting glaciers.

6.3.2 Bedrock Geology

The Bedrock Geology Map of Ireland produced by the Geological Survey of Ireland (GSI), describes the prevalent geology of the area. The proposed development spans an area predominately underlain by one geological formation – the Platin Formation being Crinoidal peloidal grainstone-packstone. An extract from the GSI map showing the area of the proposed development is shown in Figure 6.1 overleaf.

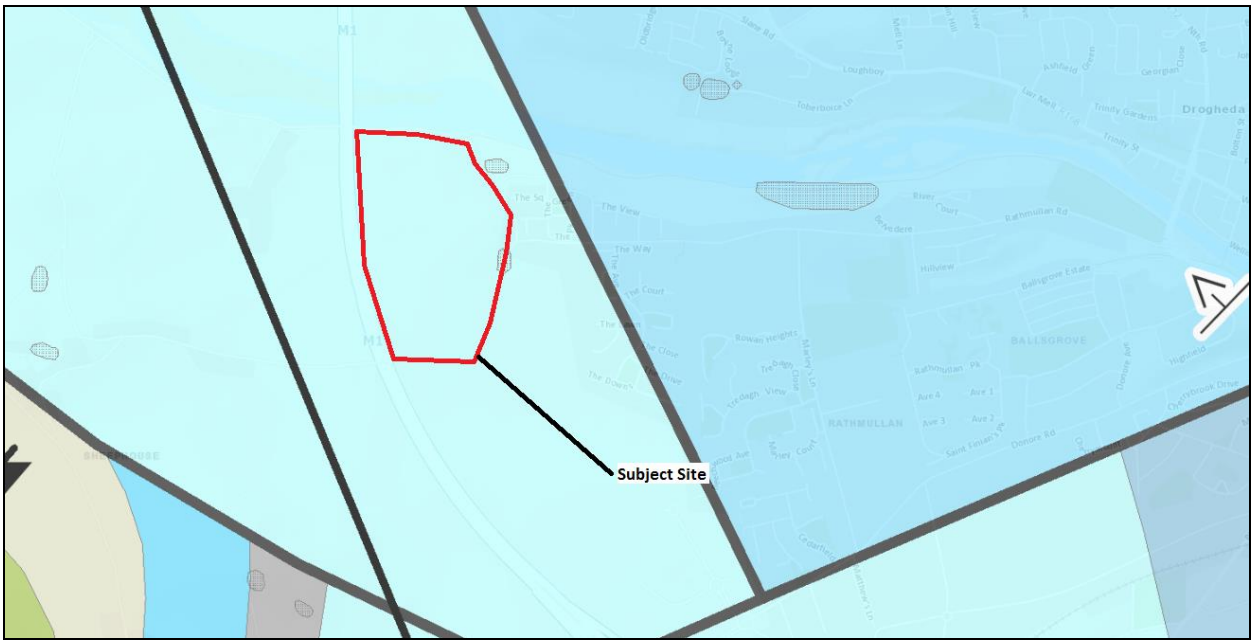


Figure 6.1 Extract from GSI Bedrock map

The ground investigation showed that in each of the exploratory holes, the bedrock was not encountered prior to the termination of the boreholes between 5.80 and 8.50 m. The final termination depths may be indicative of boulders in the glacial clay or possibly the local bedrock horizon. To confirm, the depth of bedrock proof core drilling would be required.

6.3.3 Hydrology and Hydrogeology

Hydrology is considered to be the study of the properties, distribution and effects of water on the Earth's surface, in the soil and underlying rocks, and in the atmosphere while hydrogeology is defined as the science of the occurrence, distribution, and movement of water below the surface of the earth with emphasis on geologic aspects.

The proposed development is located approximately 9.6 km west of the Irish Sea, with the River Boyne located adjacent the northern boundary of the site. It is proposed that surface water drainage from the proposed development will discharge to the existing 1200 mm culvert adjacent Rathmullan Road at the north-east of the site before. This culvert flows into a ditch which then outfalls to the River Boyne.

The bedrock aquifer beneath the site (Figure 6.2) is classified as 'Rkd: Regionally Important Aquifer – Karstified (diffuse)'. 'Karstification' is the process whereby limestone is slowly dissolved away by percolating water. It usually occurs in the upper bedrock layers and along certain factures, fissures and joints. This results in an uneven distribution of permeability through the bedrock. The landscape is generally characterised by underground drainage, with most flow occurring through the more permeable, solutionally enlarged, interconnected fissure/conduit zones. Groundwater velocities through fissures/conduits may be high and aquifer storage is often low. Groundwater often discharges as large springs (>2,000 m^3/d), with a high variance in dependability. There is strong interconnection between surface water and groundwater.

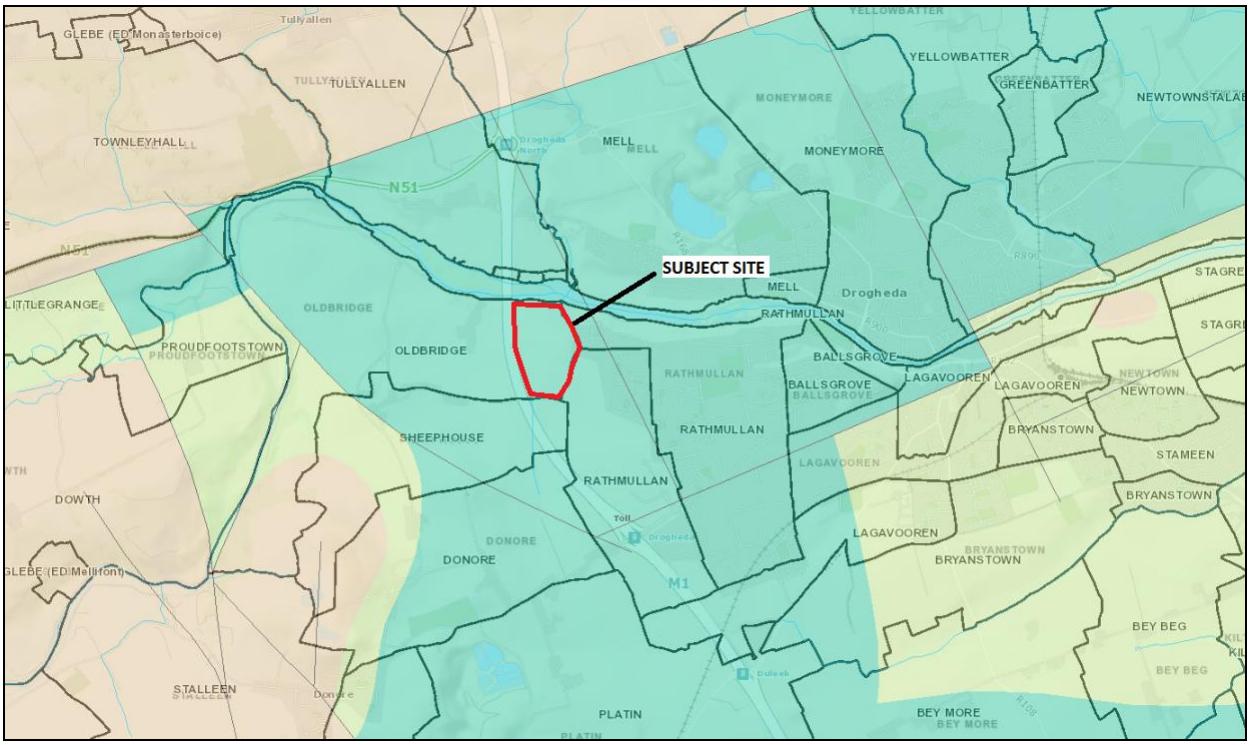


Figure 6.2 Extract from GSI Bedrock map

No ground water was encountered during the course of the exploratory trial holes during the site investigation.

In general, the proposed development will not be constructed with extensive areas of cut, and therefore would not be expected to encroach significantly below ground into water bearing strata.

6.4 Characteristics of the Proposed Development

The proposed development of the site will incorporate the following works which will be likely to have an impact on the soils, geology and hydrogeology:

- Stripping of topsoil.
- Cutting and filling of subsoil and rock to form finished floor levels and development roads
- Excavations for utilities and services.
- Importation of suitable material.
- Reinstatement of excavations and topsoil and removal off-site of unsuitable and surplus material.

Topsoil will be removed from areas of the site where construction works are to take place. This topsoil will be stored on site for reuse in landscaped areas, road verges and in open spaces.

It is intended that any surplus of materials generated on the site will be minimized. In this regard, all suitable excavated material will be reused in the construction of the development through cut/fill and in landscaping. A further detailed analysis of the proposed cut/fill will be undertaken at detailed design stage, including a 3 dimensional model of the proposed development to enable accurate calculations of cut and fill, thus ensuring that the material quantities are balanced to the best degree possible, thus minimizing cut and fill operations and associated impacts from disposal and import operations.

6.4.1 Potential Impact of the Proposal – Construction Phase

Prior to commencement of any construction works, the topsoil on the site will be stripped and removed to stockpiles in designated areas within the site boundary for re-spreading on completion of the works.

The removal of topsoil and the earthworks will expose subsoil to weathering and may result in some minor erosion of the soils during the short construction period, in particular following extreme dry and sunny or prolonged wet weather conditions. The lack of topsoil is likely to give rise to dust from the subsurface during dry periods.

Construction traffic movements involved in the construction of the proposed development and access roads may result in local compaction of the subsoil along haulage routes, but this will be a very limited area.

During the construction phase there is a risk for construction traffic to damage the structure of some of the adjoining road network and to increase the amount of mud and dust on the roads providing access to the site. A dilapidation survey should be undertaken to mitigate the risk of damage exposure to the client. There will also be a temporary increase in traffic volumes due to deliveries of fill materials and removal of surplus unsuitable cut materials.

During adverse weather conditions surface water runoff across the exposed sub-soil could result in increased levels of silt being deposited in the local ditches and/or the River Boyne.

Some minor local contamination of subsoils and groundwater may occur should chemicals or fuels used during the construction phase spill.

6.4.2 Potential Impact of the Proposal – Operational Phase

Some minor alteration of groundwater levels and drainage paths may occur beneath the final site level upon completion of construction.

On completion of the construction phase and following replacement of topsoil and a planting programme, no further impacts on the soil environment are envisaged except for the possibility of contamination of soil from foul water effluent or oil/chemical spills.

6.4.3 Ameliorative, Remedial or Reductive Measures - Construction Phase

In order to preserve the topsoil on the site, topsoil will be removed to stockpiles and protected during the construction period for reuse on completion of the works. Topsoil will be stored in mounds and suitably protected to prevent water logging during wet weather. The stripping of topsoil will be undertaken on a phased basis so that no area is stripped until such time as works are imminent in that area.

Levels of the proposed roads will be established to minimise the quantity of fill material to be imported to the site. Surplus subsoil will be used for landscaping where possible.

The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soils deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.

Cut off trenches along the northern boundary of the development boundary will be constructed prior to stripping topsoil. These cut off trenches will have a settlement pond / silt trap at the end of each trench with an overflow. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall of the settlement ponds to the overflow. These measures will be implemented and maintained during the construction phase to prevent silt runoff into the existing ditches / watercourses during the drainage works.

Dampening down measures with water sprays will be implemented during periods of dry weather to reduce dust levels arising from the development works.

After implementation of the above measures the proposed development will not give rise to any significant long term adverse impact. Negative impacts during the construction phase will be short term only in duration.

6.4.4 Ameliorative, Remedial or Reductive Measures - Operational Phase

On completion of the construction works, it is proposed to re-soil and re-plant any fill embankments and cut slopes. Within the development, landscape areas will be topsoiled and planted in accordance with the proposed landscaping plan. Following completion of these reinstatement works, no significant adverse impacts on the soils and geology of the subject lands are envisaged.

A comprehensive drainage network will be constructed to ensure that the lands drain effectively following their reshaping / re-profiling. The drainage system shall incorporate sustainable urban drainage methods to clean flows prior to discharge.

6.4.5 Predicted Impact of the Proposal - Construction Phase

Due to the implementation of the remedial or reductive measures outlined above, the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will be short term only in duration.

6.4.6 Predicted Impact of the Proposal - Operational Phase

No significant long term impacts on soil, geology or hydrogeology, resulting from the proposed development are predicted.

6.4.7 Worst Case Scenario

The worst case scenario for the site is of effluent and pollutants from the site discharging into the ground, contaminating the top soil and geological substrate. The likelihood of this scenario is very low, however, as surface water run-off will conveyed through permeable pavement, swales, attenuation systems with flow restriction, and a petrol interceptor to ensure that all run off and suspended solids grits and hydrocarbons are removed.

6.4.8 Monitoring and Reinstatement

Monitoring during the construction phase will be undertaken particularly in relation to the following: -

- Adequate protection of the topsoil stockpiled for reuse;
- Monitoring of surface water discharged to existing ditches / watercourses;
- Monitoring cleanliness of the adjoining road network;
- Monitoring measures for prevention of oil and petrol spillages; and
- Dampening down measures close to the boundaries of the site in dry weather.

Reinstatement measures in relation to soils consist primarily of the re-soiling of open areas, gardens and the replanting of these areas. No post development reinstatement works will be required

6.5 References

Geological Survey of Ireland 1:100,000 scale bedrock maps

Geological Survey of Ireland national bedrock aquifer map

Geological Survey of Ireland national aquifer vulnerability map

Geological survey of Ireland groundwater public viewer;
Google maps, 2018

Ground Investigation – Site Investigation for a Housing Development at Rathmullan, West Drogheda (Report Number: 21345)

Ordnance Survey of Ireland historical maps, 1837-1842 & 1888-1913. www.osi.ie

CHAPTER 7.0 WATER

7.1 Introduction

This section describes the impact of the proposed development on the surface water drainage, foul water drainage and water supply and other utilities through the scheme lands.

The area is currently drained by a series of drainage ditches that discharge into the River Boyne to the north.

The proposed development will generate additional surface water runoff from development of the future roads and buildings. Surface water runoff from the roads, parking and service yards will generally contain an element of hydrocarbons and worn tyre rubber as well as other detritus material.

The key governing factor in designing a suitable surface water drainage network is the requirement to limit the rate of discharge to the equivalent Greenfield runoff rate and to improve the quality of the runoff. In this particular case, the development drainage will discharge into a ditch / culvert that flows into the River Boyne. In order to limit the discharge rate from the development, a sustainable urban drainage system will be design, which will include attenuation areas, where the flow of the water will be restricted to that of Greenfield runoff.

A new foul water pumping station will be provided on the subject site to serve the proposed development. The 'Riverbank' housing estate, adjacent to the subject site, is currently served by an existing pumping station. Furthermore, a new residential development has been granted planning under Reg. Ref. LB170675 which requires the construction of a foul water pumping station to serve that development. It is proposed that the new pumping station on the subject site will be a strategic pumping station which will take the waste water from 'Riverbank' housing estate and from this proposed new residential development. This will eliminate the need for separate individual pumping stations. Foul water will be pumped from the new pumping station via a 110 mm rising main and connect to the existing 110 mm diameter rising main on Rathmullan Road to the east of the subject site. Ultimately this foul water discharges to into the existing gravity sewer network on Marley's Lane c 900 m east of the subject site. Foul drainage eventually outfalls to the Drogheda Wastewater Treatment Plant. The existing sewer network has capacity to cater for the development of the subject lands.

Water will be supplied via a connection to the existing water main on the Rathmullan Road to the east of the subject site.

This chapter was prepared by Joe Gibbons. Joe Gibbons is a Director with Waterman Moylan Consulting Engineers for the past 15 years and has over 33 years' experience in the design and delivery of large scale building projects. Joe spent 8 years working for Waterman Group in London before joining Waterman Moylan in Dublin in 1994. Joe is a Chartered Engineer and has acted in lead roles in civil/structural teams on a wide range of infrastructure and building projects throughout Ireland and the UK. Joe has extensive experience in the preparation of Civil Engineering designs for large scale residential and commercial developments in Ireland. Joe has also prepared and overseen the preparation of the technical engineering sections for numerous Environmental Impact Assessments for large scale residential and commercial developments and has given evidence at Oral Hearings in support of same.

7.2 Receiving Environment

The development lands are located within the catchments of the River Boyne. Surface water from the proposed development currently drains into an existing ditch that outfalls to the River Boyne to the north of the site. Sections of this ditch along Rathmullan Road to the east of the subject lands have been culverted through a 1200 mm diameter pipe.

7.2.1 Characteristics of the Proposal

It is proposed to discharge surface water from the proposed development to the existing 1200 mm culvert located adjacent Rathmullan Road on the north-eastern boundary of the site. All surface runoff will be restricted to the equivalent of the existing green field runoff, i.e. the runoff that would occur if the proposed development scheme was not constructed.

The surface water network for the subject site has been divided into four separate catchments, referred to in this report and associated drawings as Catchment A, Catchment B, Catchment C and Catchment D. These catchments operate in series with runoff from each flowing into the downstream catchment area at a restricted rate. It is also noted that there is a large open space area at the north of the development which is not drained into the new surface water network and is therefore, not included in the surface water calculations. Details of the surface water catchments are shown in Table 7.1.

	Total Area (ha)	**Impermeable Area (ha)**	**% Hardstanding**
Catchment A	8.12	3.432	42.3
Catchment B	4.02	1.916	47.7
Catchment C	8.14	3.723	45.7
Catchment D	2.92	1.317	45.1
Open Space	3.01	0	-
Total	**26.21**	**10.39**	**39.6**

Table 7.1 Surface Water Catchment Details

The permissible outflow from each catchment is calculated in accordance with the Greater Dublin Strategic Study. The QBAR equation which gives a figure for existing Greenfield surface water runoff was used in this calculation and the following parameters were used in estimating the Greenfield runoff:

- QBAR * = $0.00108 \times Area^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$
- Where:
  - **Area:** Site area in km^2 (Or 50 hectares if site is less than 50 Hectares)
  - **SAAR:** Taken from "Extreme Rainfall in Ireland" maps (762mm)
  - **SOIL**: Runoff constant (Varies between 0.1 and 0.53: Given as 0.37 for a Type 3 soil)
- $Qbar_{rural} = 0.00108(0.5)^{0.89} \times (762)^{1.17} \times (0.37)^{2.17}$
- $Qbar_{rural} = 158.6$ l/s (For a 50 hectare site)
- $Qbar_{rural} = 3.17$ l/s/Ha

The formula should not be applied to areas less than 50 hectares. For developments with areas smaller than this size QBAR is calculated by the interpolation from QBAR 50 hectares. The Qbar for each surface water catchment is shown in Table 7.2.

	Catchment A	Catchment B	Catchment C	Catchment D	**Total**
Catchment Area - Ha	8.12	4.02	8.14	2.92	**23.2**
$Qbar_{rural}$ – l/s	25.74	12.74	25.80	9.26	**73.54**

Table 7.2 Surface Water Outflow

The storage systems to allow attenuation of the rainfall and subsequent runoff are designed for a return rainfall period of 100 years. This calculation includes for infiltration based on rates obtained within the site investigation, and an additional 20% for anticipated climate change.

Surface water runoff from each of the four catchments shall be restricted to the Qbar runoff rate via a hydrobrake installed at the outfall manhole of each catchment with excess storm water attenuated in separate underground Stormtech, or similar approved, storage systems located beneath the open space areas.

The required and provided storage volume for each catchment area is shown in Table 7.2.

	Required Attenuation Storage (m^3)	Provided Attenuation Storage (m^3)
Catchment A	1,480	1,482
Catchment B	830	861
Catchment C	1,584	1,621
Catchment D	557	557
Total	**4,451**	**4,521**

Table 7.2 Surface Water Attenuation

There is a potential to reduce the attenuation requirements by implementation of SUD's with methods such as permeable pavements and filter drainage systems.

While storage for attenuation can take a number of forms, to suit different situations and locations, storage of surface water runoff from the proposed development and site roads will generally be provided by means of a number of online underground attenuation systems located below the open space areas of the site. Flow control devices will be provided in accordance with the requirements of Meath County Council.

If the runoff exceeds the allowable discharge rate, the surface water runoff shall back up into the underground attenuation system provided. Once the storm flow has passed the attenuation system shall drain via gravity through the proposed flow control device. The attenuation system also allows the excess runoff to permeate into the ground.

As part of the proposed development construction, surface water drainage pipes, manholes and chambers will be placed along the internal access roads where appropriate.

7.2.2 Potential Impact of the Proposal - Construction Phase

The following potential impacts from the construction of the proposed development may occur:

- There is a risk that once topsoil has been stripped from the site there will be higher runoff rates from the lands with increased amount of silt to existing watercourses in the runoff.
- There is a risk of pollution of groundwater / watercourses / soils by accidental spillage of oils / diesel from temporary storage areas or where maintaining construction equipment.
- There is a risk of damage to existing buried utilities during excavations works resulting in temporary loss of supply to existing properties
- There is a possibility of a temporary Increase in traffic due to deliveries of materials and other construction related traffic.
- There will be some minor disruption to traffic when constructing the outfall pipe across Rathmullan / River Road.
- Cross connection between surface water and foul pipes.

7.2.3 Potential Impact of the Proposal - Operational Phase

The following potential impacts from the construction of the proposed development may occur:

- There is a potential impact from increased surface water flows that could lead to downstream flooding.
- There is a potential impact for the discharge of contaminants from the proposed development and road surfaces to the surrounding drainage ditches, which ultimately drain to the River Boyne.

These would include particulates, oil, soluble extracts from the bitumen binder etc. The quality of runoff from the site would be dependent on the time of year, weather, particulate deposition from the atmosphere and any gritting or salting carried out by the Local Authority. The time of year has a major bearing on the quality of storm water run-off - in particular the first rains after a prolonged dry period where accumulated deposits of rubber, particulates, oils, etc. are, washed away.

- Stagnation of the water and siltation within the attenuation areas may occur.

7.2.4 Potential Impact of the Proposal - 'Do Nothing' Scenario

Surface water runoff would continue to be discharged to the receiving ditches / culvert at existing discharge rates.

7.2.5 Ameliorative, Remedial or Reductive Measures - Construction Phase

- The contractor will appoint a suitably qualified person to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
- Cut off trenches along the northern boundary of the development boundary will be constructed prior to stripping topsoil (illustrated in Appendix 7.1). These cut off trenches will have a settlement pond / silt trap at the end of each trench with an overflow. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall of the settlement ponds to the overflow. These measures will be implemented and maintained during the construction phase to prevent surface water runoff from discharging directly into the local water course. An indicative layout for the proposed cut off trenches is set out in Appendix 7.1 of this EIAR.
- Settlement ponds / silt traps as outlined above will be provided to prevent silt runoff into the existing ditches / watercourses during the drainage works
- Regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The project ecologist will review and agree alternative pollution control measures, such as deepening or redirecting trenches as appropriate, before works may recommence.
- All fuels and chemicals will be bunded, and where applicable, stored within double skinned tanks / containers with the capacity to hold 110% of the volume of chemicals and fuels contents. Bunds will be located on flat ground a minimum distance of 50 m from any watercourse or other water conducting features, including the cut off trenches.
- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- Temporary traffic management will be implemented as appropriate during the construction of the outfalls on Rathmullan / River Road.

7.2.6 Ameliorative, Remedial or Reductive Measures - Operational Phase

- Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the ditch / culvert.
- Attenuation systems will be constructed on-line to intercept the first flush during rainfall events after periods of dry weather. Furthermore, the proposed Stormtech attenuation system contains an 'Isolator Row' which provides treatment even in low flow conditions. This row is surrounded with filter fabric that provides for settling and filtration of sediments as the water passes through. This ensures that the majority of the solids are removed within the isolator row which prevents silt build-up in the remainder of the chambers, therefore minimising maintenance requirements and

associated costs. The Stormtech systems have a stone base and permeable chambers which encourages water to permeate into the ground.

- Sustainable urban drainage measures such as filter drains, permeable paving, rain water harvesting, swales etc. will be provided.
- A petrol interceptor will be installed to prevent hydro carbons entering the local ditch / culvert.
- The attenuation storage systems will be constructed at a fall to maintain movement of water and thus prevent stagnation. Silt would be collected at a sump and removed periodically.
- Regular maintenance of the drainage network, including petrol interceptor.

7.2.7 Predicted Impact of the Proposal - Construction Phase

Due to the proposed ameliorative remedial and reductive measures outlined above many of the potential impacts will not arise during the construction phase of the proposed development on surface water quality.

There will be increases in traffic flows at the local road network due to deliveries of materials and some minor disruption to traffic during the construction of the outfalls on Rathmullan Road / River Road.

7.2.8 Predicted Impact of the Proposal - Operational Phase

Due to the proposed ameliorative remedial and reductive measures outlined above many of the potential impacts will not arise during the operation phase of the proposed development on surface water quality. Surface water discharge from the site will be restricted by means of attenuation, therefore, no adverse impact in respect of flooding downstream will arise from the proposed development.

The attenuation system will be position on-line to provide treatment to the 'first flush' and will be constructed with permeable chambers to encourage infiltration. The installation of a petrol interceptor upstream of the outfall will ensure that any remaining hydro-carbons or pollutants within the runoff from trafficked areas are treated.

The installation of trapped gullies in accordance with BS 5911 will minimise the risk of contamination of the surface water system by floating debris.

The installation of a Sustainable Urban Drainage System will improve water quality to the surface water discharged to the local watercourses and the River Boyne.

7.2.9 Predicted Impact of the Proposal - 'Worst Case' Scenario

A worst-case scenario is that for a very intense storm, minor ponding may occur within the site.

7.3 Water Supply

7.3.1 The Receiving Environment

There is an existing water main located in Rathmullan Road to the east of the proposed development.

7.3.2 Characteristics of the Proposal

It is proposed to provide potable water for the development via a connection to the existing watermain on Rathmullan Road to the east of the site. To facilitate this connection circa 140m of 150mm ID watermain network extension is required along with a new meter and a pressure reducing valve at the connection point.

An estimate of water demand from the public water supply system for the proposed site has been based on the development of a total of 661 No. residential units, a crèche and retail unit using Irish Waters expected demand for the respective residential and commercial uses. Details are shown in Table 7.3.

Description	No. of Units	Population per Unit	PE	Flow l/h/day	Total Discharge (l/d)
Residential Units	661	2.7	1784.7	150	267,705
Crèche	1		55	50	2,750
Retail	1		10	30	300
				Total	**270,755**

Table 7.3 Total Water Demand

The total water requirement, from the public supply, for the development is estimated at 270.76 m3/day.

7.3.3 Potential Impact of the Proposal - Construction Phase

- There is a risk of contamination of the existing water supply during construction of the development when connection of the trunk watermain to the public water supply is being made.
- There is a risk of damage to watermain fittings due to high pressure in the existing watermain.
- There will be a minor water demand for site offices.
- There will be increases in traffic flows at the local road network due to deliveries of materials.
- There is a risk of damage to existing buried utilities during excavations works resulting in temporary loss of supply to existing properties.
- The proposed development will not give rise to any significant long term adverse impact. Negative impacts during the construction phase will be short term only.

7.3.4 Potential Impact of the Proposal - Operational Phase

During the operational phase, the total water requirement, from the public supply, for the development is estimated at 270,755 m3/day.

7.3.5 Potential Impact of the Proposal - 'Do Nothing' Scenario

In this scenario, the existing water demand would continue on the Irish Water network in Drogheda. There would be no additional demand.

7.3.6 Ameliorative, Remedial or Reductive Measures - Construction Phase

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- A pressure reducing valve will be installed at the connection point.
- All water mains will be cleaned, sterilised and tested to the satisfaction of the Irish Water/Local Authority prior to connection to the public water main.
- All connections to the public water main will be carried out under the supervision of the Irish Water/Local Authority.

7.3.7 Ameliorative, Remedial or Reductive Measures - Operational Phase

It is not envisaged that any other remedial or reductive measures will be necessary upon the completion of the development.

7.3.8 Predicted Impact of the Proposal - Construction Phase

Due to the proposed ameliorative remedial and reductive measures outlined above no significant impact will arise during the construction phase of the proposed development on water quality. There will be an increase in traffic flows at the local road network due to deliveries of materials. There will be disruption to local traffic during the connection of the watermains from the proposed development to the existing watermains on Rathmullan Road.

7.3.9 Predicted Impact of the Proposal - Operational Phase

There will be an increased demand for water supply due to the development.

7.3.10 Potential Impact of the Proposal - 'Worst Case' Scenario

A worst case scenario would be that water mains would be contaminated during the construction phase. This would be mitigated against by scouring out the mains, swabbing and chlorinating the mains prior to occupation of any of the units.

7.4 Foul Water

7.4.1 The Receiving Environment

It is proposed to connect the foul drainage from the proposed development to a new pumping station on the subject site. Foul water will be pumped from the new pumping station via a 110 mm rising main and connect to the existing 110 mm diameter rising main on Rathmullan Road to the east of the subject site. Ultimately this foul water discharges to into the existing gravity sewer network on Marley's Lane c. 900 m east of the subject site. Foul drainage eventually outfalls to the Drogheda Wastewater Treatment Plant.

7.4.2 Characteristics of the Proposal

A new foul water pumping station will be provided on the subject site to serve the proposed development. The 'Riverbank' housing estate, adjacent to the subject site, is currently served by an existing pumping station. Furthermore, a new residential development has been granted planning under Reg. Ref. LB170675 which requires the construction of a foul water pumping station to serve that development. It is proposed that the new pumping station on the subject site will be a strategic pumping station which will take the waste water from 'Riverbank' housing estate and from this proposed new residential development. This will eliminate the need for separate individual pumping stations.

Foul water will be pumped from the new pumping station via a 110 mm rising main and connect to the existing 110 mm diameter rising main on Rathmullan Road to the east of the subject site. Ultimately this foul water discharges to into the existing gravity sewer network on Marley's Lane c. 900 m east of the subject site. Foul drainage eventually outfalls to the Drogheda Wastewater Treatment Plant. The existing sewer network has capacity to cater for the development of the subject lands.

The design of the foul water drainage has been based on the "Code of Practice for Wastewater Supply", (December 2016) published by Irish Water. Pipe capacities and velocities have been calculated using Colebrook-White formula with a (Ks) of 1.5mm. The estimated foul flows generated from the proposed development are shown in
Table 7.4.

Description	No. of Units	Population per unit	PE	Flow l/hd/day	Infiltration Factor	Total Discharge (l/d)
Residential Units	661 Units	2.7	1,784.7	150	1.1	294,475.5
Crèche	1		55	50	1.1	3,025
Retail	1		10	30	1.1	330
	Totals					***297,830***

Calculation of Proposed Peak Foul Flow		
Total Daily Discharge *(from Table 7.1)*	297,830	l/d
Dry Weather Flow (DWF)	3.45	l/s
Peak Foul Flow (= 4.5 x DWF)	***15.54***	***l/s***

Table 7.4 Calculation of Proposed Foul Water Flow

The Dry Weather Flow (DWF) from the proposed development is 3.45 l/s.
The proposed foul pumping station design will comply with all Irish Water requirements.

7.4.3 Potential Impact of the Proposal - Construction Phase

The following potential impacts from the construction of the proposed development may occur:

- There is a risk of the ingress of ground/surface water to the foul water network.
- There is a risk of damage to existing buried utilities during excavations works resulting in temporary loss of supply to existing properties.
- There is a possibility of a temporary Increase in traffic due to deliveries of materials and other construction related traffic.
- There will be some disruption to traffic during construction works on the public road.
- Cross connection between foul and surface water pipes.

7.4.4 Potential Impact of the Proposal - Operational Phase

- Blockages may occur within the pipe network and the waste water could become septic.
- Foul water could be connected to the surface water drainage network.
  The pumps could fail and wastewater could overflow across the open space and ultimately to the River Boyne.

7.4.5 Potential Impact of the Proposal - 'Do Nothing' Scenario

In this scenario, the existing foul water demand would continue on the Irish Water network in Drogheda. There would be no additional demand.

7.4.6 Ameliorative, Remedial or Reductive Measures - Construction Phase

All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.

- Foul water pipes to be laid with sufficient falls to ensure self-cleansing velocity .
- Foul and surface water pipes will be carefully laid so as to minimise the potential for cross connections.

7.4.7 Ameliorative, Remedial or Reductive Measures - Operational Phase

The pumping station is being provided with the following emergency equipment and procedures: -

- Standby pump in the event of a pump failure.
- Telemetry system to facilitate Irish Water monitoring of the station.
- High level alarms to warn of increases in level of effluent in the pump sump.
- Storage capacity within the sump and pipe network in excess of 24 hours.
- Over-pumping facilities on the rising main to facilitate the installation of a temporary external pump to empty the sump directly into the rising main.

The above emergency equipment and procedures provide a very high level of redundancy and backup in the event of a failure in the mechanical systems in the pumping station.

In addition to the above, the drainage network will be inspected annually and maintained.

7.4.8 Predicted Impact of the Proposal - Construction Phase

Due to the proposed ameliorative remedial and reductive measures outlined above no significant impact will arise during the construction phase of the proposed development on foul water network.

There will be increases in traffic flows at the local road network due to deliveries of materials. There may be short term disruption to local traffic on connection of the foul sewers from the proposed development to the existing foul sewers.

7.4.9 Predicted Impact of the Proposal - Operational Phase

There will be increased flows in the existing foul water drainage network.

7.4.10 ‘Worst Case’ Scenario

A worst case scenario would be that foul water would be discharged to the surface water network. This would be mitigated against by ensuring no crossing connections during the construction stage. Poor workmanship could result in large quantities of surface water entering the existing foul drainage network and overloading the network.

CHAPTER 8.0 NOISE AND VIBRATION

8.1 Introduction

This chapter assesses the potential significant noise and vibration impacts associated with the proposed residential development at Rathmullen, Drogheda, Co. Meath.

This section of the EIAR has been prepared by AWN in the context of current relevant standards and guidance. This assessment has been prepared by Dr. Stephen Smyth BA BAI MIEI MIOA, Associate at AWN Consulting who has over 12 years' experience as an environmental consultant specialising in Acoustics, Impact Assessment and Management.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impacts associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment and on the development itself. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this chapter and included in the references section. In addition to specific noise guidance documents, the following guidelines were considered and consulted for the purposes of this chapter:

- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017), and;
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).

8.2 Methodology

The study has been undertaken using the following methodology:

- Detailed baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site;
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations have been performed during the construction phase of the project at the nearest sensitive locations to the development site;
- Predictive calculations have been performed to assess the potential impacts associated with the operational phase of the development at the most sensitive locations surrounding the development site;
- An inward noise impact assessment has been completed to determine the potential noise impact from environmental noise on the residential amenity of the development; and
- A schedule of mitigation measures has been proposed to reduce, where necessary, the identified potential inward and outward impacts relating to noise and vibration from the proposed development.

8.3 Receiving Environment

The site is located in Drogheda, in the Rathmullen area. The site is predominantly surrounded by green fields and is bounded by the M1 motorway to the west and the Boyne river to the north. There are a number of residential housing estates to the east.

8.3.1 Environmental Noise Survey

An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise. Specific details are set out below.

Choice of Measurement Positions

Six measurement locations were selected as shown in Figure 8.1

Figure 8.1 Noise Survey Locations

Survey Periods

The attended noise survey was conducted between the following periods:

- 12:29hrs to 15:30hrs on 16th October 2018.

The unattended noise survey was conducted between the following periods:

- 15:30hrs on 16th October 2018 to 10:40hrs on 18th October 2018.

The measurements cover a period that was selected in order to provide a typical snapshot of the existing noise climate, with the primary purpose being to ensure that the proposed noise criteria associated with the development are commensurate with the prevailing environment. The weather during the survey periods was mostly dry and overcast with winds less than 5m/s and temperatures of some 1 - 17ºC.

Personnel and Instrumentation

Donogh Casey (AWN) performed the measurements during the survey periods. Unattended measurements were made using a Rion NL-52 Sound Level Meter. Attended measurements were made using a Brüel & Kjær Type 2250 Sound Level Meter. Sample periods were 15-minutes for attended noise measurements and 5-minutes for unattended noise measurements.

Before and after the survey the measurement instruments were check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

Measurement Parameters

The unattended noise survey results are presented in terms of the following parameters.

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

L_{day} is the average L_{Aeq} noise level measured over the course of the daytime period, defined as 07:00hrs to 19:00hrs

$L_{evening}$ is the average L_{Aeq} noise level measured over the course of the daytime period, defined as 19:00hrs to 23:00hrs

L_{night} is the average L_{Aeq} noise level measured over the course of the daytime period, defined as 23:00hrs to 07:00hrs

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2x10-5 Pa.

Survey Results and Discussion

The results of the surveys at the monitoring locations are summarised in Tables 8.1 and 8.2.

Location	Date & Start time	L_{AFmax}	L_{AFmin}	L_{Aeq}	$L_{AF10.0}$	$L_{AF90.0}$
S01	16/10/2018 12:29	75	59	67	69	63
	16/10/2018 13:43	74	57	66	68	63
	16/10/2018 14:54	72	56	66	68	63
S02	16/10/2018 12:32	85	55	63	66	59
	16/10/2018 13:43	69	52	62	64	59
	16/10/2018 14:54	70	54	61	63	58
S04	16/10/2018 12:55	75	56	66	68	61
	16/10/2018 14:07	75	54	66	68	62
	16/10/2018 15:16	75	58	66	69	62
S05	16/10/2018 13:17	76	57	66	69	63
	16/10/2018 14:29	76	52	66	68	61

Location	Date & Start time	L_{AFmax}	L_{AFmin}	L_{Aeq}	$L_{AF10.0}$	$L_{AF90.0}$
S06	18/10/2018 11:08	65	50	58	60	55
	16/10/2018 13:19	72	55	63	65	59
	16/10/2018 14:30	70	51	61	63	57
	18/10/2018 11:26	62	50	57	58	54

Table 8.1 Attended Survey Results

Location	Date	L_{day}	$L_{evening}$	L_{night}
S03	16/10/2018	71	67	65
	17/10/2018	70	67	65
	18/10/2018	70	n/a	n/a

Table 8.2 Unattended Survey Results

Road traffic noise from the M1 motorway was the dominant source of noise at all locations.

8.4 Characteristics of the Proposed Development

When considering a development of this nature, the potential noise and vibration impacts on the surroundings must be considered for each of two distinct stages, the short-term construction phase and the permanent operational phase.

During the construction phase the main site activities will include, site clearance, demolition of existing buildings, building construction, road works, and landscaping. This phase has the greatest potential for noise and vibration impacts on the surrounding environment, however this phase will be of short-term impact.

During the operational phase of the development, no significant sources of outward noise or vibration are expected with the development. The primary source of outward noise in the operational context relates to any changes in traffic flows along the local road network and any operational plant noise. There is the potential for an inward noise impact on the development from road traffic noise generated by traffic on the M1 motorway.

8.5 Potential Impact of the Proposed Development

8.5.1 Noise Criteria

Construction Phase

There is no published statutory Irish guidance relating to the maximum permissible noise and vibration levels that may be generated during the construction phase of a project. It is common practice to use BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites with respect to the controlling noise and vibration impacts. In this instance, appropriate criteria relating to permissible construction noise levels are taken from Part One of the standard Noise.

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

The closest neighbouring noise sensitive properties to the proposed development are the residential dwellings to the east of the site, which are located approximately 50m from the development buildings at their closest point.

BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. Table 8.3 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Assessment category and threshold value period (L_{Aeq})	**Threshold value, in decibels (dB)**		
	Category A [A]	**Category B** [B]	**Category C** [C]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends [D]	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Table 8.3 Example Threshold of Significant Effect at Dwellings

Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5dB. Baseline monitoring carried out as part of this assessment would indicate that Category A values are appropriate in terms of the nearest noise sensitive locations being considered in this instance.

If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur. Taking account of the measured ambient noise levels, the recommended daytime noise level for construction noise is 65dB L_{Aeq}.

Operational Phase

Additional Road Traffic on Public Roads

In order to consider the potential noise impact associated with the proposed development introducing additional traffic onto the existing road networks, and given that vehicle movements on public roads are assessed using a different parameter (the ten percentile noise level; L_{A10}), it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development in terms of the L_{A10} parameter.

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 8.4 offers guidance as to the likely impact associated with any particular change in traffic noise level (Source DMRB, 2011).

Change in Sound Level (dB L_{A10})	Subjective Reaction	DMRB magnitude of Impact	EPA Classification Magnitude of Impact
0	Inaudible	No Change	Neutral
0.1 – 2.9	Barely Perceptible	Negligible	Imperceptible
3 – 4.9	Perceptible	Minor	Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate
10+	Doubling of loudness and above	Major	Significant

Table 8.4 Likely Impact Associated with Change in Traffic Noise Level

Inward Noise Impact

The Professional Guidance on Planning and Noise (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since it's adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk based 2 stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and

- Stage 2 – Involves a full detailed appraisal of the proposed development covering four "key elements" that include:

    - Element 1 - Good Acoustic Design Process;
    - Element 2 - Noise Level Guidelines;
    - Element 3 - External Amenity Area Noise Assessment
    - Element 4 - Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 8.2 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

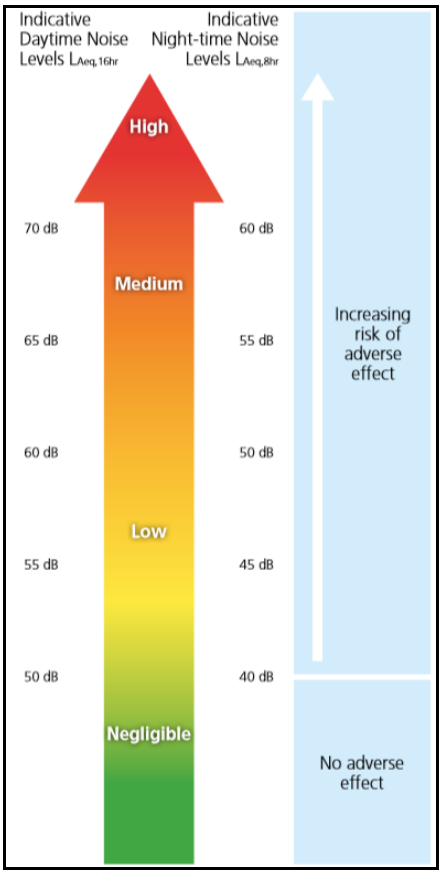


Figure 8.2 ProPG Stage 1 - Initial Noise Risk Assessment

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 8.5 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Activity	Location	(07:00 to 23:00hrs)	(23:00 to 07:00hrs)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,T}$*

Table 8.5 ProPG Internal Noise Levels

**Note* *The document comments that the internal $L_{AFmax,T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.*

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."

Outward Noise Impact

For the purposes of this study, it is appropriate to derive external limits based on the internal criteria noted in the previous paragraphs. This is done by factoring in the degree of noise reduction afforded by a partially open window and typical 15dB attenuation is noted in this British Standard. Using this correction value across an open window, the following external noise levels would achieve the internal noise levels noted in Table 8.5 above.

1. Daytime / Evening (07:00 to 23:00 hours) 50 - 55dB $L_{Aeq,1hr}$
2. Night-time (23:00 to 07:00 hours) 45dB $L_{Aeq,15min}$

These noise limits will be applied to any sources of noise from the proposed development other than road traffic, for example mechanical plant serving the development.

8.5.2 Vibration Criteria

Construction Phase

In terms of vibration, British Standard BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero. It is therefore common, on a cautious basis to use this lower value. Taking the above into consideration the vibration criteria in Table 8.6 are recommended.

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:-		
Less than 15Hz	15 to 40Hz	40Hz and above
12 mm/s	20 mm/s	50 mm/s

Table 8.6 Recommended Vibration Criteria During Construction Phase

Operational Phase

There are no expected sources of vibration associated with the operational phase, therefore, vibration criteria have not been specified for this phase.

8.6 Impact Assessments

8.6.1 Construction Phase

It is predicted that the construction programme will create typical construction activity related noise on site. During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators.

The proposed general construction hours are 07:00 to 18:00hrs, Monday to Friday and 08:00 to 14:00 on Saturdays.

Due to the nature of daytime activities undertaken on a construction site of this nature, there is potential for generation of significant levels of noise. The potential for vibration at neighbouring sensitive locations during construction is typically limited to excavation works and lorry movements on uneven road surfaces. Due to the nature of the construction works on site there is little likelihood of structural or even cosmetic damage to existing neighbouring dwellings as a result of vibration.

Due to the fact that the construction programme has been established in outline form only, it is difficult to calculate the actual magnitude of noise emissions to the local environment. However, it is possible to predict typical noise levels using guidance set out in BS5228-1:2009+A1:2014. Table 8.7 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme at a standard reference distance of 10 metres from the various plant items.

Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	Construction Noise Level at 10m Distance (dB $L_{Aeq(1hour)}$)
Site Preparation	Wheeled Loader Lorry (D3 1)	75
	Track Excavator (C2 22)	72
	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
Demolition	Pulveriser on Tracked Excavator (C1.5)	72
	Tracked Crusher (C1.14)	82
	Breaker Mounted on Backhoe (C1.2)	92
	Dump Truck (C4.2)	78
Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (D7 6)	77
	Poker Vibrator (C4 33)	78
General Construction	Hand tools	81
	Tower Crane (C4.48)	76
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78

Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	Construction Noise Level at 10m Distance (dB $L_{Aeq(1hour)}$)
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68

Table 8.7 Typical Noise Levels Associated with Construction Plant Items

For the purposes of the assessment we have assumed that standard good practice measures for the control of noise from construction sites will be implemented. These issues are commented upon in further detail in the mitigation section of this chapter.

Table 8.8 presents the predicted daytime noise levels from an indicative construction period on site at the nearest off-site receptor. Note construction noise sources for site are assumed to be running 50% of the time. The predictions have been prepared for a distance of 50m from the site works which is representative of the worst-case situation when construction work is ongoing on the site boundaries closest to existing residential dwellings.

Construction Phase	Item of Plant (*BS 5228-1:2009+A1:2014* Ref)	BS5228 Reference Noise Level dB L_{Aeq} at 10m	Predicted at Receiver (50m distance) dB L_{Aeq}
Site Clearance/ Groundworks	Tracked excavator (C2.21)	71	49
	Dump Truck (C2.30)	79	57
	Telescopic Handler (C4.54)	79	57
	Tracked Mobile Crane (C4.50)	71	49
	Diesel Generator (C4.76)	61	39
	Total Site Clearance		60
General Construction	Dump Truck (D2.30)	79	57
	Tracked excavator (D2.21)	71	49
	Compressor (D7.08)	70	48
	Telescopic Handler (D4.54)	79	57
	Hand Held Circular Saw (D4.72)	79	57
	Diesel Generator (D4.76)	61	39
	Internal Fit out	70	48
	Total General Construction		62
Road Works/ Landscaping	Asphalt Paver & Tipping Lorry (D5.30)	75	53
	Electric Water Pump (D5.40)	68	46
	Vibratory Roller (D5.20)	75	53
	Total Landscaping and Road Works		56

Table 8.8 Typical Noise Levels Associated with Construction Plant Items

It is not expected that construction noise levels will be such that a significant impact would occur at any of the nearest noise sensitive locations.

Note that the predicted noise levels referred to in this section are indicative only and are intended to demonstrate that it will be possible for the contractor to comply with current best practice guidance. It should also be noted that the predicted noise levels are expected to occur for only short periods of time at a limited number of properties. Construction noise levels will be lower than these levels for the majority of the time at the majority of properties in the vicinity of the proposed development.

Potential for vibration impacts during the construction phase programme are likely to be limited given the minimal level of ground breaking and excavations required. Piling is not anticipated as part of the works. In this instance, taking account of the distance to the nearest sensitive off-site buildings, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 8.6 to avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants.

8.6.2 Operational Phase

Additional Road Traffic on Public Roads

A traffic impact assessment relating to the proposed development has been prepared by Waterman Moylan as part of this EIAR. Information from this report has been used to determine the predicted change in noise levels in the vicinity of a number of roads in the area surrounding the proposed development, for the opening and design years.

For the purposes of assessing potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the development. Traffic flow data in terms of the AADT figures has been assessed and the calculated change in noise levels during these two periods are summarised in Tables 8.9 and 8.10.

Road	Opening Year AADT		Change in Noise Level dB (A)
	Without Development	With Development	
Rathmullan Rd – North of Site Entrance	1700	2177	+1.0
Rathmullan Rd – South of Site Entrance	379	563	+1.7

Table 8.9 Change in Traffic Noise Levels with Proposed Development – Opening Year

Road	Design Year AADT		Change in Noise Level dB (A)
	Without Development	With Development	
Rathmullan Rd – North of Site Entrance	1935	2412	+1.0
Rathmullan Rd – South of Site Entrance	431	615	+1.5

Table 8.10 Change in Traffic Noise Levels with Proposed Development – Design Year

The predicted increase in traffic noise levels associated with the development is less than 2dB for both the opening and design years. Reference to Table 8.4 confirms that this increase is barely perceptible and the resultant impact is imperceptible.

In summary, the predicted increase in noise levels associated with vehicles at road junctions in the vicinity of the proposed development is of long-term imperceptible impact.

Mechanical and Electrical Sources

Once a development of this nature becomes fully operational, a variety of electrical and mechanical plant will be required to service the site and the commercial buildings associated with the development. Most of this plant will be capable of generating noise to some degree. Some of this plant may operate 24 hours a day, and hence would be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties would potentially have the greatest impact.

In particular there is a pumping station provided to Irish Water specifications including a wet kiosk and control kiosk. To ensure noise impacts on the nearest sensitive locations, on and off site, are controlled to be within the criteria discussed in Section 8.5, noise from building services plant, including the pumping station, will be controlled such that it does not exceed a level of 45dB(A) at a distance of 10m from the façade of any building associated with the development.

INWARD NOISE IMPACT

The development lands in question are in proximity to the M1 motorway to the west of the site. Noise from the motorway has the potential to impact the residential developments proposed for the site itself.

Existing Noise Climate

The existing noise and vibration climate within the development lands was surveyed and the results summarised in Section 8.2 of this chapter. The results of the survey have indicated that the M1 Motorway contributes significant noise levels at the measurement locations on the western boundary of the site.

In order to determine the inward noise impact for noise sensitive properties proposed as part of the development, it is necessary to determine the internal noise levels within the proposed buildings. These can then be compared against appropriate internal noise criteria from BS 8233, as summarised in Section 8.4 (Table 8.5).

It is possible to calculate internal noise levels within the residential properties proposed within the site, taking account of the existing and future potential noise environment, proposed constructions and the relevant sound insulation provided by the building elements (i.e. walls, roof, glazing etc.).

Noise Model of Site

In order to calculate noise levels across the site, an acoustic model was developed in order to initially calibrate against noise survey data recorded on site. Proprietary noise calculation software was used for the purposes of establishing the prevailing noise levels on the proposed site. The selected software, Brüel & Kjær Type 7810 *Predictor*, calculates noise levels in accordance with the selected source.

The following information was included in the model:

- Site layout drawings of proposed development;
- Topographical survey of the development site, and;
- OS mapping of surrounding environment.

Calibration of Noise Model

Noise levels recorded during the unattended survey location S03 were used to calibrate the noise model. Noise levels are calculated at the same location using the developed noise model. The results are presented in Table 8.11 overleaf for daytime periods, i.e. 07:00 to 19:00hrs, evening periods (19:00 to 23:00hrs) and night-time periods, 23:00 to 07:00hrs and compared against those measured on site.

Location	Time Period	Measured Noise Level, dB	Predicted Noise Level, dB
S03	Daytime	71	70
	Evening	67	67
	Night-time	65	64

Table 8.11 Predicted & Measured Noise Levels at Development Site

The model results are considered an accurate representation of noise levels across the site.

Noise Risk Classification of the Site

Following the methodology outlined in ProPG, as discussed in Section 8.5.1, the noise model has been used to predict noise levels across the site. The results of this exercise are presented in Figures 8.3 and 8.4 for day and night periods respectively.

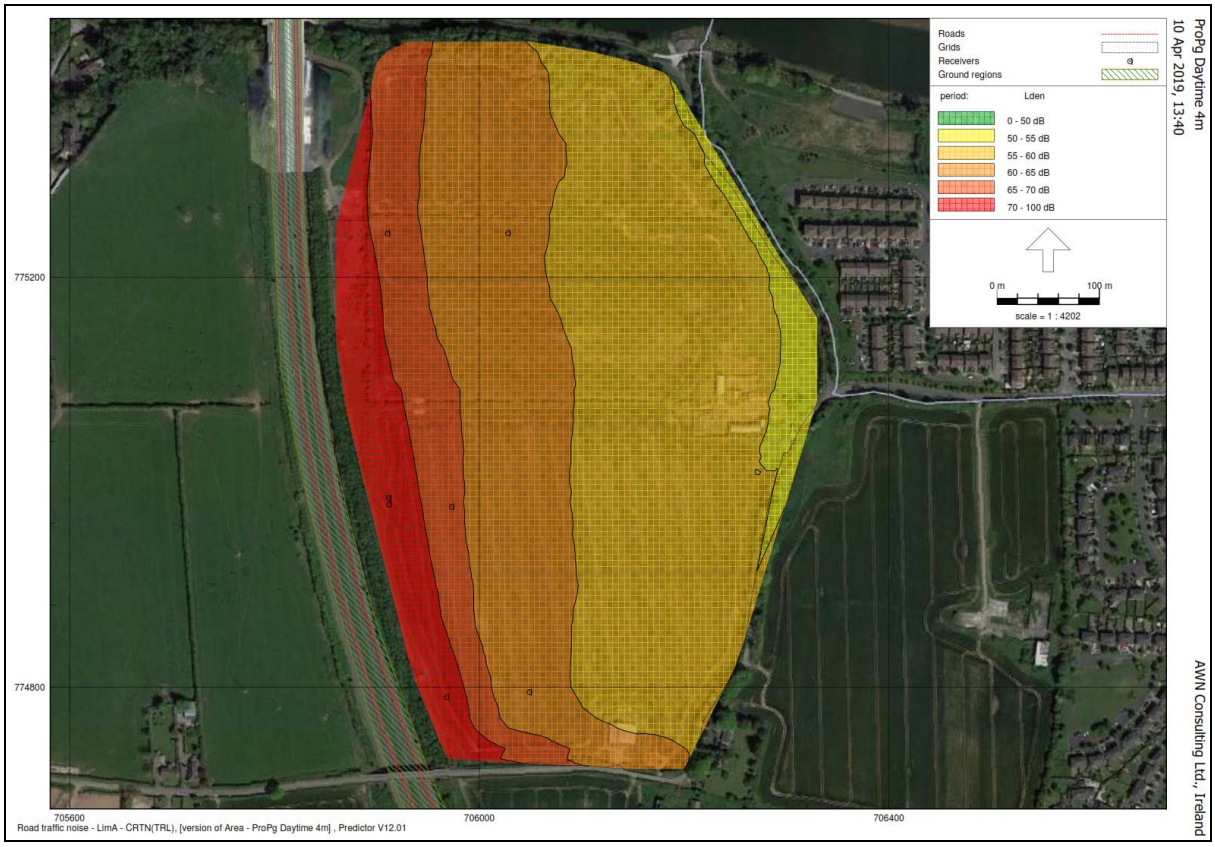


Figure 8.3 Predicted Existing Noise Contour Across the Cleared Development Site – Daytime

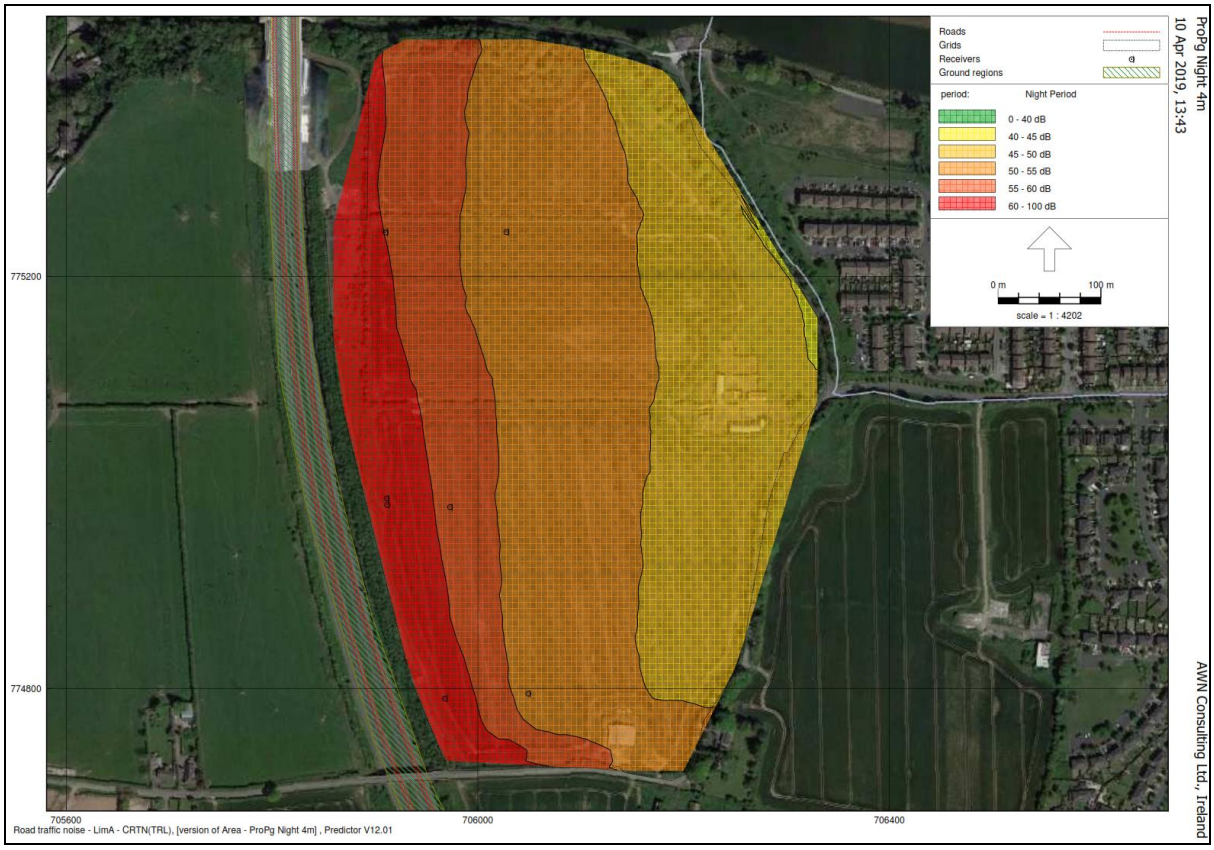


Figure 8.4 Predicted Existing Noise Contour Across the Cleared Development Site – Night

Road traffic noise levels calculated across the majority of the site during daytime periods are between 55 and 70dB $L_{Aeq,16hr}$. Night time noise levels are the order of 45 to 60dB $L_{Aeq,8hr}$ across the site in this situation. The area of the site closest to the M1 experience noise levels up to 75dB $L_{Aeq,16hr}$ during the day and 65dB $L_{Aeq,8hr}$ at night.

Giving consideration to the measured and predicted noise levels presented in the previous sections, the initial site noise risk assessment has concluded that the level of risk across the site varies from medium to high noise risk.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. In the case of the AWN survey the L_{AFmax} noise levels typically measured less than 80dB during the night with sporadic events also recorded above this level. ProPG guidance considers 20 night events over 80dB to be a high risk, therefore this site would be considered a medium risk in terms of maxima events.

ProPG states the following with respect to medium and high risks:

Medium Risk *As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.*

High Risk *High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.*

Given the above it can be concluded that the development site may be categorised as *Medium to High Risk* and as such an Acoustic Design Strategy will be required to demonstrate that suitable care

and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used,

"2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design."

Therefore, following the guidance contained in ProPG does not preclude residential development on sites that are identified as having medium or high-risk noise levels. It merely identifies the fact that a more considered approach will be required to ensure the developments on the higher risk sites are suitable designed to mitigate the noise levels. The primary goal of the approach outlined in ProPG is to ensure that the best possible acoustic outcome is achieved for a particular site.

Façade Noise Levels

Noise levels have been predicted across the development site during day and night-time periods using the noise model developed to include the development buildings and the 4m high earth berm proposed along the western boundary with the M1. Where façade noise levels are less than 55dB $L_{Aeq,16hr}$ during the day and 50dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal noise levels while also ventilating the dwellings with open windows. Therefore, for those properties where the façade noise levels are less than 55dB $L_{Aeq,16hr}$ during the day and 50dB $L_{Aeq,8hr}$ at night no further mitigation is required.

Where façade levels are above these levels the sound insulation performance of the building façade becomes important and a minimum sound insulation performance specification is required for windows and vents to ensure the internal noise criteria are achieved.

Figure 8.5 identifies those facades where the noise levels are higher and where mitigation in the form of enhanced glazing and ventilation will be required. The specification of this enhanced façade is discussed in Section 8.7.

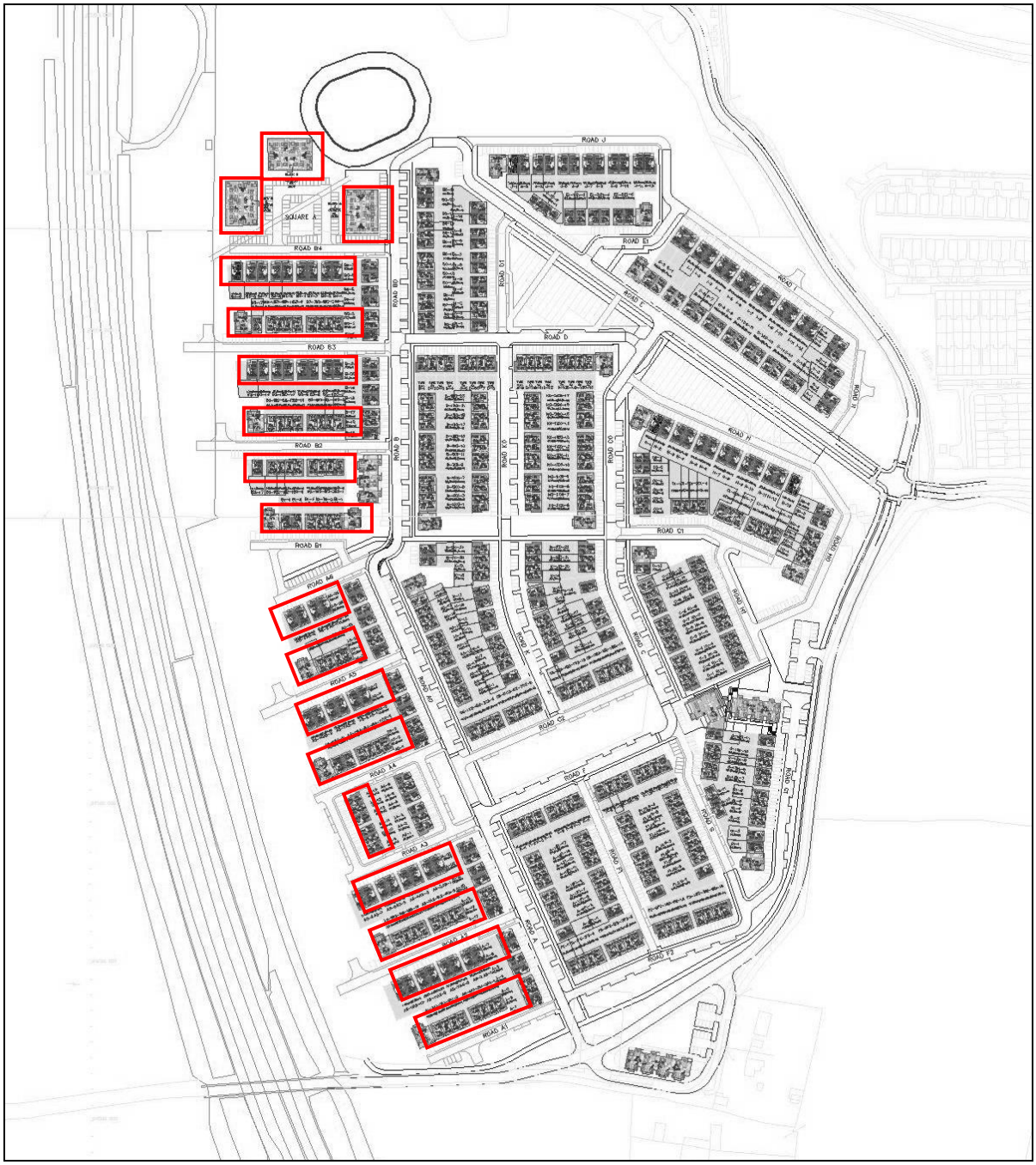


Figure 8.5 Locations for Enhanced Acoustic Façade Specification

External Noise Levels

External noise levels within the vast majority of public open spaces and private gardens across the development site are generally within the recommended range of noise levels from ProPG of between 50 – 55 dB $L_{Aeq,16hr}$ as illustrated in Figure 8.6. It is considered that the objectives of achieving suitable external noise levels is achieved within the overall site.

Figure 8.6 Predicted Noise Levels Across External Areas (1.5m above ground)

The predicted external levels include the screening benefit afforded by the 4m high earth berm along the western boundary of the site. No further mitigation is required to control external noise levels across amenity areas.

8.7 Remedial and Reductive Measures

8.7.1 Construction Phase

The assessment of construction phase impacts has found that significant noise and vibration impacts are not expected. Notwithstanding this, best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be adopted. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening; and
- liaison with the public.

8.7.2 Operational Phase

Additional Traffic on Adjacent Roads

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

Building Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria included in Section 8.7 (i.e. 45dB(A) at a distance of 10m from any plant) is achieved, it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward Noise Impact

The proposed 4m high earth berm along the western boundary of the site is included within the noise impact assessment as a mitigation measure.

Furthermore, as is the case in most buildings, the glazed elements and ventilation paths of the building envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.e. block work or concrete and spandrel elements) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal.

In this instance the facades highlighted in Figure 8.5 will be provided with glazing that achieves the minimum sound insulation performance as set out in Table 8.12. Other facades in the development have no minimum requirement for sound insulation.

Typical Glazing Specification	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
10/12/4	25	22	33	40	43	44	35

Table 8.12 Sound Insulation Performance Requirements for Glazing, SRI (dB)

The overall R_w outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 8.12 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

In addition, any background ventilators through the façade, e.g. trickle vents, will be selected to achieve an acoustic performance of at least 37dB $D_{ne,w}$ when in the open position for those facades identified in Figure 8.5.

With these measures in place the internal noise levels within those proposed buildings most exposed to environmental noise from the M1 motorway will achieve the criteria outlined in Table 8.5 when the windows are closed and the ventilators are open.

8.8 Predicted Impact of the Proposed Development

8.8.1 Construction Phase

During the construction phase of the project there is the potential for temporary noise impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable.

For the duration of the construction period, construction noise impacts will be short-term, negative, slight to moderate.

Vibration impacts during the construction phase will be short-term and negligible.

8.8.2 Operational Phase

The predicted change noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network. In the context of the existing noise environment, the overall contribution of induced traffic is considered to be of neutral, imperceptible and long-term impact to nearby residential locations.

Noise levels associated with building services plant are expected to be well within the adopted day and night-time noise limits at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be of neutral, imperceptible, long term impact.

8.9 Monitoring

8.9.1 Construction Phase

The contractor will be required to ensure construction activities operate within the noise limits set out within this assessment. The contractor will be required to undertake regular noise monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*.

8.9.2 Operational Phase

Noise or vibration monitoring is not required once the development is operational.

8.10 Cumulative Impacts

Traffic volumes associated with the operational phase assessed within this chapter take account of other permitted developments in the local area. Cumulative noise impacts associated with the traffic generated from other developments in the surrounding environment have therefore been assessed within this chapter.

Given the site location and distance to other permitted developments it is not expected that there will be any cumulative noise or vibration impacts during either construction stage or operational stage.

CHAPTER 9.0 AIR QUALITY AND CLIMATE

9.1 Introduction

This chapter assesses the likely air quality and climate impacts, if any, associated with the residential development at Rathmullan, Drogheda, Co. Meath.

This chapter was completed by Ciara Nolan, an environmental consultant in the air quality section of AWN Consulting Ltd. She holds an MSc. (First Class) in Environmental Science from University College Dublin and has also completed a BSc. in Energy Systems Engineering. She is an Associate Member of both the Institute of Air Quality Management and the Institution of Environmental Science. She has been active in the field of air quality for 2 years, with a primary focus on consultancy.

9.2 Background Information

9.2.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, \national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 9.1 and Appendix 9.1).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC, which has set limit values for NO_2, PM_{10}, $PM_{2.5}$, benzene and CO (see Table 9.1). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see Appendix 9.1).

Pollutant	Regulation Note 1	Limit Type	Value
Nitrogen Dioxide (NO_2)	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
		Critical level for protection of vegetation	30 µg/m^3 NO + NO_2
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3
Benzene	2008/50/EC	Annual limit for protection of human health	5 µg/m^3
Carbon Monoxide (CO)	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10 mg/m^3 (8.6 ppm)

Note 1 *EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC*

Table 9.1 Air Quality Standards Regulations

9.2.2 Dust Deposition Guidelines

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) and the EU ambient air quality standards outlined in Table 9.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m^2*day) averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Health & Local Government (DEHLG, 2004) apply the Bergerhoff limit of 350 mg/(m^2*day) to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction of the proposed development.

9.2.2 Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002 (UNFCC, 1997, 1999). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, in June 1998, Ireland agreed to limit the net growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012 (ERM, 1998; EC 2014). The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP24) took place in Katowice, Poland from the 4th to the 14th December 2018 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The Paris Agreement was agreed by over 200 nations and has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, in October 2014, agreed the “2030 Climate and Energy Policy Framework” (EU, 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under “Renewables and Energy Efficiency”, an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

9.2.4 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_X), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO_2 (67% below 2001 levels), 65 kt for NO_X (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH_3 (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% on 2005 levels), 65 kt for NO_X (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels).

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG, 2004; 2007). Data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X (EEA, 2012). Directive (EU) 2016/2284 "*On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC*" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3, $PM_{2.5}$ and CH_4. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% on 2005 levels), 65 kt for NO_X (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels). In relation to 2030, Ireland's emission targets are 85% below 2005 levels for SO_2, 69% reduction for NO_x, 32% reduction for VOCs, 5% reduction for NH_3 and 41% reduction for $PM_{2.5}$.

9.3 Methodology

9.3.1 Local Air Quality Assessment

The air quality assessment has been carried out following procedures described in the publications by the EPA (EPA, 2002; 2003; 2015; 2017) and using the methodology outlined in the guidance documents published by the UK DEFRA (UK DEFRA 2016a, 2016b; UK DETR, 1998). The assessment of air quality was carried out using a phased approach as recommended by the UK DEFRA (UK Highways Agency, 2007). The phased approach recommends that the complexity of an air quality assessment be consistent with the risk of failing to achieve the air quality standards. In the current assessment, an initial scoping of possible key pollutants was carried out and the likely location of air pollution "*hot-spots*" identified. An examination of recent EPA and Local Authority data in Ireland (EPA, 2018; 2019) has indicated that SO_2 and smoke are unlikely to be exceeded at the majority of locations within Ireland and thus these pollutants do not require detailed monitoring or assessment to be carried out. However, the analysis did indicate potential issues in regards to nitrogen dioxide (NO_2), PM_{10} and $PM_{2.5}$ at busy junctions in urban centres (EPA, 2018; 2019). Benzene, although previously reported at quite high levels in urban centres, has recently been measured at several city centre locations to be well below the EU limit value (EPA, 2018; 2019). Historically, CO levels in urban areas were a cause for concern. However, CO concentrations have decreased significantly over the past number of years and are now measured to be well below the limits even in urban centres (EPA, 2019). The key pollutants reviewed in the assessments are NO_2, PM_{10}, $PM_{2.5}$, benzene and CO, with particular focus on NO_2 and PM_{10}.

Key pollutant concentrations will be predicted for nearby sensitive receptors for the following scenarios:

- The Existing Baseline scenario, for model verification;
- Opening Year Do-Nothing scenario (DN), which assumes the retention of present site usage with no development in place;
- Opening Year Do-Something scenario (DS), which assumes the proposed development in place;
- Design Year Do-Nothing scenario (DN), which assumes the retention of present site usage with no development in place; and
- Design Year Do-Something scenario (DS), which assumes the proposed development in place.

The assessment methodology involved air dispersion modelling using the UK DMRB Screening Model (UK Highways Agency, 2007) (Version 1.03c, July 2007), the NO_x to NO_2 Conversion Spreadsheet (UK DEFRA, 2017) (Version 6.1, October 2017), and following guidance issued by the TII (2011), UK Highways Agency (2007), UK DEFRA (2016a, 2016b) and the EPA (2002, 2003, 2015, 2017).

The TII guidance (2011) states that the assessment must progress to detailed modelling if:

- Concentrations exceed 90% of the air quality limit values when assessed by the screening method; or

- Sensitive receptors exist within 50m of a complex road layout (e.g. grade separated junctions, hills etc).

The UK DMRB guidance (UK Highways Agency, 2007), on which the TII guidance was based, states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment:

- Road alignment change of 5 metres or more;
- Daily traffic flow changes by 1,000 AADT or more;
- HGV flows change by 200 vehicles per day or more;
- Daily average speed changes by 10 km/h or more; or
- Peak hour speed changes by 20 km/h or more.

Concentrations of key pollutants are calculated at sensitive receptors that have the potential to be affected by the proposed development. For road links which are deemed to be affected by the proposed development and within 200 m of the chosen sensitive receptors inputs to the air dispersion model consist of: road layouts, receptor locations, annual average daily traffic movements (AADT), percentage heavy goods vehicles, annual average traffic speeds and background concentrations. The UK DMRB guidance states that road links at a distance of greater than 200 m from a sensitive receptor will not influence pollutant concentrations at the receptor. Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the worst-case sensitive receptors using generic meteorological data. The DMRB model uses conservative emission factors, the formulae for which are outlined in the DMRB Volume 11 Section 3 Part 1 – HA 207/07 Annexes B3 and B4. These worst-case road contributions are then added to the existing background concentrations to give the worst-case predicted ambient concentrations. The worst-case ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards. The TII *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Scheme* (2011) detail a methodology for determining air quality impact significance criteria for road schemes and this can be applied to any project that causes a change in traffic flows. The degree of impact is determined based on both the absolute and relative impact of the proposed development. The TII significance criteria have been adopted for the proposed development and are detailed in Appendix 9.2 Table A1 to Table A3. The significance criteria are based on PM_{10} and NO_2 as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3). However, the criteria have also been applied to the predicted 8-hour CO, annual benzene and annual $PM_{2.5}$ concentrations for the purposes of this assessment.

9.3.2 Regional Air Quality and Climate Assessment

The impact of the proposed development at a national / international level has been determined using the procedures given by Transport Infrastructure Ireland (2011) and the methodology provided in Annex 2 in the UK Design Manual for Roads and Bridges (UK Highways Agency, 2007). The assessment focused on determining the resulting change in emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_x) and carbon dioxide (CO_2). The Annex provides a method for the prediction of the regional impact of emissions of these pollutants from road schemes and can be applied to any development that causes a change in traffic flows. The inputs to the air dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds.

9.3.3 Conversion of NO_X to NO_2

NO_x (NO + NO_2) is emitted by vehicles exhausts. The majority of emissions are in the form of NO, however, with greater diesel vehicles and some regenerative particle traps on HGV's the proportion of NOx emitted as NO_2, rather than NO is increasing. With the correct conditions (presence of sunlight and O_3) emissions in the form of NO, have the potential to be converted to NO_2.

Transport Infrastructure Ireland states the recommended method for the conversion of NO_x to NO_2 in "*Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*" (2011). The TII guidelines recommend the use of DEFRAs NO_x to NO_2 calculator (UK DEFRA, 2017) which was originally published in 2009 and is currently on version 6.1. This calculator (which can be downloaded in the form of an excel spreadsheet) accounts for the predicted availability

of O_3 and proportion of NO_x emitted as NO for each local authority across the UK. O_3 is a regional pollutant and therefore concentrations do not vary in the same way as concentrations of NO_2 or PM_{10}.

The calculator includes Local Authorities in Northern Ireland and the TII guidance recommends the use of 'Armagh, Banbridge and Craigavon' as the choice for local authority when using the calculator. The choice of Craigavon provides the most suitable relationship between NO_2 and NO_x for Ireland. The "*All other Non-Urban UK Traffic"* traffic mix option was used.

9.3.4 Ecological Sites

For routes that pass within 2 km of a designated area of conservation (either Irish or European designation) the TII requires consultation with an Ecologist (TII, 2011). However, in practice the potential for impact to an ecological site is highest within 200 m of the proposed development and when significant changes in AADT (>5%) occur.

Transport Infrastructure Ireland's *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (TII, 2009) and *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (DEHLG, 2010) provide details regarding the legal protection of designated conservation areas.

If both of the following assessment criteria are met, an assessment of the potential for impact due to nitrogen deposition should be conducted:

- A designated area of conservation is located within 200 m of the proposed development; and
- A significant change in AADT flows (>5%) will occur.

The Boyne River Islands pNHA (site code 001862), River Boyne and River Blackwater SPA (site code 004232) and River Boyne and River Blackwater SAC (site code 002299) are located directly adjacent to the Rathmullan Road which will be directly impacted by the proposed development. As such an assessment of the impact with regards to nitrogen deposition was conducted. Dispersion modelling and prediction was carried out at typical traffic speeds at this location. Ambient NOx concentrations were predicted for the worst case assessment year along a transect of up to 200 m within the pNHA, SPA and SAC. The road contribution to dry deposition along the transect was also calculated using the methodology outlined in Appendix 9 of the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (TII, 2011).

9.4 Receiving Environment

9.4.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport, which is located approximately 33 km south of the site. Dublin Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 9.1). For data collated during five representative years (2013 - 2017), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.3 m/s over the period 2005 - 2018.

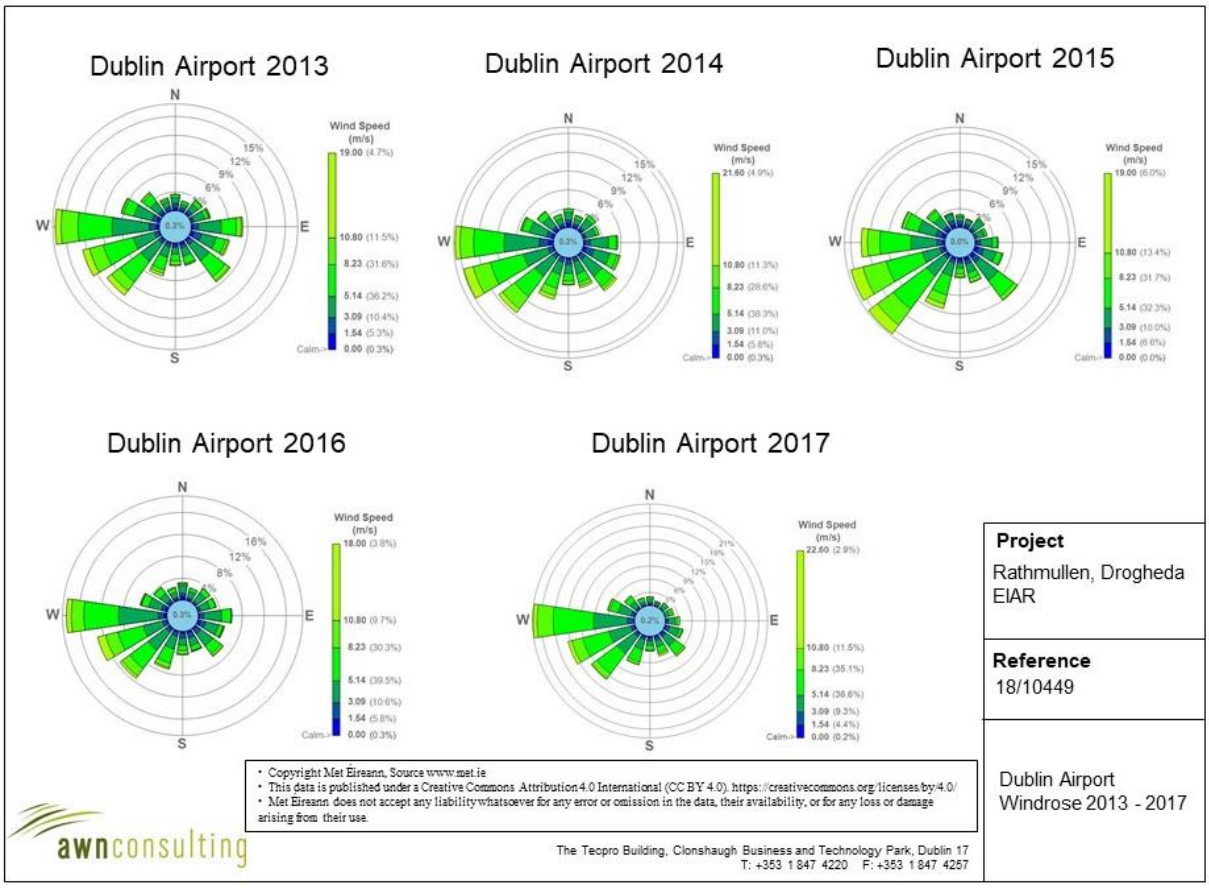


Figure 9.1 Dublin Airport Windrose 2013 – 2017

9.4.2 Trends in Air Quality

Air quality is variable and subject to both significant spatial and temporal variation. In relation to spatial variations in air quality, concentrations generally fall significantly with distance from major road sources (UK Highways Agency, 2007). Thus, residential exposure is determined by the location of sensitive receptors relative to major roads sources in the area. Temporally, air quality can vary significantly by orders of magnitude due to changes in traffic volumes, meteorological conditions and wind direction.

In assessing baseline air quality, two tools are generally used: ambient air monitoring and air dispersion modelling. In order to adequately characterise the current baseline environment through monitoring, comprehensive measurements would be required at a number of key receptors for PM_{10}, NO_2 and benzene. In addition, two of the key pollutants identified in the scoping study (PM_{10} and NO_2) have limit values which require assessment over time periods varying from one hour to one year. Thus, continuous monitoring over at least a one-year period at a number of locations would be necessary in order to fully determine compliance for these pollutants. Although this study would provide information on current air quality it would not be able to provide predictive information on baseline conditions (UK DEFRA, 2016b), which are the conditions which prevail just prior to opening in the absence of the development. Hence the impacts of the development were fully assessed by air dispersion modelling (UK DEFRA, 2016b), which is the most practical tool for this purpose. The baseline environment has also been assessed using modelling, since the use of the same predictive technique for both the 'do-nothing' and 'do-something' scenario will minimise errors and allow an accurate determination of the relative impact of the development.

In 2011 the UK DEFRA published research (Highways England, 2013) on the long term trends in NO_2 and NO_X for roadside monitoring sites in the UK. This study marked a decrease in NO_2 concentrations between 1996 and 2002, after which the concentrations stabilised with little reduction between 2004 and 2010. The result of this is that there now exists a gap between projected NO_2 concentrations which UK DEFRA previously published and monitored concentrations. The impact of this 'gap' is that

the DMRB screening model can under-predict NO_2 concentrations for predicted future years. Subsequently, the UK Highways Agency (HA) published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years.

9.4.3 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2017 – Indicators of Air Quality*" (EPA, 2018). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2019).

As part of the implementation of the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2019). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone C (EPA, 2019). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

NO_2 monitoring was carried out at three Zone C locations in recent years, Kilkenny, Portlaoise and Mullingar (EPA, 2018). The NO_2 annual average in 2017 for Kilkenny and Portlaoise was 5 µg/m^3 and 11 µg/m^3 respectively. Hence long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m^3. The average results over the last five years at a range of Zone C locations suggests an upper average of no more than 12 µg/m^3 as a background concentration as shown in Table 9.2. Based on the above information, a conservative estimate of the current background NO_2 concentration, for the region of the development in 2019 is 12 µg/m^3.

Long term NO_X monitoring has been carried out at a three Zone C locations in recent years: Mullingar, Kilkenny and Portlaoise. Annual mean concentrations of NO_X at the monitoring sites over the period 2013 – 2017 ranged from 6 - 27 µg/m^3, suggesting an upper average over the five year period of no more than 19 µg/m^3 as a background concentration. An appropriate estimate for the current background NO_X concentration in the region of the proposed development is 19 µg/m^3.

Station	Averaging Period Notes 1, 2	Year				
		2013	2014	2015	2016	2017
Kilkenny	Annual Mean NO_2 (µg/m^3)	4	5	5	7	5
	Max 1-hr NO_2 (µg/m^3)	90	57	70	51	58
Portlaoise	Annual Mean NO_2 (µg/m^3)	-	16	10	11	11
	Max 1-hr NO_2 (µg/m^3)	-	74	84	86	80
Mullingar	Annual Mean NO_2 (µg/m^3)	6	4	-	-	-
	Max 1-hr NO_2 (µg/m^3)	68	53	-	-	-

Note 1 *Annual average limit value – 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).*

Note 2 *1-hour limit value – 200 µg/m^3 as a 99.8th%ile, i.e. not to be exceeded >18 times per year (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).*

Table 9.2 Trends In Zone C Air Quality – Nitrogen Dioxide (NO_2)

Long-term PM_{10} monitoring was carried out at the urban Zone C locations of Galway, Ennis and Portlaoise in recent years. The average annual mean concentrations measured at Ennis and Portlaoise in 2017 were 16 µg/m^3 and 10 µg/m^3 respectively (Table 9.3). In addition, there were at most 12 exceedances over the five year period (in Ennis) of the 24 hour limit value of 50 µg/m^3 measured as a 90.4th percentile (i.e. it must not be exceeded more than 35 times per year). The average results over the last five years at a range of Zone C locations suggests an upper average of no more than 19 µg/m^3 as a background concentration. Based on the above information a

conservative estimate of the current background PM_{10} concentration for the region of the development in 2019 is 19 µg/m^3.

Station	Averaging Period Notes 1, 2	Year				
		2013	2014	2015	2016	2017
Galway	Annual Mean PM_{10} (µg/m^3)	21	15	15	15	-
	24-hr Mean > 50 µg/m^3 (days)	11	0	2	3	-
Ennis	Annual Mean PM_{10} (µg/m^3)	20	21	18	17	16
	24-hr Mean > 50 µg/m^3 (days)	8	8	10	12	9
Portlaoise	Annual Mean PM_{10} (µg/m^3)	-	-	12	12	10
	24-hr Mean > 50 µg/m^3 (days)	-	-	1	1	0

Note 1 *Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).*

Note 2 *24-hour limit value - 50 µg/m^3 as a 90.4th%ile, i.e. not to be exceeded >35 times per year (EU Council Directive 1999/30/EC & S.I. No. 180 of 2011).*

Table 9.3 Trends In Trends In Zone D Air Quality - PM_{10}

The results of $PM_{2.5}$ monitoring at Ennis for the period 2013-2017 indicated an average $PM_{2.5}/PM_{10}$ ratio ranging from 0.60–0.76. Based on this information, a conservative ratio of 0.8 was used to generate a current background $PM_{2.5}$ concentration of 15.2 µg/m^3.

In terms of benzene, monitoring data for the Zone C location of Kilkenny for the period 2014 – 2017 showed an upper average concentration of no more than 0.2 µg/m^3, which is significantly below the 5 µg/m^3 limit value. Based on this monitoring data a conservative estimate of the current background concentration in the region of the development is 0.2 µg/m^3.

With regard to CO, annual averages at the Zone C monitoring station in Portlaoise over the 2015–2017 period, gave an annual mean concentration of no more than 0.4 mg/m^3. Based on this EPA data, a conservative estimate of the current background CO concentration in the region of the development is 0.4 mg/m^3.

9.5 Characteristics of the Proposed Development

The site is located in Drogheda, in the Rathmullan area. The site is predominantly surrounded by green fields and is bounded by the M1 motorway to the west and the Boyne River to the north. There are a number of residential housing estates to the east. A full description of the development can be found in Chapter 2.0.

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

A. Construction phase; and
B. Operational phase.

During the construction stage, the main source of air quality impacts will be as a result of fugitive dust emissions from site activities. Emissions from construction vehicles and machinery have the potential to impact climate. The primary sources of air and climatic emissions in the operational context are deemed long term and will involve the change in traffic flows or congestion in the local areas which are associated with the development.

The following describes the primary sources of potential air quality and climate impacts which have been assessed as part of this EIAR.

9.6 Potential Impact of the Proposed Development

9.6.1 Construction Stage

Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust and PM_{10}/$PM_{2.5}$ emissions. The proposed development can be considered large in scale and therefore there is the potential for significant dust soiling 100m from the source (TII, 2011) (Table 9.4). While construction dust tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. There are a number of sensitive receptors, predominantly residential properties within 100m of the site to the direct east. In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a dust minimisation plan. Provided the dust minimisation measures outlined in the plan (see Appendix 9.3) are adhered to, the air quality impacts during the construction phase will not be significant.

Source		Potential Distance for Significant Effects (Distance From Source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation Effects**
Major	Large construction sites, with high use of haul roads	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul roads	50m	15m	15m
Minor	Minor construction sites, with limited use of haul roads	25m	10m	10m

Table 9.4 Assessment Criteria for the Impact of Dust from Construction, with Standard Mitigation in Place (TII, 2011)

Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. However, the impact on the climate is considered to be imperceptible in the short and long term.

Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short-term and imperceptible with respect to human health.

9.6.2 Operational Stage

Local Air Quality

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, CO, benzene, PM_{10} and $PM_{2.5}$.

Traffic flow information was obtained from Waterman Moylan, the consulting engineers on this project and has been used to model pollutant levels under various traffic scenarios and under sufficient spatial resolution to assess whether any significant air quality impact on sensitive receptors may occur.

Cumulative effects have been assessed, as recommended in the EU Directive on EIA (Council Directive 97/11/EC) and using the methodology of the UK DEFRA (2016a, 2016b). Firstly, background concentrations (EPA, 2019) have been included in the modelling study. These background concentrations are year-specific and account for non-localised sources of the pollutants of concern. Appropriate background levels were selected based on the available monitoring data provided by the EPA (2019) (see Section 9.4.3). The modelling scenarios include for the cumulative impact of other developments in the vicinity of the proposed development, where such information is available.

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of CO, benzene, NO_2, PM_{10} and $PM_{2.5}$ for the baseline, opening and design years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impact, to be determined.

The receptors modelled represent the worst-case locations close to the proposed development and were chosen due to their close proximity (within 200 m) to the road links impacted by proposed development. The worst case traffic data, which satisfied the assessment criteria detailed in Section 9.3.1, is shown in Table 9.5. Seven sensitive receptors (R1 – R7) in the vicinity of the proposed development have been assessed. Sensitive receptors have been chosen as they have the potential to be adversely impacted by the development, these receptors are detailed in Figure 9.2.

Road Name	Speed (kmh)	% HGV	Base	Do Nothing	Do Something	Do Nothing	Do Something
			2018	2023		2028	
Rathmullan Road Note 1	40	5%	1,610	1,700	2,177	1,769	2,246
Rathmullan Road/Site Location	40	5%	1,949	2,058	4,668	2,142	4,751
Rathmullan Road/Marley's Lane (W)	40	5%	5,714	6,034	8,838	6,280	9,083
Marley's Lane	40	5%	7,949	8,394	9,860	8,736	10,202
Rathmullan Road/Marley's Lane (E)	40	5%	7,831	8,270	9,763	8,607	10,100
Rathmullan Road/R132	40	5%	7,667	8,096	9,608	8,426	9,938
Marley's Lane/Dorone Road	40	5%	8,417	8,889	10,377	9,251	10,739

Note 1 Data used for ecological assessment only

Table 9.5 Traffic Data Used in Air Modelling Assessment

Figure 9.2 Approximate Location of Sensitive Receptors used in Air Quality Assessment

Modelling Assessment

Transport Infrastructure Ireland *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (TII, 2011) detail a methodology for determining air quality impact significance criteria for road schemes and has been adopted for this assessment, as is best practice. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

NO_2

The results of the assessment of the impact of the proposed development on NO_2 in the opening year 2023 and design year 2028 are shown Table 9.6 for the Highways Agency IAN 170/12 and Table 9.7 using the UK Department for Environment, Food and Rural Affairs technique respectively. The annual average concentration is in compliance with the limit value at all worst-case receptors using both techniques. Levels of NO_2 are 38% of the annual limit value in 2023 using the more conservative IAN technique, while concentrations are 36% of the annual limit value in 2023 using the UK Department for Environment, Food and Rural Affairs technique. Concentrations in the design year of 2028 are also low, with NO_2 levels reaching at most36% of the annual limit value using the more conservative IAN technique. The hourly limit value for NO_2 is 200 µg/m^3 and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The maximum 1-hour NO_2 concentration is not predicted to be exceeded using either technique in 2023 or 2028 (Table 9.8).

The impact of the proposed development on annual mean NO_2 levels can be assessed relative to "Do Nothing (DN)" levels in 2023 and 2028. Relative to baseline levels, some small increases in pollutant levels are predicted as a result of the proposed development. With regard to impacts at individual receptors, the greatest impact on NO_2 concentrations will be an increase of 3% of the annual limit value at Receptor 1. Thus, using the assessment criteria outlined in Appendix 9.2 Tables A1 – A2, the impact of the proposed development in terms of NO_2 is negligible. Therefore, the overall impact of

NO_2 concentrations as a result of the proposed development is long-term and imperceptible at all of the receptors assessed.

PM_{10}

The results of the modelled impact of the proposed development for PM_{10} in the opening year 2023 and design year 2028 are shown in Table 9.9. Predicted annual average concentrations at the worst-case receptor in the region of the development are at most 49% of the limit value in 2023 and 2028. The 24-hour mean limit value of 50 µg/m^3 is expressed as a 90.4th percentile (i.e. it must not be exceeded more than 35 times per year). The proposed development will cause an increase of one day exceedance from 2 to 3 days at the worst case receptors (R2, R3, R6 and R7), however, 35 days of exceedance are permitted per year (Table 9.10).

Relative to baseline levels, some imperceptible increases in PM_{10} levels at the worst-case receptors are predicted as a result of the proposed development. The greatest impact on PM_{10} concentrations in the region of the proposed development will be an increase of 0.6% of the annual limit value at Receptor 1. Thus, the magnitude of the changes in air quality are negligible at all receptors based on the criteria outlined in Appendix 9.2, Tables A1 – A3. Therefore, the overall impact of PM_{10} concentrations as a result of the proposed development is long-term and imperceptible.

$PM_{2.5}$

The results of the modelled impact of the proposed development for $PM_{2.5}$ are shown in Table 9.11. Predicted annual average concentrations in the region of the proposed development are 62% of the limit value in 2023 and 2028 at the worst-case receptor.

Relative to baseline levels, imperceptible increases in $PM_{2.5}$ levels at the worst-case receptors are predicted as a result of the proposed development. None of the receptors assessed will experience an increase in concentrations of over 0.7% of the limit value. Therefore, using the assessment criteria outlined in Appendix 9.2, Tables A1 – A2, the impact of the proposed development with regard to $PM_{2.5}$ is negligible at all of the receptors assessed. Overall, the impact of increased $PM_{2.5}$ concentrations as a result of the proposed development is long-term and imperceptible.

CO and Benzene

The results of the modelled impact of CO and benzene are shown in Table 9.12 and Table 9.13 respectively. Predicted pollutant concentrations with the proposed development in place are below the ambient standards at all locations. Levels of CO are 22% of the limit value in 2023 with levels of benzene reaching 6% of the limit value. CO concentrations in the design year 2028 also reach only 22% of the limit value and concentrations of benzene reach 5% of the limit.

Relative to baseline levels, some imperceptible increases in pollutant levels at the worst-case receptors are predicted as a result of the proposed development. The greatest impact on CO and benzene concentrations will be an increase of 0.66% of the CO limit and 0.3% of the benzene limit value at Receptor 1. Thus, using the assessment criteria for NO_2 and PM_{10} outlined in Appendix 9.2 and applying these criteria to CO and benzene, the impact of the proposed development in terms of CO and benzene is negligible, long-term and imperceptible.

Summary of Local Air Quality Modelling Assessment

Levels of traffic-derived air pollutants from the proposed development will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in Appendix 9.2, Tables A1 – A3, the impact of the development in terms of PM_{10}, $PM_{2.5}$, CO, NO_2 and benzene is negligible, long-term, localised negative and imperceptible.

Regional Air Quality Impact

The regional impact of the proposed development on emissions of NO_X and VOCs has been assessed using the procedures of Transport Infrastructure Ireland (2011) and the UK Department for Environment, Food and Rural Affairs (2016b). The results (see Table 9.14) show that the likely impact of the proposed development on Ireland's obligations under the Targets set out by Directive

EU 2016/2284 "*On the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC*" are imperceptible and long-term. For the opening year 2023, the predicted impact of the changes in AADT is to increase NO_x levels by 0.00043% of the NO_x emissions ceiling and increase VOC levels by 0.00017% of the VOC emissions ceiling to be complied with in 2020. Impacts in the design year of 2028 are also predicted to be low, with NOx levels increasing by 0.00071% of the NOx emissions ceiling and VOC levels increasing by 0.00019% of the VOC emissions ceiling to be complied with in 2030.

Therefore, the likely overall magnitude of the changes on air quality in the operational stage of the proposed development is imperceptible, long-term and not significant.

Air Quality Impact on Sensitive Ecosystems

The impact of NO_X (i.e. NO and NO_2) emissions resulting from the traffic associated with the proposed development at the Boyne River Islands pNHA, River Boyne and River Blackwater SPA and River Boyne and River Blackwater SAC was assessed. The traffic data, which satisfied the assessment criteria outlined in Section 9.3.4 and used in the modelling assessment is detailed in Table 9.5. Ambient NO_X concentrations were predicted for the worst case assessment year of 2028 along a transect of up to 200m, and are given in Table 9.15. The road contribution to dry deposition along the transect is also given and was calculated using the methodology of TII (2011).

The predicted annual average NO_X level in the pNHA, SPA and SAC is below the limit value of 30 $\mu g/m^3$ for the "Do Something" scenario with the proposed development in place, with NO_X concentrations reaching 61% of the limit value in the assessment year of 2028, including background levels.

The impact of the proposed development can be assessed relative to "Do Nothing" levels, the impact of the proposed development leads to an increase in NO_X concentrations of at most 0.37 $\mu g/m^3$ within the designated sites. Appendix 9 of the TII guidelines (2011) state that where the scheme or development is expected to cause an increase of more than 2 $\mu g/m^3$ and the predicted concentrations (including background) are close to, or exceed the standard, then the sensitivity of the habitat to NO_X should be assessed by the project ecologist. Concentrations within the pNHA, SPA and SAC are not predicted to increase by 2 $\mu g/m^3$ or more and the predicted concentrations are not above or close to the standard, as such it was not necessary for the sensitivity of the habitat to NO_X to be assessed by an ecologist.

The contribution to the NO_2 dry deposition rate along the 200m transect within the pNHA, SPA and SAC is also detailed in Table 9.15. The maximum increase in the NO_2 dry deposition rate is 0.02 Kg(N)/ha/yr. This is well below the critical load for inland and surface water habitats of 5 - 10Kg(N)/ha/yr (TII, 2011).

It can be determined that the impact from air quality on the designated sites is long-term, imperceptible and not significant.

Climate

The impact of the proposed development on emissions of CO_2 impacting climate were also assessed using the Design Manual for Roads and Bridges screening model (see Table 9.14). The results show that the impact of the proposed development in the opening year 2023 and design year 2028 will be to increase CO_2 emissions by 0.00041% of Ireland's EU 2020 Target. Thus, the impact of the proposed development on national greenhouse gas emissions will be insignificant in terms of Ireland's obligations under the EU 2020 Target (EU, 2014).

Therefore, the likely overall magnitude of the changes on climate in the operational stage of the proposed development is imperceptible, negative, long-term and not significant.

Human Health

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results, emissions as a result of the proposed

development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

Odour

A pumping station provided to Irish Water specifications including a wet kiosk and control kiosk will form part of the proposed development. There is the potential for odour related emissions from this to impact nearby dwellings during the operational stage. However, odour nuisance issues are unlikely as a result of the pumping station as the station will be built to the current Irish Water standards and will incorporate best practice odour abatement techniques such as chemical dosing into the wet well and will be fully enclosed. In addition, the station will be located at a minimum of 15m from the nearest habitable dwelling further reducing the potential for odour impacts.

Any odour emissions are likely to be brief and highly infrequent in nature, and will depend on wind direction and weather conditions. As the pumping station is to be located in the north-eastern area of the site and the prevailing wind direction in the area is from westerly to south-westerly (see Figure 9.1) this will aid in dispersal of any potential odours away from nearby sensitive receptors. Provided appropriate abatement is in place at the pumping station, odour related impacts are not predicted to be significant.

Receptor	Impact Opening Year 2023					Impact Design Year 2028				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	11.9	13.1	1.17	Small	Small Increase	11.5	12.6	1.11	Small	Small Increase
2	13.4	14.3	0.87	Small	Small Increase	13.0	13.8	0.82	Small	Small Increase
3	13.5	14.5	1.06	Small	Small Increase	13.1	14.1	1.00	Small	Small Increase
4	14.4	15.0	0.60	Small	Small Increase	14.0	14.6	0.57	Small	Small Increase
5	13.8	14.3	0.51	Small	Small Increase	13.4	13.8	0.48	Small	Small Increase
6	13.6	14.1	0.50	Small	Small Increase	13.2	13.6	0.46	Small	Small Increase
7	13.3	13.7	0.40	Imperceptible	Negligible Increase	12.9	13.3	0.37	Imperceptible	Negligible Increase

Table 9.6 Annual Mean NO_2 Concentrations (µg/m³) (using IAN 170/12 V3 Long Term NO_2 Trend Projections)

Receptor	Impact Opening Year 2023					Impact Design Year 2028				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	11.3	12.4	1.11	Small	Small Increase	11.4	12.4	1.09	Small	Small Increase
2	12.8	13.7	0.83	Small	Small Increase	12.9	13.7	0.81	Small	Small Increase
3	12.9	13.9	1.01	Small	Small Increase	13.0	14.0	0.99	Small	Small Increase
4	13.8	14.4	0.58	Small	Small Increase	13.9	14.5	0.57	Small	Small Increase
5	13.2	13.7	0.49	Small	Small Increase	13.3	13.7	0.48	Small	Small Increase
6	13.0	13.5	0.48	Small	Small Increase	13.1	13.5	0.46	Small	Small Increase
7	12.7	13.1	0.38	Imperceptible	Negligible Increase	12.8	13.1	0.37	Imperceptible	Negligible Increase

Table 9.7 Annual Mean NO_2 Concentrations (µg/m³) (using Defra's Technical Guidance)

Receptor	IAN 170/12 V3 Long Term NO_2 Trend Projections Technique				Defra's Technical Guidance Technique			
	Opening Year 2023		Design Year 2028		Opening Year 2023		Design Year 2028	
	DN	DS	DN	DS	DN	DS	DN	DS
1	41.7	45.8	40.3	44.2	41.7	45.8	40.3	44.2
2	47	50	45.5	48.3	47	50	45.5	48.3
3	47.2	50.9	45.7	49.2	47.2	50.9	45.7	49.2
4	50.4	52.5	49	51	50.4	52.5	49	51
5	48.2	50	46.8	48.5	48.2	50	46.8	48.5
6	47.6	49.3	46.1	47.8	47.6	49.3	46.1	47.8
7	46.6	48	45.1	46.4	46.6	48	45.1	46.4

Table 9.8 1 Hour 99.8th%ile NO_2 Concentrations (µg/m³)

Receptor	Impact Opening Year 2023					Impact Design Year 2028				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	18.8	19.1	0.23	Imperceptible	Negligible Increase	18.9	19.1	0.23	Imperceptible	Negligible Increase
2	19.2	19.3	0.17	Imperceptible	Negligible Increase	19.2	19.4	0.18	Imperceptible	Negligible Increase
3	19.2	19.4	0.21	Imperceptible	Negligible Increase	19.2	19.4	0.21	Imperceptible	Negligible Increase
4	19.4	19.5	0.12	Imperceptible	Negligible Increase	19.4	19.5	0.12	Imperceptible	Negligible Increase
5	19.2	19.3	0.10	Imperceptible	Negligible Increase	19.3	19.4	0.10	Imperceptible	Negligible Increase
6	19.2	19.3	0.10	Imperceptible	Negligible Increase	19.2	19.3	0.10	Imperceptible	Negligible Increase
7	19.1	19.2	0.08	Imperceptible	Negligible Increase	19.2	19.2	0.08	Imperceptible	Negligible Increase

Table 9.9 Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

Receptor	Opening Year 2023		Design Year 2028	
	DN	DS	DN	DS
1	2	2	2	2
2	2	3	2	3
3	2	3	2	3
4	3	3	3	3
5	3	3	3	3
6	2	3	3	3
7	2	3	2	3

Table 9.10 No. Days with PM_{10} Concentration > 50 $\mu g/m^3$

Receptor	Impact Opening Year 2023					Impact Design Year 2028				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	15.1	15.3	0.18	Imperceptible	Negligible Increase	15.1	15.3	0.19	Imperceptible	Negligible Increase
2	15.3	15.5	0.14	Imperceptible	Negligible Increase	15.3	15.5	0.14	Imperceptible	Negligible Increase
3	15.3	15.5	0.17	Imperceptible	Negligible Increase	15.4	15.5	0.17	Imperceptible	Negligible Increase
4	15.5	15.6	0.10	Imperceptible	Negligible Increase	15.5	15.6	0.10	Imperceptible	Negligible Increase
5	15.4	15.5	0.08	Imperceptible	Negligible Increase	15.4	15.5	0.08	Imperceptible	Negligible Increase
6	15.4	15.4	0.08	Imperceptible	Negligible Increase	15.4	15.5	0.08	Imperceptible	Negligible Increase
7	15.3	15.4	0.06	Imperceptible	Negligible Increase	15.3	15.4	0.06	Imperceptible	Negligible Increase

Table 9.11 Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)

Receptor	Impact Opening Year 2023					Impact Design Year 2028				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	2.05	2.12	0.066	Imperceptible	Negligible Increase	2.05	2.12	0.066	Imperceptible	Negligible Increase
2	2.14	2.19	0.050	Imperceptible	Negligible Increase	2.15	2.20	0.050	Imperceptible	Negligible Increase
3	2.15	2.21	0.061	Imperceptible	Negligible Increase	2.15	2.21	0.061	Imperceptible	Negligible Increase
4	2.20	2.24	0.036	Imperceptible	Negligible Increase	2.21	2.25	0.035	Imperceptible	Negligible Increase
5	2.16	2.19	0.030	Imperceptible	Negligible Increase	2.17	2.20	0.029	Imperceptible	Negligible Increase
6	2.15	2.18	0.029	Imperceptible	Negligible Increase	2.16	2.19	0.029	Imperceptible	Negligible Increase
7	2.14	2.16	0.023	Imperceptible	Negligible Increase	2.14	2.16	0.023	Imperceptible	Negligible Increase

Table 9.12 Maximum 8-hour CO Concentrations (mg/m³)

Receptor	Impact Opening Year 2023					Impact Design Year 2028				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	0.21	0.23	0.015	Imperceptible	Negligible Increase	0.21	0.23	0.015	Imperceptible	Negligible Increase
2	0.23	0.24	0.011	Imperceptible	Negligible Increase	0.23	0.24	0.011	Imperceptible	Negligible Increase
3	0.23	0.25	0.014	Imperceptible	Negligible Increase	0.23	0.25	0.014	Imperceptible	Negligible Increase
4	0.25	0.25	0.008	Imperceptible	Negligible Increase	0.25	0.25	0.008	Imperceptible	Negligible Increase
5	0.24	0.24	0.007	Imperceptible	Negligible Increase	0.24	0.24	0.007	Imperceptible	Negligible Increase
6	0.23	0.24	0.006	Imperceptible	Negligible Increase	0.24	0.24	0.006	Imperceptible	Negligible Increase
7	0.23	0.24	0.005	Imperceptible	Negligible Increase	0.23	0.24	0.005	Imperceptible	Negligible Increase

Table 9.13 Annual Mean Benzene Concentrations (µg/m³)

Year	Scenario	VOC (kg/annum)	NO_X (kg/annum)	CO_2 (tonnes/annum)
2023	Do Nothing	802	2389	1305
	Do Something	898	2673	1461
2028	Do Nothing	834	2490	1360
	Do Something	930	2774	1516
Increment in 2023		96.2 kg	283.9 kg	156.4 Tonnes
Increment in 2028		96 kg	284.3 kg	156.6 Tonnes
Emission Ceiling (kilo Tonnes) 2020		**56.8**	**66.2**	**37,943**
Emission Ceiling (kilo Tonnes) 2030		**51.5**	**40.2**	**37,943**
Impact in 2023 (%)		0.00017 %	0.00043 %	0.00041 %
Impact in 2028 (%)		0.00019 %	0.00071 %	0.00041 %

Table 9.14 Regional Air Quality and Climate Impact Assessment

Distance to Road (m)	NO_X Concentration (µg/m³)			NO_2 Dry Deposition Rate Impact
	Do Nothing	Do Something	Change in Concentration - Impact	Kg N ha^{-1} yr^{-1}
2	17.88	18.25	0.37	0.020
12	17.68	18.00	0.32	0.017
22	17.39	17.64	0.24	0.013
32	17.19	17.37	0.19	0.011
42	17.04	17.18	0.14	0.008
52	16.92	17.04	0.11	0.006
62	16.83	16.92	0.09	0.005
72	16.76	16.83	0.07	0.004
82	16.71	16.76	0.06	0.003
92	16.66	16.71	0.04	0.002
102	16.63	16.66	0.03	0.002
112	16.60	16.62	0.03	0.002
122	16.58	16.60	0.02	0.001
132	16.56	16.58	0.02	0.001
142	16.55	16.56	0.01	0.000
152	16.54	16.55	0.01	0.001
162	16.54	16.55	0.01	0.001
172	16.54	16.55	0.01	0.000
182	16.53	16.54	0.01	0.000
192	16.52	16.53	0.01	0.001

Table 9.15 Air Quality Impact on Designated Sites - Boyne River Islands pNHA, River Boyne and River Blackwater SPA and River Boyne and River Blackwater SAC

9.6.3 Do Nothing Impact

The Do Nothing scenario includes retention of the current site without the proposed residential development in place. In this scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

The Do Nothing scenario for the operational phase has been assessed in Section 9.6.2.

9.6.4 Cumulative Assessment

Should the construction phase of the proposed development coincide with the construction of any other permitted developments within 350m of the then there is the potential for cumulative dust impacts to the nearby sensitive receptors. The dust mitigation measures outlined in Appendix 9.3 should be applied throughout the construction phase of the proposed development, with similar mitigation measures applied for other permitted developments which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the proposed development are deemed short-term and not significant.

If additional residential or commercial developments are proposed in the future, in the vicinity of the proposed development, this has the potential to add further additional vehicles to the local road network. However, as the traffic impact for the proposed development has an imperceptible impact on air quality, it is unlikely that other future developments of similar scale would give rise to a significant impact during the construction and operational stages of those projects. Future projects of a large scale would need to conduct an EIA to ensure that no significant impacts on air quality will occur as a result of those developments.

9.7 Remedial Or Reductive Measures

9.7.1 Construction Phase

Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 9.3.

In summary the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Climate

Construction traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the development. Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term and temporary nature of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

9.7.2 Operational Phase

The results of the air dispersion modelling study indicate that the impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase.

9.8 Monitoring

9.8.1 Construction Phase

Monitoring of construction dust deposition at nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m^2*day) during the monitoring period between 28 - 32 days.

9.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

9.9 References

DEHLG (2004) National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010

DEHLG (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities

DEHLG (2007) Update and Revision of the National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010

Department of the Environment, Heritage and Local Government (2010) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities

EEA (2012) NEC Directive Status Reports 2011

Environmental Protection Agency (EPA) (2002) Guidelines On Information To Be Contained in Environmental Impact Statements

Environmental Resources Management (1998) Limitation and Reduction of CO2 and Other Greenhouse Gas Emissions in Ireland

EPA (2003) Advice Notes On Current Practice (In The Preparation Of Environmental Impact Statements)

EPA (2015) Advice Notes for Preparing Environmental Impact Statements – Draft

EPA (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft

EPA (2018) Air Quality Monitoring Report 2017 (& previous annual reports 2012-2016)

EPA (2019) EPA Website: http://www.epa.ie/whatwedo/monitoring/air/

EU (2014) EU 2030 Climate and Energy Framework

European Commission (2014)

Framework Convention on Climate Change (1997) Kyoto Protocol To The United Nations Framework Convention On Climate Change

Framework Convention on Climate Change (1999) Ireland - Report on the in-depth review of the second national communication of Ireland

German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft

Highways England (2013) Interim Advice Note 170/12 v3 Updated air quality advice on the assessment of future NO_x and NO_2 projections for users of DMRB Volume 11, Section 3, Part 1 'Air Quality

Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1

Transport Infrastructure Ireland (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes (Rev. 2, Transport Infrastructure Ireland, 2009)

Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes

UK DEFRA (2016a) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM. PG(16)

UK DEFRA (2016b) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG(16)

UK DEFRA (2017) NO_x to NO_2 Conversion Spreadsheet (Version 6.1)

UK Department of the Environment, Transport and Roads (1998) Preparation of Environmental Statements for Planning Projects That Require Environmental Assessment - A Good Practice Guide, Appendix 8 - Air & Climate

UK Highways Agency (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 - HA207/07 (Document & Calculation Spreadsheet)

World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)

CHAPTER 10 MATERIAL ASSETS – WASTE MANAGEMENT & TRAFFIC AND TRANSPORT

WASTE MANAGEMENT

10.1 Introduction

AWN Consulting has prepared part of this chapter of the EIAR which assesses and evaluates the likely impact of the generation of waste materials arising during the construction and operational phases of the proposed development.

A site-specific Construction and Demolition Waste Management Plan (C&D WMP) has been prepared to deal with waste generation during the construction phase of the project and is included as Appendix 10.1. The C&D WMP was prepared in accordance with the 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006. A separate Operational Waste Management Plan (OWMP) has also been prepared for the operational phase of the development and is included as Appendix 10.2. These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

This chapter was completed by Chonaill Bradley, a Senior Environmental Consultant in the waste section of AWN Consulting. He holds a BSc (Environmental Science) and is a Graduate Member of the Institute of Waste Management (GradCIWM). He has over 5 years' experience in environmental consultancy and Environmental Impact Assessment with 3 years of this experience focused on in Waste Management. He has assisted in the coordination and preparation of specialist inputs including the Waste Management Chapters, Operational, and C&D Waste Management Plans for numerous EIS/EIA/EIARs.

10.2 Research Methodology

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in Appendices 10.1 and 10.2.

This Chapter is based on the proposed development, as described in Chapter 2.0 and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation and excavation); and
- Operational phase.

A desk study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the construction and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the *National Waste Reports* and *National Waste Statistics*, data recorded from

similar previous developments, Irish and US EPA waste generation research as well as other available research sources.
Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 10.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 6.0 Soils, Geology and Hydrogeology. Chapter 6.0 of the EIAR also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the proposed development

10.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act, 1996 (as amended).

In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006. The guidance document *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* was also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports including the EMR Waste Management Plan 2015–2021, BS 5906:2005 Waste Management in Buildings – Code of Practice, the EPA National Waste Database Reports 1998–2016 and the EPA National Waste Statistics Web Resource.

10.3 Receiving Environment

In terms of waste management, the receiving environment is largely defined by Meath County Council (MCC) as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021.*

The waste management plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of *"70% preparing for reuse, recycling and other recovery of construction and demolition waste"* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020. The National Waste Statistics update published by the EPA in October 2018 identifies that Ireland's current progress against this C&D waste target is at 68% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 45%. Both of these

targets are required to be met by 12th December 2020 in accordance with the requirements of the Waste Framework Directive.

In terms of physical waste infrastructure, there are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

There is a civic amenity centre at Mell Road, Drogheda, Co. Louth, which accepts a wide range of wastes including cardboard, newspaper, glass (green, brown, clear), aluminium, drink cans, textiles (e.g. clothes), car batteries, scrap metal, wood, washing machines, fridges, cookers and electrical appliances. There are also 9 no. bring banks in Drogheda that take glass and cans.

10.4 Characteristics of the Proposed Development

A full description of the development can be found in Chapter 2.0. The characteristics of the development that are relevant in terms of waste management are summarised below.

10.4.1 Demolition Phase

There will be waste materials generated from the demolition of the existing buildings and hardstanding areas on site, as well as from the excavation of the building foundations. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

Scott Cawley Ltd. undertook a site assessment/survey searching directly for evidence of Japanese Knotweed (*Fallopia japonica*) and other invasive species on the 25th September 2018 and the 26th March 2019. This included a walkover survey of the entire site, and around part of the outside perimeter. No Knotweed plant species were recorded inside the site boundary. Japanese Knotweed was recorded nearby along the banks of the river Boyne. Further details can be found in Chapter 5.0 Biodiversity.

The estimated quantum of demolition waste and indicative reuse/recovery/recycling/disposal targets as detailed in the C&D WMP are presented in Table 10.1.

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	0.0	0	0.0	85	0.0	15	0.0
Concrete, Bricks, Tiles, Ceramics	297.0	30	89.1	65	193.1	5	14.9
Plasterboard	0.0	0	0.0	80	00	20	0.0
Asphalts	16.2	0	0.0	25	4.1	75	12.2
Metal	162.0	5	8.1	80	129.6	15	24.3
Slate	0.0	0	0.0	85	0.0	15	0.0
Timber	64.8	20	6.5	40	25.9	50	32.4
Total	**540.0**		**103.7**		**352.6**		**83.7**

Table 10.1 Estimated off-site reuse, recycle and disposal rates for demolition waste

It should be noted that until a detailed survey of the areas to be demolished is carried out, it is difficult to predict with a high level of accuracy the demolition waste that will be generated from the proposed works.

As noted in Section 10.1, a site-specific C&D WMP has been prepared by AWN consulting (AWN) for the proposed development and is included as Appendix 10.1. The plan will be updated, or a demolition plan will be prepared and submitted prior to commencement of the demolition phase which may refine the demolition waste figures detailed in Table 10.1.

10.4.2 Construction Phase

During the construction phase, waste will be produced from 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.

In addition, topsoil and subsoil will require excavation to facilitate site preparation, construction of the building foundations and access roads and the installation of underground services. The project engineers, (Waterman-Moylan) have estimated that there will be no surplus soils and stones generated from the excavations. If any excavated material is required to be removed from site it will be taken for offsite reuse, recovery and/or disposal.

Site investigations were undertaken at the site in November 2018. Soil samples were collected for analysis for the Waste Acceptance Criteria (WAC) suite of analysis. Based on the samples collected, the soil would be classed as inert in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC). This legislation sets limit values for acceptance of waste material to landfills based on properties of the waste including potential pollutant concentrations and leachability.

Based on the sampling conducted, it is anticipated that if any surplus material is generated it will be suitable for acceptance at inert soil recovery facilities/landfills in Ireland. In the unlikely event of hazardous material being encountered, it would need to be transported for treatment/recovery or exported abroad for disposal in suitable facilities. Additional sampling and analysis may be required prior to commencement of the excavations to provide further confirmation of the classification of the material prior to removal offsite. The density of the sampling and the range of analysis required are dependent on the requirements of the receiving facilities.

During the construction phase there may be a surplus of building materials, such as off-cuts of timber, plasterboard, insulation and plastic ducts, broken concrete blocks, bricks, tiles and metal waste. There may also be excess concrete during construction which will need to be disposed of. A significant volume of cardboard and soft plastic waste will be generated from packaging.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP, included as Appendix 10.1. The C&D WMP provides an estimate of the main waste types likely to be generated during the construction phase of the proposed development and these are summarised in Table 10.2.

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	825.9	10	82.6	80	660.7	15	82.6
Timber	700.8	40	280.3	55	385.4	5	35.0
Plasterboard	250.3	30	75.1	60	150.2	20	25.0

Metals	200.2	5	10.0	90	180.2	75	10.0
Concrete	150.2	30	45.0	65	97.6	15	7.5
Other	375.4	20	75.1	60	225.2	15	75.1
Total	2502.7	10	568.1	80	1699.3	50	235.3

Table 10.2 Reuse, Recycle/Recovery and Disposal Rates for Construction Waste

It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the construction waste that will be generated from the construction of the proposed development as the exact materials and quantities may be subject to some degree of change and variation during the construction process. However, the above estimates are considered to be the worst-case scenario

10.4.3 Operational Phase

As noted in Section 10.1, an OWMP has been prepared for the development and is included as Appendix 10.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the operational phase including dry mixed recyclables, organic waste and mixed non-recyclable waste as well as providing a strategy for management of waste glass, batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the development for the main waste types is presented in Table 10.3, 10.4 and 10.5 below and is based on the uses and areas as advised by the project architects (NDBA Architects) in April 2019.

Waste Type	**Waste Volume (m^3/week)**			
	Residential no. 2 Bedroom (Individual)	**Residential no. 3 Bedroom (Individual)**	**Residential no. 4 Bedroom (Individual)**	**Residential Apartment Block A**
Organic Waste	0.02	0.02	0.02	0.67
DMR	0.12	0.14	0.18	4.59
Glass	0.01	0.01	0.01	0.13
MNR	0.07	0.08	0.10	3.05
Total	**0.22**	**0.25**	**0.31**	**8.44**

Table 10.3 Estimated waste generation for the proposed development for the main waste types

Waste Type	**Waste Volume (m^3/week)**			
	Residential Apartment Block B	**Residential Apartment Block C**	**Residential Apartment Block D**	**Residential Apartment Block E**
Organic Waste	0.32	0.10	0.20	0.20
DMR	2.16	0.69	1.38	1.38
Glass	0.06	0.02	0.04	0.04
MNR	1.44	0.46	0.91	0.91
Total	**3.97**	**1.26**	**2.53**	**2.53**

Table 10.4 Estimated waste generation for the proposed development for the main waste types

Waste Type	Waste Volume (m^3/week)			
	Residential Apartment Block G (Each Block)	Crèche	Café	Retail
Organic Waste	0.05	0.05	0.09	0.09
DMR	0.34	1.91	0.17	1.71
Glass	0.01	0.01	0.01	0.05
MNR	0.23	0.85	0.22	0.71
Total	**0.63**	**2.82**	**0.47**	**2.55**

Table 10.5 Estimated waste generation for the proposed development for the main waste types

The BS5906:2005 Waste Management in Buildings – Code of Practice was considered in the estimations of the waste arising. It has been assumed that the retail, café, and residential units will generate similar waste volumes over a seven-day period, while the crèche will operate over a five-day period. It is anticipated that the conservative estimation of waste quantities from the residents will be sufficient to cover the small quantities likely to be generated in the community facilities on a weekly basis.

AWN's modelling methodology is based on data from recent published data and data from numerous other similar developments in Ireland and based on AWN's experience it is a more representative estimate of the likely waste arisings from the development.

Residents in houses with side access to the rear of the property will store waste in bins at the back of their residences. For houses without external access to the rear of property, a dedicated shielded area for has been allocated at the front of each property. Shared Waste Storage Areas (WSAs) have been allocated externally for residents in each apartment block and a shared commercial WSA has been allocated at the rear of Block C for the retail, crèche and café unit.

The OWMP seeks to ensure the development contributes to the targets outlined in the EMR Waste Management Plan 2015–2021, the MCC Waste Management (Storage, Presentation and Segregation of Household and Commercial Waste) By-Laws.

Mitigation measures proposed to manage impacts arising from wastes generated during the operation of the proposed development are summarised below

10.5 Potential Impact of the Proposed Development

This section details the potential waste effects associated with the proposed development.

10.5.1 Construction Phase

The proposed development will generate a range of non-hazardous and hazardous waste materials during demolition, excavation and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will be identified across the site. These areas will need to be easily accessible to waste collection vehicles.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as

outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials and acceptance of waste from the proposed development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. Where possible, waste will be segregated into reusable, recyclable and recoverable materials. The majority of demolition and construction materials are either recyclable or recoverable.

Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of soil and stone which will need to be excavated to facilitate the proposed development. It is anticipated that there will be ample opportunities for reuse of the excavated material on site and so it will remain onsite. If for some reason it is required to be removed from site, it will be taken for offsite reuse, recovery and/or disposal. 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 off-site.

The potential effect of construction waste generated from the proposed development is considered to be **short-term, not significant** and **neutral.**

10.5.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. 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. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

Waste contractors will be required to service the development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

The potential impact of operational waste generation from the development is considered to be **long-term, not significant** and **negative.**

10.6 Mitigation and Remedial Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

10.6.1 Construction Phase

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG and is included as Appendix 10.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement of demolition, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to MCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

The project engineers have estimated that no excess material will be generated from the excavations required for construction of new foundations, the installation of underground services and attenuation tank. It is anticipated that all material excavated will be reused onsite in site levelling and landscaping. If excavated material is required to be removed offsite, it will be taken for offsite reuse, recovery, recycling and/or disposal.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:

    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.

- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as detailed in the C&D WMP (Appendix 10.1). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that article 27 will be used.

These mitigation measures will ensure that the waste arising 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 EMR Waste Management Plan (2015-2021) and the and the DCC Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste and the DCC waste and draft waste bye-laws. It will also ensure

optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

10.6.2 Operational Phase

As previously stated, a project specific OWMP has been prepared and is included as Appendix 10.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021 and the MCC waste and draft waste bye-laws.

In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Waste electrical and electronic equipment (WEEE);
    - Batteries (non-hazardous and hazardous);
    - Cooking oil;
    - Light bulbs;
    - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
    - Furniture (and from time to time other bulky waste); and
    - Abandoned bicycles.
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from 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 *EMR Waste Management Plan (2015 - 2021)* and the MCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved

10.7 Predicted Impact of the Proposed Development

The implementation of the mitigation measures outlined in Section 10.6 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the demolition, excavation and construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

10.7.1 Construction Phase

A carefully planned approach to waste management as set out in Section 10.6.1 and adherence to the C&D WMP during the construction phase will ensure that the effect on the environment will be **short-term, imperceptible and neutral.**

10.7.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 10.6.2 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be **long-term, imperceptible** and **neutral.**

10.7.3 Do-Nothing Scenario

If the proposed development was not to go ahead there would be no excavation or construction or operational waste generated at this site. There will would be a neutral effect on the environment.

10.8 Predicted Impact of the proposed Development

The implementation of the mitigation measures outlined in Section 10.6 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the demolition, excavation and construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved

10.9 Difficulties Encountered

There were no difficulties encountered during the production of this chapter of the EIAR.

TRAFFIC AND TRANSPORT

10.10 Introduction

This chapter of the EIAR assesses the likely effects of the proposed development in terms of vehicular, pedestrian and cycle access during the construction and operational phases of the proposed development.

The chapter describes: the methodology; the receiving environment at the application site and surroundings; the characteristics of the proposal in terms of physical infrastructure; the potential impact that proposals of this kind would be likely to produce; the predicted impact of the proposal examining the effects of the proposed development on the local road network; and the remedial or reductive measures required to prevent, reduce or offset any significant adverse effects.

This part of this chapter was prepared by Joe Gibbons. Joe is a Director with Waterman Moylan Consulting Engineers for the past 15 years and has over 33 years' experience in the design and delivery of large scale building projects. Joe spent 8 years working for Waterman Group in London before joining Waterman Moylan in Dublin in 1994. Joe is a Chartered Engineer and has acted in lead roles in civil/structural teams on a wide range of infrastructure and building projects throughout Ireland and the UK. Joe has extensive experience in the preparation of Civil Engineering designs for large scale residential and commercial developments in Ireland. Joe has also prepared and overseen the preparation of the technical engineering sections for numerous Environmental Impact Assessments for large scale residential and commercial developments and has given evidence at Oral Hearings in support of same.

10.11 Methodology

The following methodology has been adopted for this assessment:

- Review of relevant available information including where available Development Plans, existing traffic information and other relevant studies;
- Site visit to gain an understanding of the site access and observe the existing traffic situation;
- Consultations with Meath County Council Roads Department to agree the site access arrangements and determine the scope of the traffic analysis required to accompany a planning application;

- Detailed estimation of the transport demand that will be generated by the development. The morning and evening peak times will be addressed as well as an estimation of the construction stage traffic; and
- Assessment of the percentage impact of traffic on local junctions, car parking requirements and accessibility of the site by sustainable modes including walking, cycling and public transport.

10.12 Receiving Environment

This section considers the baseline conditions, providing background information for the site in order to determine the significance of any traffic implications. This section also considers the existing accessibility of the site by sustainable modes of transport.

10.12.1 Site location

The site is located on Rathmullan Road in Drogheda, Co. Meath. The site is situated approximately 2.5 km west of Drogheda town centre as indicated in Figure 10.1 below. The subject site is bounded to the north by the River Boyne, to the east by existing residential and agricultural areas, to the south by agricultural lands, and to the west by the M1 Dublin to Belfast Motorway.

Figure 10.1 Site location and local road network (Source: Google Earth)

10.12.2 Local Road Network

The main entrance into access to the site is from the Rathmullan Road, which is subject to a speed limit of 50km/h and is 2km in length running from the priority junction with the R132 in Drogheda through to a priority junction at our proposed site entrance. The Rathmullan Road has a cross section of 7.3m wide with footways running along both sides for the majority of its length.

Along the Rathmullan Road, approximately 800m from the priority junction at the proposed site entrance, is a signalised junction with Marleys Lane. Marleys Lane runs north-south between Rathmullan and Donore Road and is also subject to a speed limit of 50km/h. It has a cross section great than 7.3m with a number of traffic islands acting as traffic calming with footways on both sides.

At the southern end of Marleys Lane is a signalised junction with the Donore Road, which is also subjected to a speed limit of 50km/h. The Donore Road to the east, approximately 1.5km, links up with the R132 signalised junction, and to the west, approximately 700m, to the M1 motorway junction.

Proposed road improvements

Meath County Council recently granted planning permission for a residential development on lands adjacent to the subject site under Planning Register Reference No. LB170675. As part of the approved adjacent development, it is proposed to upgrade the existing signalised junction of Rathmullan Road/Marleys Lane by providing a right turn lane on Rathmullan Road. The modelling carried out for the proposed development that is the subject of this EIAR, assumes that the upgrade of the Rathmullan Road/Marleys Lane junction has been completed in advance of our development.

10.12.3 Baseline Traffic Data

In order to quantify the volumes of traffic movements at key points on the road network adjacent to the site, a set of classified turning movement traffic counts were commissioned. The location of these counts was agreed in consultation with Meath County Council's Transportation Department and based upon the locations of the previously approved development.

Accordingly, a Manual classified traffic survey was carried out by 'Abacus Surveys' on Tuesday 10th April 2018 at 2 signalised junctions and 2 priority junctions in the Drogheda Environs during the peak hours of 07:00 – 10:00 and 16:00 – 19:00. The junctions surveyed were:

- Site 01: Rathmullan Road/Local Road,
- Site 02: Rathmullan Road/Marleys Lane (Signalised),
- Site 03: Rathmullan Road/R132 Dublin Road, and
- Site 04: Donore Road/Marley's Lane (Signalised).

The surveys were carried out on the dates identified above to ensure that flows were representative of normal term time and hence not affected by school holidays or other public holidays or events. As such they provide a reasonable representation of a neutral month during a period of normal school and employment activity. The surveys are designed to provide representative values encompassing AM and PM periods during normal traffic conditions. The location of the survey points is depicted below at Figure 10.2.

Figure 10.2 Location of traffic survey points

The results of the traffic surveys are set out in Appendix 10.3 of this report.

The locations of the surveys are each pertinent to the proposal in terms of being at key nodes in the road network that would be affected by traffic assignment and distribution of flows associated with the development site. A summary of the survey results is presented below in
Table 2 for Site 1, Table 10.7 for Site 2, Table 10.8 for Site 3 and Table 10.9 for Site 4.

Description	Total Junction Flow (Veh)	Site Access Road Two Way Flow (Veh)	% Site Access Road Traffic
AM Peak Hour (08:00 - 09:00)	263	355	134%
PM Peak Hour (17:00 - 18:00)	186	363	195%

Table 20.6 Rathmullan Road/Local Road.

Description	Total Junction Flow (Veh)	Site Access Road Two Way Flow (Veh)	% Site Access Road Traffic
AM Peak Hour (08:00 - 09:00)	1,058	284	26.8%
PM Peak Hour (17:00 - 18:00)	1,067	292	27.4%

Table 10.7 Rathmullan Road/Marley's Lane.

Description	Total Junction Flow (Veh)	Site Access Road Two Way Flow (Veh)	% Site Access Road Traffic
AM Peak Hour (08:00 - 09:00)	1,931	142	7.4%
PM Peak Hour (17:00 - 18:00)	2,092	146	7.0%

Table 10.8 Rathmullan Road/R132 Dublin Road.

Description	Total Junction Flow (Veh)	Site Access Road Two Way Flow (Veh)	% Site Access Road Traffic
AM Peak Hour (08:00 - 09:00)	1,237	142	11.5%
PM Peak Hour (17:00 - 18:00)	1,503	146	9.7%

Table 10.9 Donore Road/Marley's Lane.

The General Expansion Factor Method, as described in the NRA Project Appraisal Guidelines Unit 16.1: Expansion Factors for Short Period Traffic Counts (October 2016) was used to convert the surveyed flows for Site 1 into the Annual Average Daily Traffic (AADT). The corresponding factors for the Mid-East Region were used. The surveyed AADT for the Rathmullan Road/Local Road was 1,959 vehicles as shown in Table 10.10 below.

Hour Ending	Proportion of Daily Traffic Flow	Surveyed Traffic Flows through Site 1 (vehicles)
08:00	0.071	66
09:00	0.078	263
10:00	0.062	140
17:00	0.080	171
18:00	0.093	186
19:00	0.080	140
Total	0.464	966

Table 10.10 AADT Calculations

24 Hour Estimate = 966 ÷ 0.464 = 2,082 vehicles

Weekly Average Day Traffic (WADT) = 2,082 x 0.97 = 2,020 vehicles

Annual Average Daily Traffic (AADT) = 2,020 x 0.97 = **1,959 vehicles**

10.12.4 Pedestrian and Cycling Facilities

There are existing footpaths on Rathmullan Road to the east of the subject site leading towards the Drogheda Town Centre. Generally, these footpaths have a width of 2m and are set back from the road edge by a c. 2m wide grass verge. There are signal controlled pedestrian crossings outside St Oliver's Community College and at the junction with Marley's Lane. Marley's Lane also contains footpaths on both sides of the roadway.

The River Boyne boardwalk/rampart to the north of the subject site also provides pedestrian and cyclist links into Drogheda Town Centre.

10.13.5 Public Transport Accessibility

The site is not directly served by public transport services, though the closest services would be approx. 1km east of the site access, being the Drogheda (Opp Hillview Estate) stop which is served by the 173 bus route.

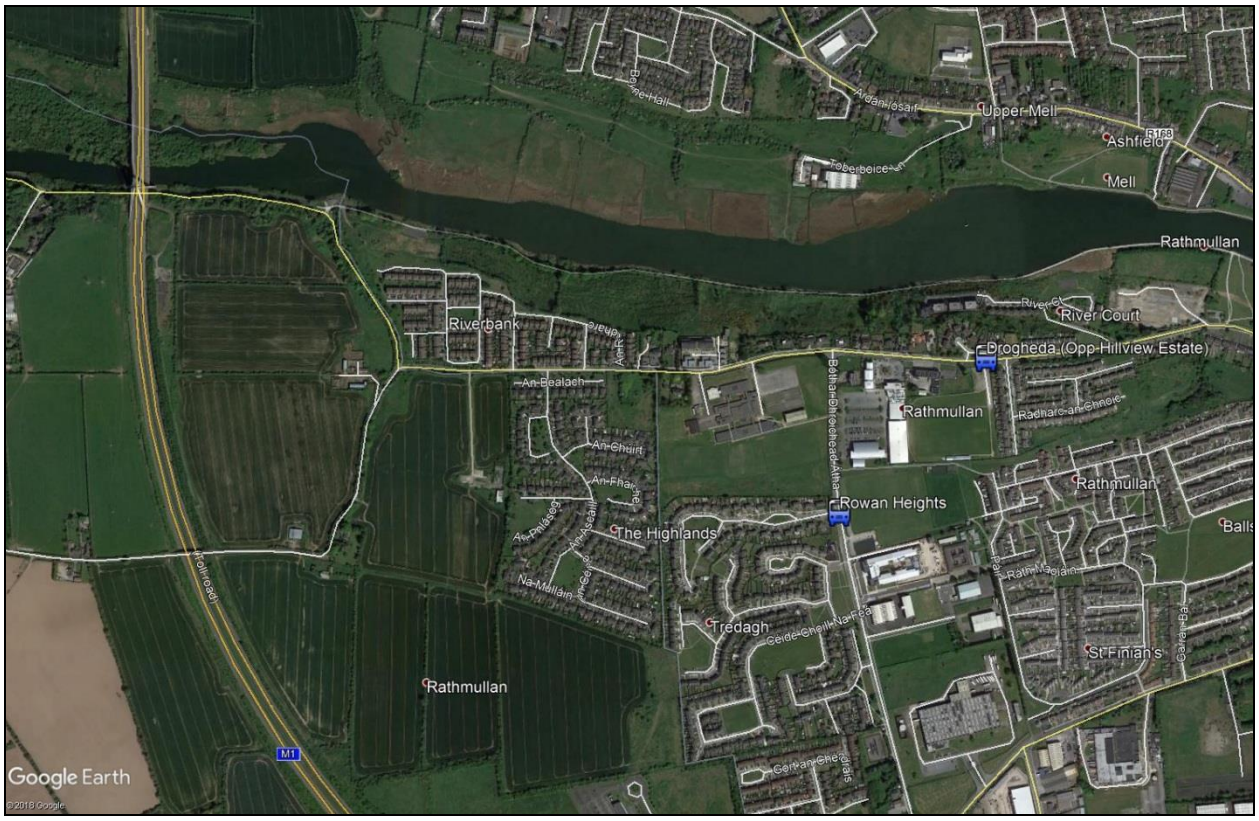


Figure 10.3 Location of Public Transport Services

A summary of these stops can be seen in Tables 10.11 and 10.12 below and overleaf:

Drogheda (Opp Hillview Estate)		
Service	Service Route	Frequency
173	West Street Drogheda - Dominick Street (Opp Church)	Hourly

Table 10.11 Drogheda (Opp Hillview Estate).

Rowan Heights		
Service	Service Route	Frequency
173	West Street Drogheda - Dominick Street (Opp Church)	Hourly

Table 10.12 Rowan Heights

The Drogheda Bus Station is located 2.5m to the east of the subject site, which provides a high number of local and national bus routes.

The Drogheda Rail Station is located 3.5km to the east of the subject site, which is located on the Northern Commuter line running between Newry and Dublin Pearse Street. This line extends north to Belfast Central and south to Rosslare Europort.

Reference is made to the NTA (formerly DTO) publication "*The Route to Sustainable Commuting*" while accessing the suitability of the site to utilise public transport for commuters to the proposed development. This document states 4km as being a reasonable distance for a commuter to walk to work and 10km for a commuter to cycle to work.

10.13 Characteristics of the Proposal

10.13.1 Introduction

The proposed development consists of a Strategic Housing Development on residential zoned lands c. 2.5 km west of Drogheda town centre. The accommodation provided on the site consists of: - 661 no. residential units with a crèche, cafe and retail unit

10.13.2 Physical Infrastructure

Access to the subject site will be provided on Rathmullan Road to the east of the subject site by means of a proposed 4 arm signalised junction, and an alternative access on the local access road to the south of the site by means of a proposed priority junction. Internal estate roads are generally 6 m wide with corner radii ranging from 3 to 6 m. Various speed reduction measures have been implemented within the roads layout such as raised crossings, shared surface / home zone areas and on-street parking. Car parking spaces have generally been provided in accordance with the Meath County Council standards.

Footpaths will be provided in accordance with Section 4.3.1 of DMURS which suggests that a minimum 1.8m footpath should be provided on all footways. Crossing points are located at various points within the development such that unimpeded pedestrian movement is facilitated. Cyclists will be kept on-road within the proposed development. Accordingly, the proposed development is consistent with the principles outlined in DMURS. A separate statement in respect of DMURS has been prepared and accompanies this application under separate cover.

Further to discussions with Meath County Council, it is also proposed to upgrade a section of the existing Rathmullan Road along the eastern boundary of the subject site by widening the carriageway to 6m and providing a new kerb with gullies for surface water drainage and a new 2m wide footpath. In this regard, pedestrian access links from the proposed development and the existing footpath on Rathmullan Road will also be provided via the proposed new 2m wide footpath which facilitates access to the River Boyne walkway.

It is also proposed to implement minor upgrades to Rathmullan Road along the northern boundary of the site. This includes the widening of the existing carriageway to 6 m. This section of road down to Oldbridge House currently operates with a stop / yield one-way system in place as the River Boyne greenway is intermittently on-road in this area. Furthermore, this road is not intended to operate as a major link and therefore anticipated traffic volumes will be low.

10.13.3 Trip Generation

The volume of traffic expected to be generated by the proposed development has been derived using the trip rates from the Traffic and Transport Assessment's TRICS output for the adjacent residential

development which has recently been approved by Meath County Council under Planning Register Reference No. LB170675.

No additional trip generation has been included from the on-site crèche, café and retail unit as it is expected that these amenities will serve the proposed residential units within the development and will therefore not generate additional traffic on the surrounding road network.

Development	Units	Trip Rate (Arr/Unit)	Trip Rate (Dep/Unit)	No. Arrivals	No. Departures	Total Trips
Residential	661	0.145	0.391	96	259	355

Table 10.13 Trip Generation Rates for Proposed Development at AM Peak Hour.

Development	Units	Trip Rate (Arr/Unit)	Trip Rate (Dep/Unit)	No. Arrivals	No. Departures	Total Trips
Residential	661	0.346	0.203	229	134	363

Table 10.14 Trip Generation Rates for Proposed Development at PM Peak Hour.

It can be seen from the above that the total vehicle movements generated by the proposed development will be 96 arrivals and 259 departures in the AM peak (two-way total of 355). The total number of vehicle movements in the PM peak hour will be 229 arrivals and 134 departures (two-way total of 363).

10.13.4 Traffic Distribution

For the purpose of the Traffic and Transport Assessment for this scheme, the traffic distribution has been assumed to be the same as that assumed for the adjacent approved residential development (Reg. Ref. No. LB170675). The distribution for the AM and PM peak hour generated traffic is detailed in Figure 10.4 and the corresponding AM & PM peak hour traffic flows, based on the assumed distribution, are shown in
Figure .

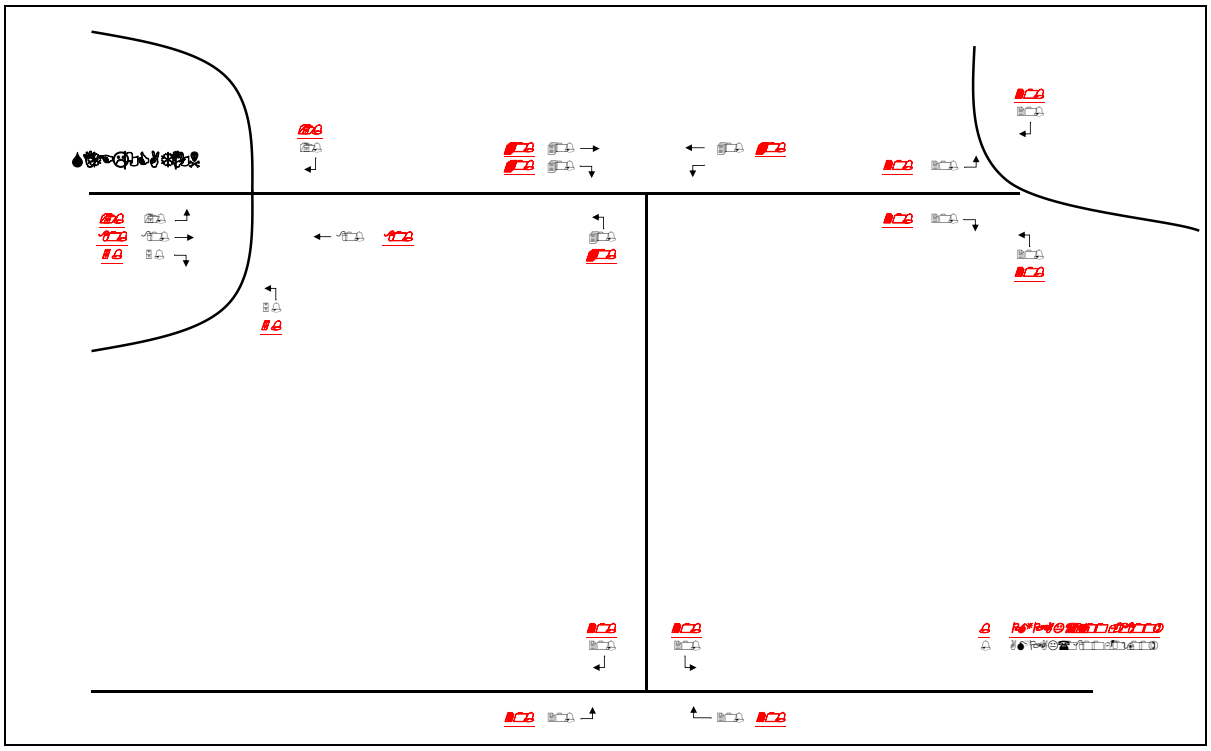


Figure10.4 Distribution of Generated Traffic

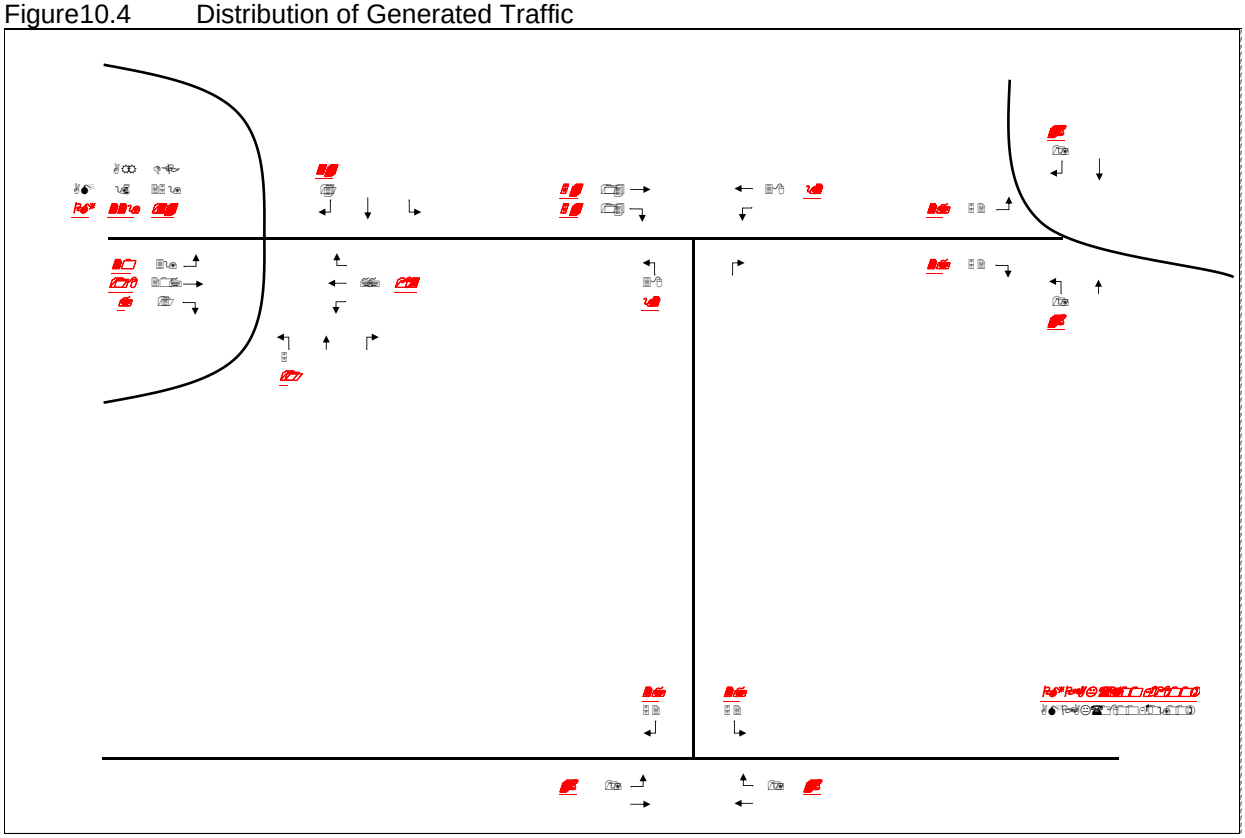


Figure 10.5 Site Generated Traffic Flows

10.14 Potential impact of the proposal

10.14.1 Introduction

This section considers the possible types of effects a development proposal of this kind is likely to produce. The potential traffic and transport impacts of the development are considered below.

10.14.2 Trip Generation

The proposed development will generate a number of trips by various modes of travel including vehicular, pedestrian, cycle and public transport. These trips may have an impact on the surrounding road network. Specific impacts are identified below.

10.14.3 Traffic Impact

The traffic impact of the development is dependent upon the background traffic on the local road network, the capacity of the existing road network, and the amount of additional traffic generated as a result of the proposed development.

Traffic count data was obtained for the purposes of the planning application. This data is expected to reflect the peak traffic conditions on the network. A robust estimation of the traffic generation and distribution of the proposed development has been set out in the previous section. This will be compared to the background traffic counts in order to ascertain the impact the development will have on the local road network.

Should there be a reasonable impact as a result of the proposed development which causes potential capacity implications at surrounding junctions, traffic modelling software, if required, will be used to identify further details of the impact of development traffic, in terms of queuing and delay.

10.14.4 Walking and Cycling Infrastructure

It is also necessary to ensure that the proposal incorporates appropriate access facilities for pedestrians, cyclists and public transport users in order to facilitate trips by these modes.

10.14.5 Construction Traffic

The construction traffic impacts of the proposed development are dependent on the capacity of the local road network to facilitate access to the development by HGV's and heavy construction machinery associated with the construction phase. The ability to accommodate temporary parking for contractors and storage of materials on site is another key consideration.

10.14.6 Do-nothing scenario

Should the proposed development not take place, the access roads and infrastructure will remain in their current state and there will be no change. Background traffic would be expected to grow over time. Given the location and zoning of the subject site, it is reasonable to assume that a similar development, with a potentially more intensive requirement for vehicular trips would be established on this site at some stage in the future.

10.14.7 Remedial or Reductive Measures

Construction Phase

It is proposed that a Construction Management Plan (CMP) would be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road. The CMP will consider the following aspects:

- routes to be used by vehicles;
- working hours of the site;
- details of construction traffic forecasts;
- times when vehicle movements and deliveries will be made to site;
- facilities for loading and unloading; and
- facilities for parking cars and other vehicles.

Operational Phase

The proposed development is situated adjacent to suitable infrastructure and transport services for travel by sustainable modes. A key barrier to modal shift towards sustainable modes of travel is often a lack of information about potential alternatives to the car. As such, it is proposed that residents will be made aware of potential alternatives including information on walking, cycle routes and public transport.

Residents will be encouraged to avail of these facilities for travel to and from work. Provision of this information would be made during the sales process and will be included in the new homeowners pack upon the sale of each unit, as this represents the best opportunity to make residents aware and to secure travel behaviour change. It is anticipated that this measure may help to reduce the level of traffic at the proposed development, thus providing mitigation against the already minimal traffic and transport effects of the development.

10.15 Predicted Impact of the Proposal

10.15.1 Introduction

When considering a development of this nature, the potential traffic impact on the surrounding area must be considered for each of two stages; the construction phase and operational phase. These two distinct stages are considered separately within this section.

10.15.2 Construction Phase

A number of the construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicle movements associated with the appointed contractors and their staff.

Whilst it is not possible at this stage to accurately identify the day to day traffic movements associated with the construction activities, based on experience of similar sites it is considered that the number of construction related heavy goods vehicle movements to and from the application site will be approximately 20 arrivals and departures per day.

Similarly, the general workforce is unlikely to exceed approximately 120 in number, which with an allowance for shared journeys could equate to a maximum of around 80 arrivals and departures per day.

A construction car park will be created on the start of works by the laying of a temporary surface for vehicles. This number of construction vehicle movements is considered to be relatively low compared to the wider road network. It should be noted that the majority of such vehicle movements would be undertaken outside of the traditional peak hours, and it is not considered this level of traffic would result in any operational problems.

Care will be taken to ensure existing pedestrian and cycling routes are suitably maintained or appropriately diverted as necessary during the construction period, and temporary car parking is provided within the site for contractor's vehicles. It is likely that construction will have a negligible impact on pedestrian and cycle infrastructure.

10.15.3 Operational Phase

The traffic modelling carried out as part of this TTA includes the analysis of 4 no. junctions of the surrounding road network as set out below:

- Junction 01: Rathmullan Road/Local Road/Site Access (Signalised Junction);
- Junction 02: Rathmullan Road/Marleys Lane (Signalised);
- Junction 03: Rathmullan Road/R132 Dublin Road; and
- Junction 04: Donore Road/Marley's Lane (Signalised).

Traffic Growth Factors

These junctions were assessed for the estimated opening year of 2023 and future design years of 2028 and 2038, with the baseline flows factored in accordance with the recommendations of Table 5.5.1 of the NRA's *Project Appraisal Guidelines Unit 5.5 Link-Based Traffic Growth Forecasting* published in January 2011. The growth factors are:

- 1.011 (Medium Growth) growth factor from 2018 to 2025
- 1.009 (Medium Growth) growth factor from 2026 to 2038

Committed Development

The traffic model also includes for committed traffic from the adjacent approved residential development, (Reg. Ref. No. LB170675). This development has current planning for 156 no. units under Phase 1 with a further 140 no. additional units to be submitted as part of a Phase 2 development for the site. The generated traffic from the two phases of the development, a total of 296 no. residential units, has been extracted from the Traffic and Transport Assessment submitted as part of the planning application for the adjacent site. These committed development flows are detailed in Figure 10.6 and included with the background traffic, proposed development traffic to establish the future year (2038) traffic flows. See
Figure 10.2 Committed Development Traffic

.

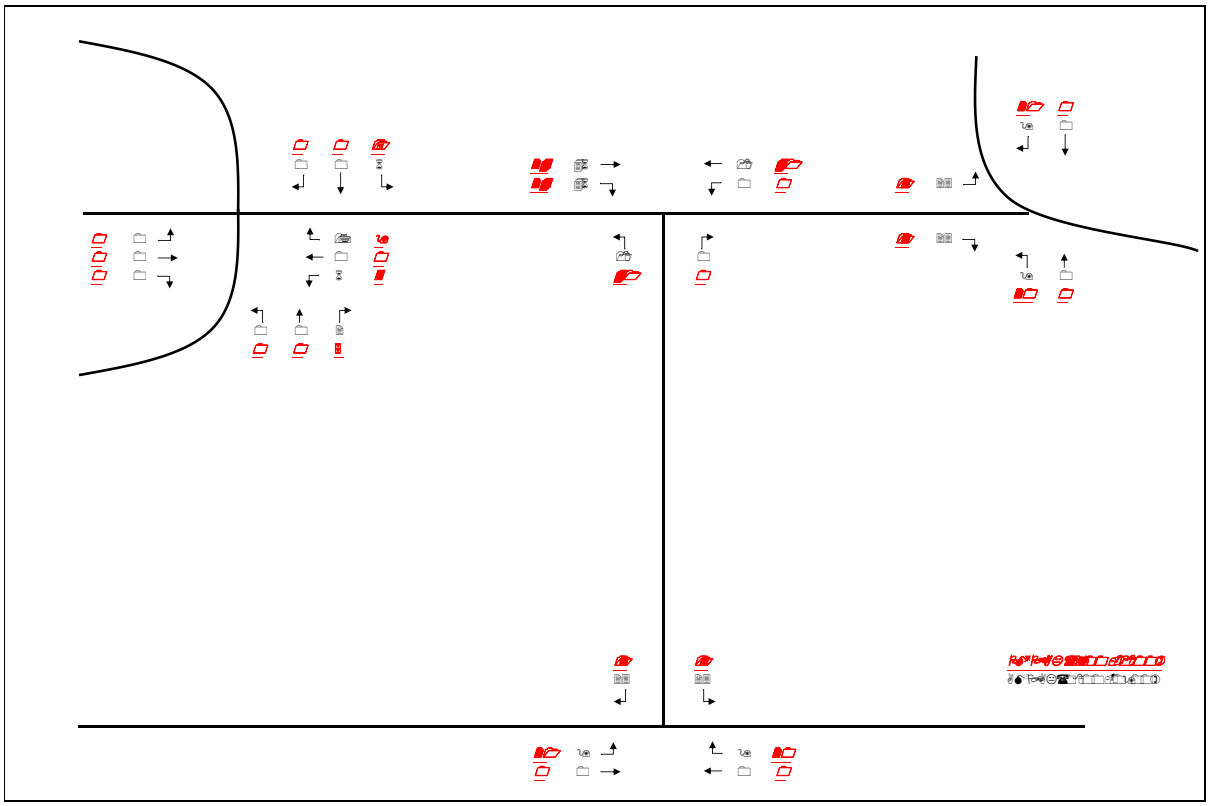


Figure 10.2 Committed Development Traffic

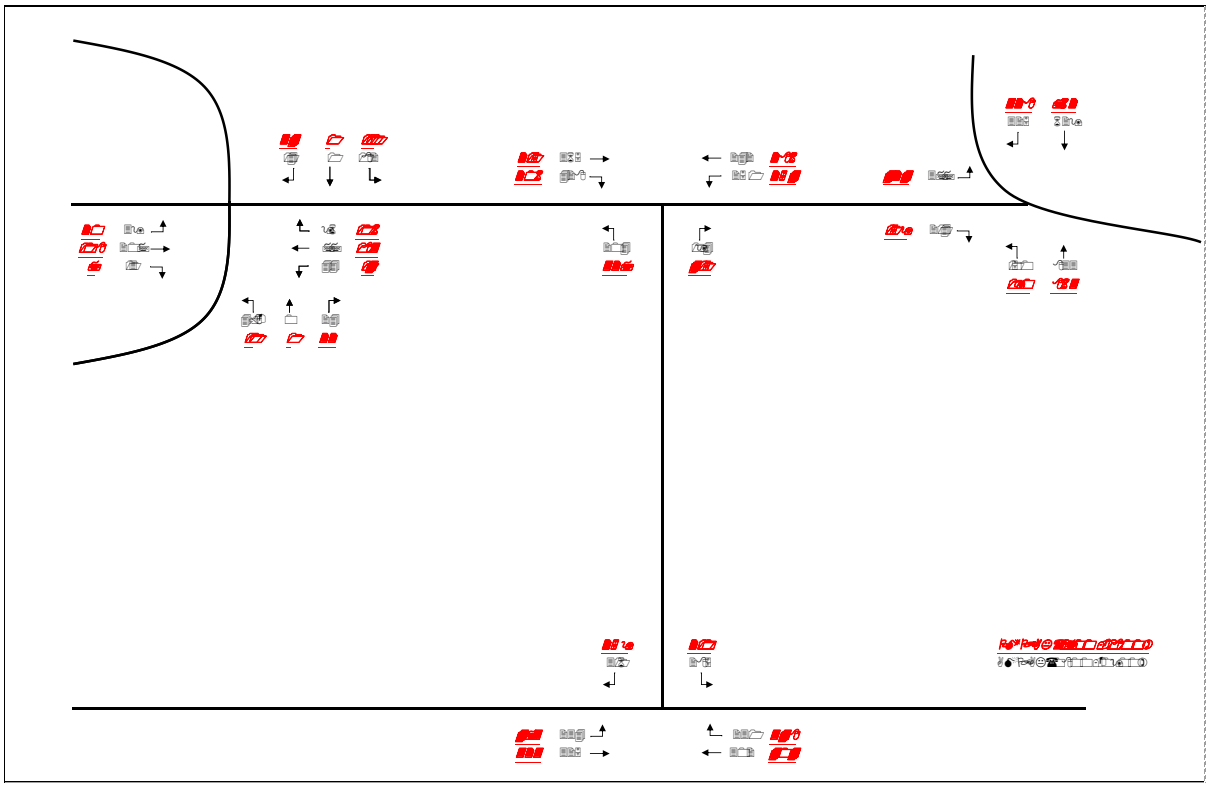


Figure 10.3 2038 Design Year Traffic (Base + Site Generated + Committed Development)

Junction 1 – Rathmullan Road/Local Road

Junction No. 1 is the proposed four arm signalised junction with arms linking the Rathmullan Road (East), the Rathmullan Road (West) the proposed site access and the local access road to the south of the signalised junction. This signalised junction will be constructed as part of the proposed development as an upgrade to the existing priority junction of Rathmullan Road and a local access road.

The TRANSYT modelling results are presented in Table 3.15.

Year	Time	Arm A - Rathmullan Road E		Arm B - Local Road S		Arm C - Proposed Site Access W		Arm D - Rathmullan Road N	
		DOS%	Max Queue.	DOS%	Max Queue.	DOS%	Max Queue.	DOS%	Max Queue.
2023 (BASE + DEV)	AM	50	5.58	18	0.77	44	6.94	47	5.14
	PM	48	7.58	20	0.86	35	3.88	36	3.54
2023 (BASE + DEV + COMM (PHASE 1))	AM	51	5.95	19	0.80	45	7.02	48	5.28
	PM	49	7.86	22	0.96	36	3.93	37	3.78
2028 (BASE + DEV)	AM	51	5.72	19	0.80	44	6.94	49	5.38
	PM	47	7.57	20	0.86	36	3.93	37	3.70
2028 (BASE + DEV + COMM (PHASES 1 AND 2))	AM	53	6.43	20	0.86	47	7.11	50	5.58
	PM	49	7.99	24	1.04	39	4.03	38	4.07
2038 (BASE + DEV)	AM	54	6.08	20	0.86	47	7.11	49	5.80
	PM	50	8.00	21	0.93	38	3.97	36	3.85
2038 (BASE + DEV + COMM (PHASES 1 AND 2))	AM	56	6.73	21	0.93	49	7.36	51	6.00
	PM	51	8.34	25	1.11	41	4.08	39	4.30

Table 3.15 Rathmullan Road/Local Road TRANSYT Modelling Results – Proposed Signalised Junction.

The above results indicate that the proposed 4-arm signalised junction will operate well within capacity during the 2038 plus development plus committed scenario with the highest Degree of Saturation (DOS) at 56% during the AM peak period.

Junction 2 – Rathmullan Road/Marleys Lane

Junction No. 2 is an existing signal controlled junction. Modelling undertaken on this junction assumes that it has been upgraded to provide a right turn pocket in accordance with the recently approved planning permission (Reg. Ref. No. LB170675) on the site adjacent to the proposed development. The TRANSYT analysis results for the Rathmullan Road/Marleys Lane signalised junction are presented in Table.

Year	Time	Arm 1 - Rathmullan Road E		Arm 2 - Marleys Lane		Arm 3 - Rathmullan Road W	
		DoS (%)	Max Queue.	DoS (%)	Max Queue.	DoS (%)	Max Queue.
2018	AM	14	7.67	56	7.07	50	5.01
	PM	23	8.23	53	9.45	50	2.86
2023 (BASE)	AM	15	8.12	57	7.47	54	5.43
	PM	26	8.89	55	10.00	52	3.04
2023 (BASE + DEV)	AM	18	9.40	70	9.13	65	7.37
	PM	38	11.61	67	13.39	58	4.29
2023 (BASE + DEV + COMM (PHASE 1))	AM	20	9.74	72	9.58	67	7.81
	PM	43	12.35	68	13.88	62	4.68
2028 (BASE)	AM	16	8.66	60	7.81	54	5.57
	PM	29	9.38	57	10.59	50	3.10
2028 (BASE + DEV)	AM	20	9.88	70	9.46	66	7.63
	PM	42	12.14	68	13.88	59	4.42
2028 (BASE + DEV + COMM (PHASES 1 AND 2))	AM	22	10.42	73	10.20	73	8.70
	PM	46	13.24	74	15.78	64	5.04
2038 (BASE)	AM	19	9.71	63	8.71	57	6.04
	PM	34	10.40	62	12.01	55	3.45
2038 (BASE + DEV)	AM	24	10.99	73	10.35	68	8.05
	PM	45	13.08	73	15.80	63	4.78
2038 (BASE + DEV + COMM (PHASES 1 AND 2))	AM	26	11.69	76	11.25	74	9.13
	PM	68	15.24	92	23.50	88	11.56

Table 10.16 Rathmullan Road/Marleys Lane TRANSYT Modelling Results.

The above results indicate that the signalised junction will operate within capacity during the 2038 plus development scenario with the highest degree of saturation (DOS) at 73% during the AM/PM peak periods, and with acceptable capacity during the 2038 plus development plus committed development scenario with the highest degree of saturation at 92% during the PM peak period.

Junction 3 – R132/Rathmullan Road

Junction No. 3 is an existing priority junction onto a dual carriageway. TRANSYT has been utilised due to the complexity of the intersection of the Rathmullan Road minor road movements with the R132 dual carriageway movements.

The junction has been modelled utilising its current configuration of a priority junction, and it has been established that the junction currently is operating over capacity.

A detailed transportation study was undertaken in December 2006 by WSP on behalf of Drogheda Borough Council. The Drogheda Transportation Study (Dec 2006) has highlighted improvements that are required to be carried out on the R132/Rathmullan road junction. These improvements include the provision of signalising the junction, and amending the current island configuration to assist movements through the junction. Details of this proposals can be seen in Figure 10.8.

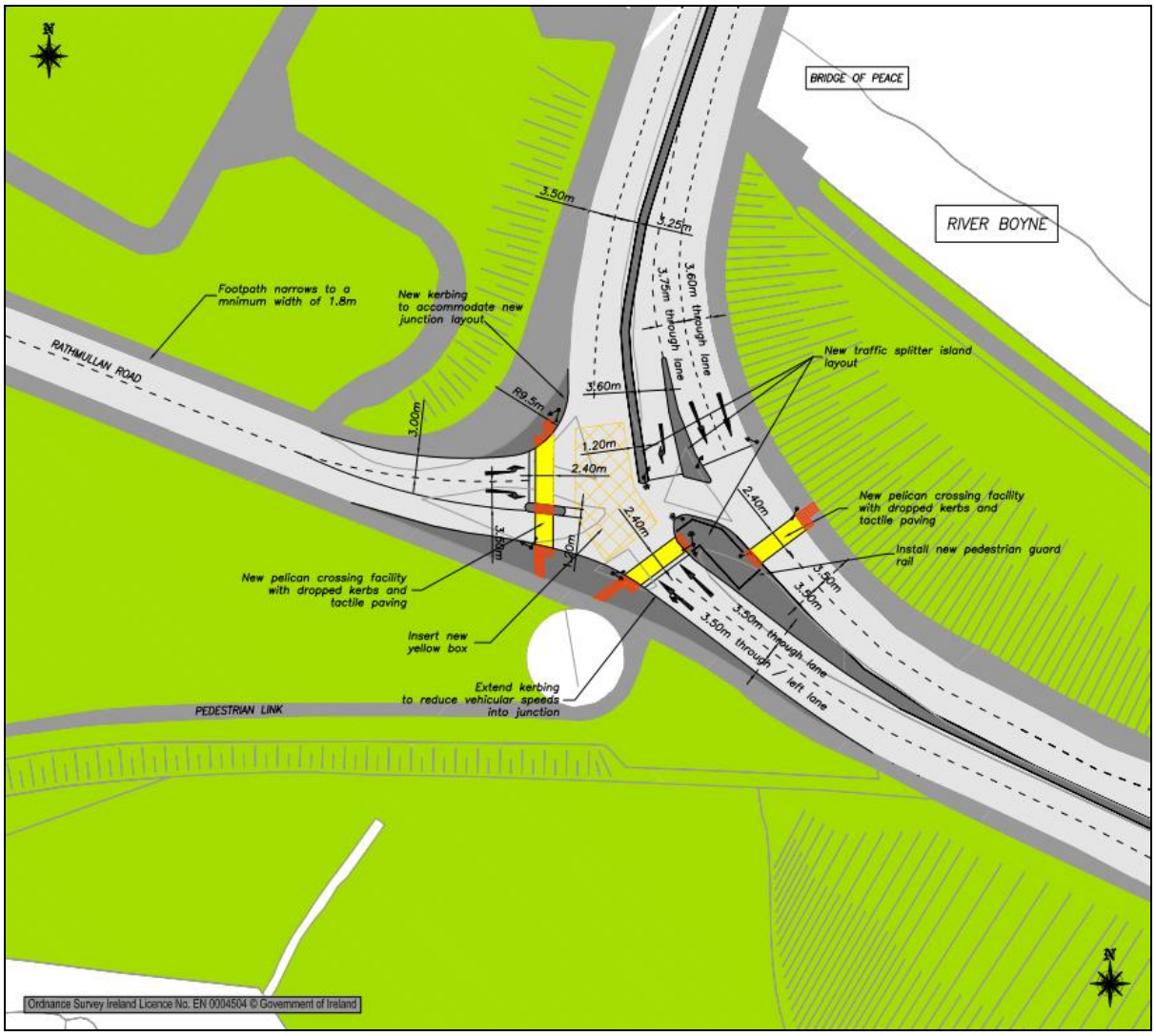


Figure 10.8 R132/Rathmullan Road Junction Upgrade Proposals.

This junction has been modelled on the basis of the upgrade proposed in Figure 10.8. Details of the results of the modelling are set out in
Table .

Year	Time	Arm 1 - R132 E		Arm 2 - Rathmullan Road		Arm 3 - R132 N	
		DoS (%)	Max Queue.	DoS (%)	Max Queue.	DoS (%)	Max Queue.
2038 (BASE)	AM	65	11.19	76	8.98	72	8.48
	PM	70	12.35	79	11.28	73	7.67

2038 (BASE + DEV)	AM	71	12.23	78	10.53	76	9.35
	PM	78	13.95	85	12.94	80	9.74
2038 (BASE + DEV + COMM (PHASES 1 AND 2))	AM	74	12.78	81	11.32	79	9.76
	PM	87	14.48	87	13.87	57	10.51

Table 10.17 R132/Rathmullan Road TRANSYT Modelling Results.

The above results indicate that the junction operates within capacity during the 2038 plus committed plus development scenario with the highest degree of saturation (DOS) at 87% during the PM peak period.

Junction 4 – Donore Road/Marleys Lane

Junction No. 4 is an existing signal controlled junction. The TRANSYT analysis results for the Donore Road/Marleys Lane signalised junction are presented in the Table.

Year	Time	Arm 1 - Donore Road W		Arm 2 - Marleys Lane		Arm 3 - Donore Road E	
		DoS (%)	Max Queue.	DoS (%)	Max Queue.	DoS (%)	Max Queue.
2018	AM	12	8.09	55	8.47	47	4.34
	PM	15	10.47	62	8.26	54	6.00
2023 (BASE)	AM	13	8.81	56	8.85	50	4.62
	PM	16	11.41	63	8.73	57	6.45
2023 (BASE + DEV)	AM	18	10.26	60	10.78	52	5.13
	PM	19	13.00	68	10.22	63	7.71
2023 (BASE + DEV + COMM (PHASE 1))	AM	19	10.50	62	11.29	54	5.33
	PM	20	13.40	68	10.50	65	8.14
2028 (BASE)	AM	14	9.31	59	9.36	49	4.78
	PM	17	12.06	66	9.25	57	6.62
2028 (BASE + DEV)	AM	19	10.66	62	11.28	54	5.39
	PM	20	13.69	69	10.56	65	8.11
2028 (BASE + DEV + COMM (PHASES 1 AND 2))	AM	21	11.43	64	11.97	57	5.66
	PM	22	14.51	71	11.23	69	8.86
2038 (BASE)	AM	17	10.49	61	10.27	54	5.33
	PM	20	13.59	70	10.23	60	7.30
2038 (BASE + DEV)	AM	22	12.10	65	12.33	56	5.78
	PM	23	15.54	70	11.45	70	9.00

2038 (BASE + DEV + COMM (PHASES 1 AND 2))	AM	25	12.78	66	13.01	58	6.11
	PM	26	16.41	72	12.11	72	9.58

Table 10.18 Donore Road/Marleys Lane TRANSYT Modelling Results.

The above results indicate that the signalised junction operates well within capacity during the 2038 plus committed plus development scenario with the highest degree of saturation (DOS) at 72% during the PM peak period.

10.15.4 Summary

Each of the junctions assessed operate within the capacity for the design year 2038 with acceptable queue lengths.

10.15.5 Car Parking Provision

Car parking will be provided in accordance with Section 11.9 of the Meath County Development Plan 2013-2019.

Land Use	Rate	Unit Numbers /GFA	Maximum Permitted
Dwellings	2 per dwelling	509 No. units	1018
1 & 2 Bedroom Apartments	1.25 per unit	22 No. units	28
3 & 4 Bedroom Apartments	2 per unit	131 No. units	262
Retail	1 Per 20 sq. m	458.2	22
Crèche	1 per employee & dedicated set down area 1 per 5 children	458.2	20

Table 4 Car Parking Provision

There will be adequate parking provided within the development to cater for the parking demand.

10.15.6 Walking, Cycling and Public Transport

Cycle parking will be provided in accordance with Section 11.9.2 of the Meath County Development Plan 2013-2019. In this regard, generous sheltered bicycle parking has been provided locally to serve the retail, café and crèche units.

10.16 Remedial or Reductive Measures

10.16.1 Introduction

This section of the report will discuss remedial and reductive measures to minimise the impact the proposed development will have on the surrounding area during the construction phase and operational phase.

10.16.2 Construction Phase

It is considered that a Construction Management Plan (CMP) would be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road. The CMP will consider the following aspects:

- Routes to be used by vehicles;
- Working hours of the site;

- Details of construction traffic forecasts;
- Times when vehicle movements and deliveries will be made to site;
- Facilities for loading and unloading; and
- Facilities for parking cars and other vehicles.

10.16.3 Operational Phase

The local road network provides suitable infrastructure and transport services for travel by sustainable modes to/from the proposed development. The subject site is located in close proximity to local schools, community centres, shopping centres and public transport options. Pedestrian links between the proposed development and the local community facilities and amenities outlined above will be provided as part of the works.

There are 2 no. schools, St. Oliver's Community College on Rathmullan Road and St. Johns National School on Marley's Lane, located within walking distance of the proposed development. St Oliver's Community College is c. 700m or a 9 min walk along Rathmullan Road east of the subject site, whilst St. Johns National School is c. 1.3 km or a 16 min walk.

The Drogheda Leisure Park is also located on Rathmullan Road, c. 1 km (10 min walk) east of the proposed development. The park contains community facilities such as a leisure centre, a pub/restaurant and a range of retail outlets.

Furthermore, the Drogheda Town Centre is located c. 2.5 km east. Pedestrian and cyclist links will be provided to facilitate access from the development to existing facilities such as the footpath network along Rathmullan Road and the River Boyne boardwalk / greenway. Using the linkages, the town centre is accessible by walking in c. 35 min and c. 11 min by cycling.

The Drogheda Bus Station is located on the corner of George's Street and Donore Road, c. 2.5 km (30 min walk or 12 min cycle) east of the proposed development. The Drogheda Train Station on the Dublin Road is located c. 3.5 km east of the proposed development and can be accessed by a 45 min walk or 16 min cycle. These high quality public transport facilities provide commuter links to surrounding towns and Dublin.

The analysis of road network surrounding the subject site has shown that the existing and proposed upgraded junctions will operate within acceptable parameters. Therefore, there will be no negative impact on traffic as a result of the proposed development.

CHAPTER 11.0 ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

11.1 Introduction

This section of the EIAR outlines the Archaeological, Architectural and Cultural Heritage issues with respect to proposed strategic housing development at Rathmullan, Co. Meath (centered on O06125 75058), compromising the demolition of two sets of existing farm buildings and the construction of a residential development, comprising 661 no. dwellings; a retail unit, a café and a crèche.

This section of the EIAR has been prepared by Eoin Halpin, Operations Manager with Archaeology and Heritage Consultancy Ltd. Eoin graduated from University College Dublin (UCD) with an Honours Degree in Archaeology in 1982. He is a member of the Chartered Institute for Field Archaeologists and a member of the Institute of Archaeologist of Ireland, for which he has acted as chairperson. He has over 30 years of experience, working on all aspects of development led archaeological projects including large scale infrastructural projects, such as various TII road schemes and gas pipeline projects

The aim of the study is to identify any remains of archaeological or historical significance on or near the proposed development site, in order to address in advance any Cultural Heritage matters, which might arise in the course of the development.

11.2 Research Methodology

This assessment determines, as far as reasonably possible from existing records, the nature of the Cultural Heritage resource within the footprint and a defined vicinity of the proposed development using appropriate methods of study and leads to the following:

- Determining the presence of known archaeological and built heritage sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Determining the impact (direct/indirect) upon the known Cultural Heritage sites in the surrounding area (receiving environment)
- Identifying mitigation measures based upon the results of the above research; and
- Describing the residual impact on the archaeological, architectural and Cultural Heritage resource.

Research for this assessment has been undertaken in four phases. The first phase comprised a paper survey of publicly available archaeological, architectural, historical and cartographic sources, which was undertaken by Mark Moraghan of ADS Ltd in 2007 in advance of the original proposal for the site (under Reg. Ref. SA60260). The second phase involved a comprehensive geophysical survey of the site (Appendix 11.2), as recommended in the 2007 impact assessment (J.M Leigh Surveys 07R0190).The third phase involved an extensive testing programme carried out in 2008 by Ros O'Maolduin of ADS Ltd under licence 80E0506, which involved the excavation of 99 test trenches across the footprint of the subject site Appendix 11.3). The final phase involved a re-examination of the work undertaken thus far and the compilation of the present EIAR chapter.

11.2.1 Guidance and Legislation

This assessment has been undertaken having regard to general EIA guidance and the following legislation and guidelines were also consulted as part of the assessment.

- National Monuments Act 1930 to 2014;
- The Planning and Development Acts 2000 to 2018;
- Planning & Development Regulations 2001–2018;
- Heritage Act, 1995, as amended;

- Heritage Act 2018;
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands; and
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 and the Local Government (Planning and Development) Acts 2000–2018.

11.2.2 Study Area

The archaeological, architectural and cultural heritage receiving environment is defined as an area measuring some 0.5 km from the red line boundary for the subject site.

11.2.3 Site Visits

Field inspection is necessary to determine the extent and nature of archaeological and architectural remains and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information. Archaeological and architectural field inspections were carried out in 2006, as noted in the original Impact Assessment, and also in July and August 2018 and February 2019 which entailed:

- Noting and recording the terrain type and land usage;
- Noting and recording the presence of known and previously unknown features of archaeological, architectural or Cultural Heritage significance;
- Verifying the extent and condition of recorded sites and structures (RMPs/ RPS/ NIAH); and
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin and of archaeological, architectural or cultural heritage significance.

11.2.4 Consultation

Following the initial research, a number of statutory and voluntary bodies were consulted to gain further insight into the cultural background of the receiving environment and study area, as follows:

- Correspondence with the Development Applications Unit of Department of Culture, Heritage and the Gaeltacht (DCHG) in March 2019 regarding the Rathmullan development; and
- Meeting with representatives of the NMS in July 2019 in Dublin to discuss the proposed mitigation measures. The recommended strategy was deemed to be appropriate in this regard.

11.2.5 Categorisation of the Baseline Environment - Paper Survey

A paper survey is a document search undertaken as part of the desktop study of the baseline data. The following sources were examined and a list of areas of archaeological, architectural and cultural heritage potential was compiled:

- Record of Monuments and Places for County Meath;
- Sites and Monuments Record for County Meath;
- National Monuments in State Care Database;
- Preservation Orders List;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- Meath County Development Plan 2013–2019;
- Aerial photographs;
- Excavations Bulletin (1970−2018); and
- National Inventory for Architectural Heritage.

Further information is provided in Appendix 11.5 on the key data sources.

11.2.6 Geophysical Survey

Geophysical surveys are used to create 'maps' of subsurface archaeological features. Features are the non-portable part of the archaeological record, whether standing structures or traces of human activities left in the soil. Geophysical instruments can detect buried features when their electrical or magnetic properties contrast measurably with their surroundings. In some cases, individual artefacts, especially metal, may be detected as well. Readings, which are taken in a systematic pattern, become a dataset that can be rendered as image maps. Survey results can be used to guide excavation and to give archaeologists insight into the pattern of non-excavated parts of the site. Unlike other archaeological methods, the geophysical survey is not invasive or destructive. A geophysical survey was undertaken to inform this assessment in June 2008, by J.M. Leigh Surveys, within the proposed development area under licence 07R0190. The full text is included in Appendix 11.2.

11.2.7 Archaeological Test Trenching

Archaeological Test Trenching can be defined as '*a limited programme...of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land or underwater. If such archaeological remains are present test trenching defines their character and extent and relative quality'* (IFA 2014a, 4). A program of archaeological testing based on the results of the geophysical survey was carried out in the proposed development area in 2008. This was undertaken by Ros O'Maolduin of ADS Ltd, under licence 08E0506. A summary of the testing report is presented in Section 11.9.3 and the full text is included in Appendix 11.3.

11.2.8 Impact Assessment Methodology

In order to assess, distil and present the findings of this study, the following definitions apply:

- 'Cultural heritage' where used generically, is an over-arching term applied to describe any combination of archaeological, architectural and cultural heritage features, where;
- The term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places);
- The term 'architectural heritage' is applied to structures, buildings, their contents and settings of an (assumed) age typically younger than AD 1700;
- The term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations. This designation can also accompany an archaeological or architectural designation or describe features that have a more recent origin, but retain cultural heritage significance; and
- For the purposes of this report the terms 'architectural heritage' and 'built heritage' have the same intended meaning and are used interchangeably.

The Impact Definitions identified in Section 3.7 of the draft 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2017) are used.

CURRENT ARCHAEOLOGICAL ENVIRONMENT

11.3 General Background to Subject Site

The underlying geology consists of limestone towards the southern end of the site, with glacial gravels forming the sub-strata to the north. A local fault line has formed a deep gully which bounds the site to the northeast (see Figure 11.1 overleaf).

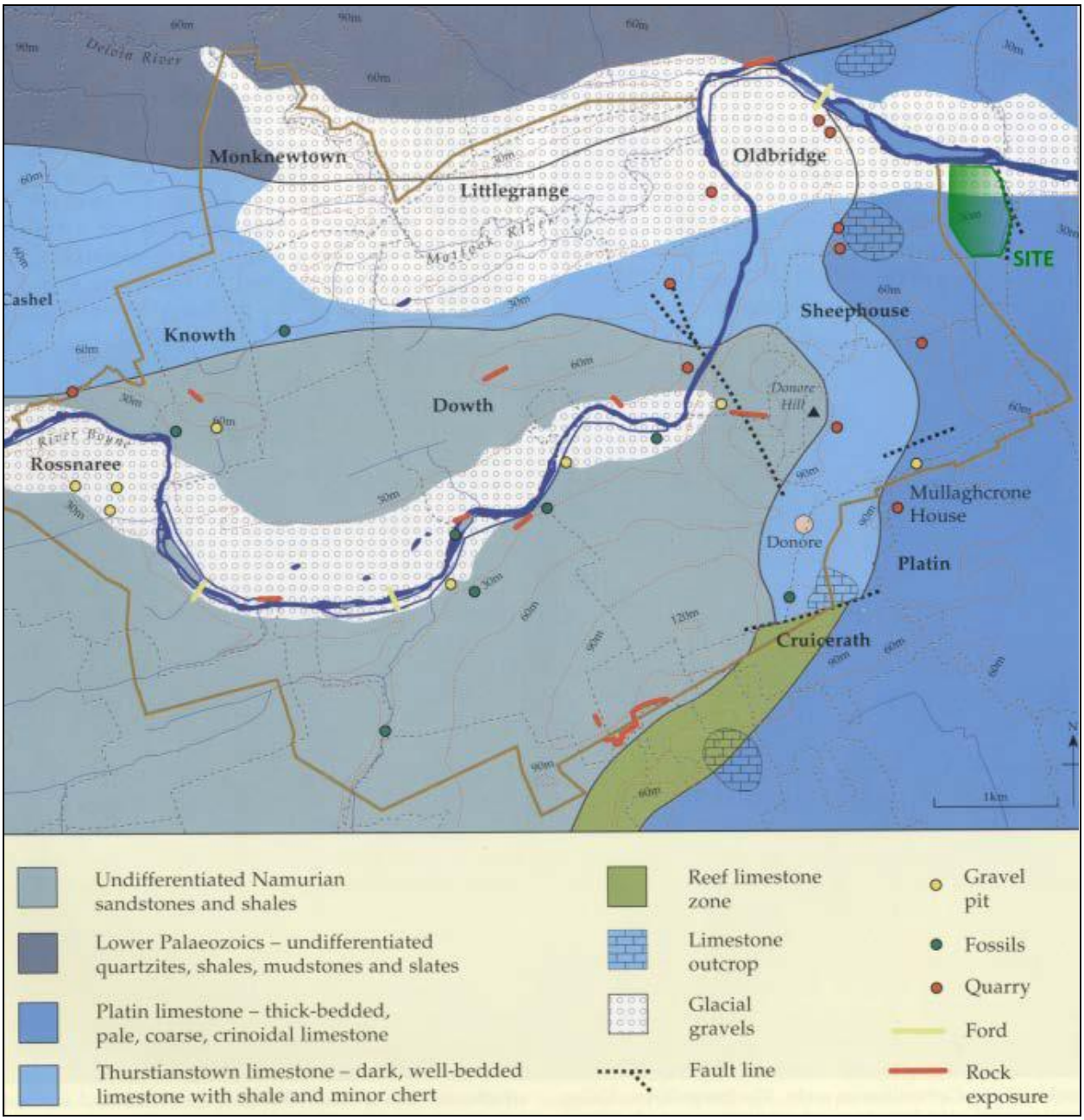


Figure 11.1 Underlying geology in area of the subject site (Stout 2002)

The subject site is bounded by the M1 motorway to the west and by the Rathmullan Road and Sheephouse Road along its eastern and southern sides. The northern extent of the site runs steeply down into the valley of the River Boyne. The eastern side of the site is further defined by a narrow ravine, known locally as *Pass-if-you-can* or *Pass*, which is steep sided and gives out at its upper, southern end onto the relatively flat ground of Rathmullan and Sheephouse, rising eventually to Donore hill.

There are fine commanding views to the north towards Tullyallen, with Louth Hill (116 m OD) to the north west and Red Mountain (134 m OD) to the north east forming the high ground on the north bank of the river (Plate 11.1). There are no views of the River Boyne from the site, which flows through a steep sided gorge, at least on the south bank, immediately to the north of the subject site. The modern Mary

McAleese Bridge to the north west, marks the line of the river.

To the east, views are blocked by mature trees running along the Rathmullan to Sheephouse Road, with relatively flat ground of Rathmullan townland beyond. To the west, the views are now largely blocked by the maturing planting associated with the opening of the M1, Drogheda by-pass, in 2003 (Plate 11.2).

To the south, the ground rises gently away from the river valley, but has two local high spots, the first is surmounted by Donore church and graveyard (83m OD) which is located to the south of the development lands (Plate 11.3) and a second hill, known locally as Donore Hill (104m OD), is located to the southwest.

11.4 Description of the Current Archaeological Environment within the Subject Site

The subject site was inspected in July and August 2018 and again in February 2019. The area was examined for the presence of topographical anomalies – features that might indicate the presence or remains of earthworks of archaeological value. The ground surface was examined for the presence of archaeological artefacts. In addition, the surrounding area was examined to assess potential impacts to and from the site.

At the time of the site visit, the three fields which comprise the subject site had recently been harvested, with low stubble across the entire area (Plate 11.4).

The northernmost field which is 3.7 ha in size, slopes considerably downwards towards the River Boyne. Only the southern portion of this field will be incorporated into the main part of the proposed development. Nothing of Cultural Heritage interest was identified in this field during the site inspection, however, the Sites and Monuments Record (SMR) database, records the western part of this field as the location of a sub soil cut enclosure(ME020-088----) of Middle Bronze Age date, c.1500BC, which was uncovered in the archaeological testing undertaken in 2008 under licence 08E0506 (Appendix 11.3).

The field immediately to the south was in stubble at the time of the site inspection. This field is some 6.8 ha in extent and slopes relatively gently from south to north. Near the southern field boundary, almost on the highest point of the field, a slight depression was visible that was circular in shape and measured approximately 20-22m in diameter. The landowner has described this depression as a 'wet hollow' that had been filled with topsoil following its appearance during construction works for the M1. It is likely that this is the same feature which was noted on the Lidar survey (Figure 11.2 overleaf) and recorded on the SMR as ME020-072----, however subsequent testing in 2008 proved this site to be modern in origin and non-archaeological.

The southernmost field, also the largest at 11.3 ha, was under stubble at the time of the site visit. It sloped gently down from south to north. There were no obvious areas of darker topsoil or any evidence of burning identified that may indicate archaeological activity. There are however two clusters of buildings surviving within this field, the most recent, located along the southern boundary of the subject site, consists of modern corrugated iron-roofed sheds and concrete animal pounds (Plate 11.5). These buildings are not recorded on the OS 25" map revision of 1909 and are certainly modern in date. This group of agricultural sheds has no Cultural Heritage value.

The second cluster of buildings is located along the eastern boundary of the site in the north east corner of the southernmost field opposite the Sheephouse Road / Rathmullan Road junction. It consists of modern corrugated iron-roofed sheds and concrete animal pounds. However, within the southern range of buildings, very badly disturbed and modified by later construction, are the remains of at least one older building, the western gable of which survives reasonably well. The gable wall is some 1 m in thickness and built of rough stone and mortar (Plate 11.6). It stands to a height of roughly 4 m, with a window, splayed on the interior, still surviving. The wall fragment has a modern corrugated iron-roof built on it and is backed to the south by a concrete wall.

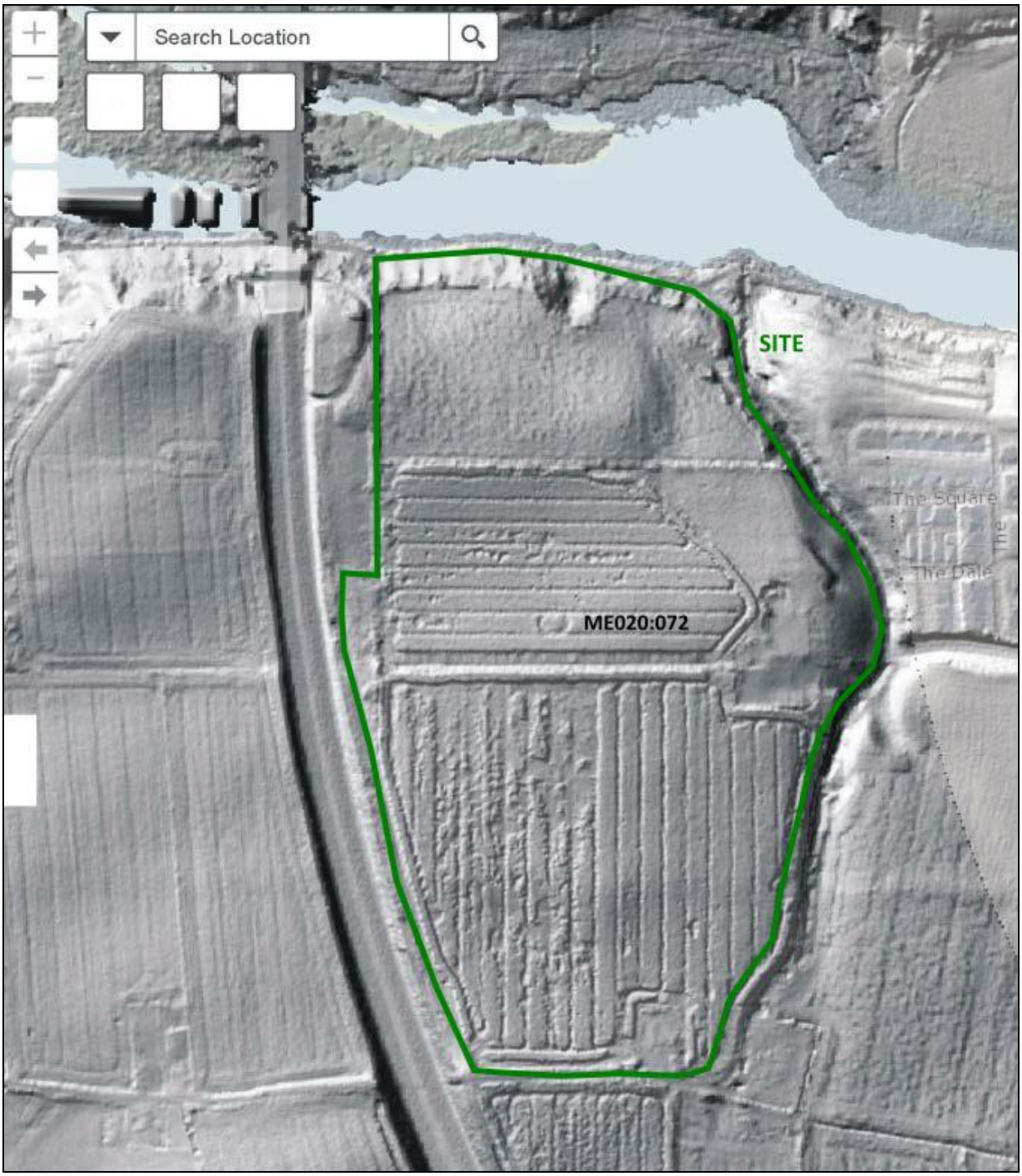


Figure 11.2 Lidar survey of the subject site, with location of ME020:072 indicated

A second section of old wall, albeit in a much poorer state of preservation, is located some 15 m to the east of the surviving gable (Plate 11.7). This short, 3 m long and 1.5 m high length, probably formed the original south wall of the building. Like the gable end, this wall is constructed from rough stone and mortar and is some 1 m in thickness. These buildings appear on William Larkin's map of 1812 and the Ordnance Survey 1st ed map of c. 1850 and must therefore predate this, dating this cluster to at least the early 19th century.

The subject site lies within the area of the wider Battle of the Boyne site, however, there are no certain upstanding remains recorded associated with the battle, notwithstanding a number of unidentified 'ferrous' items which came to light in the course of testing, licence 08E00506, on the site, some of which could be military in origin.

In addition to the ferrous objects, a series of isolated pits and linear gullies were uncovered in the testing with particular concentrations across the southern field, where a number of cremations and a possible ring ditch were noted.

11.5 Description of the Current Archaeological Environment in the Wider Landscape

The landscape beyond the subject is particularly rich. Perhaps most significantly is the World Heritage Site (UNESCO Ref. No. 659) – *Brú na Bóinne* - Archaeological Ensemble of the Bend of the Boyne, the buffer zone for which runs along the west side of the motorway some 150 m from the western boundary of the subject site (Figure 11.3 below).The Bend of the Boyne complex was inscribed on the World Heritage List in 1993 having been judged to have met three of the six criteria for Cultural Heritage of outstanding universal value. The three criteria were: representing a masterpiece of human creative genius; bearing a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or which has disappeared; being an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates significant stage(s) in human history.

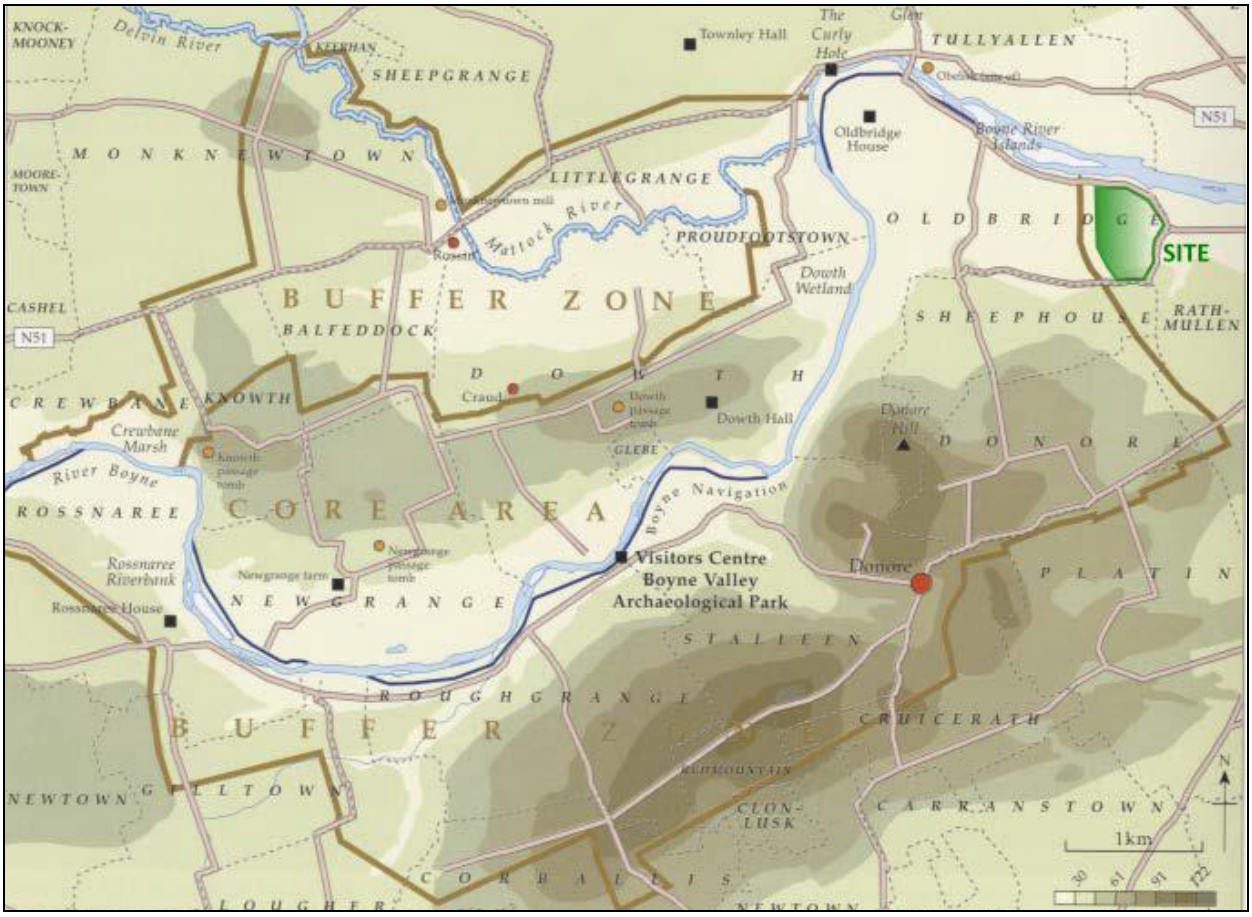


Figure 11.3 Location of UNESCO World Heritage Site buffer zone in relation to subject site (Stout 1997)

The core area of the World Heritage Site, which lies at its closest some 2.5 km to the west, comprises

approximately 780 hectares contained within the bend of the River Boyne. The surrounding buffer zone, comprising approximately 2,500 hectares, extends to the River Mattock in the north, includes the River Boyne itself and to the south extends to the ridgeline of an escarpment that overlooks the core area. The boundaries of the buffer zone were set having taken into account views into and out of the core area.

In addition to the archaeological landscape associated with the World Heritage Site, a number of sites of archaeological interest were noted on the SMR in the vicinity (Fig 11.4 below and Appendix 11.1). In the course of the construction of the M1 motorway immediately to the west of the subject site, four sites were uncovered. These consisted of a small flint scatter (ME020-035----), a spread of isolated archaeological features (ME020-049----), an undated archaeological complex of inter-cut features (ME020-054----) and finally a kiln site (ME020-063----). Further afield to the south in Donore townland a pre-historic enclosure with associated activity was found (ME020-036----) and a short distance to the south a Bronze occupation site was uncovered (ME020-040----).

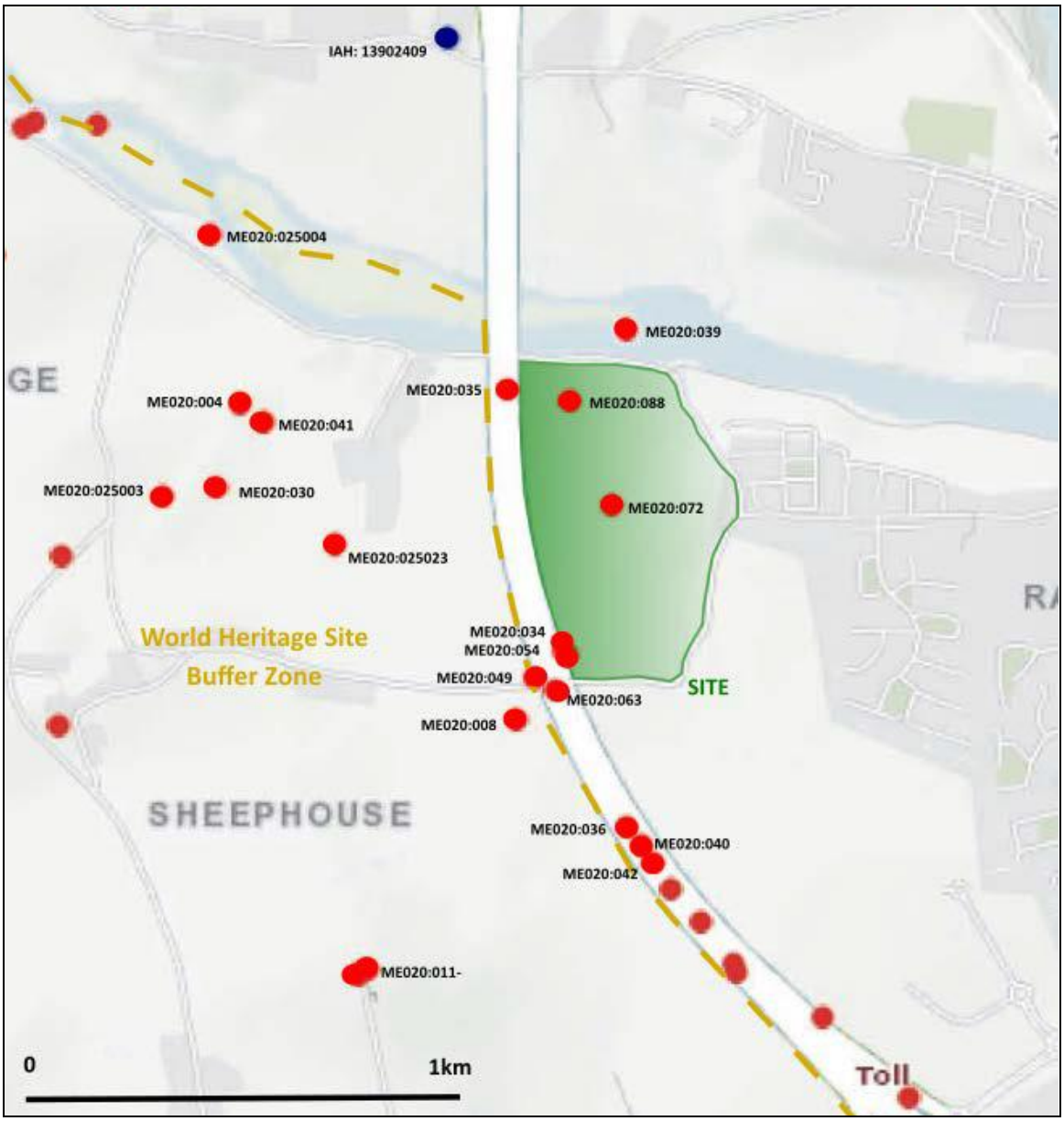


Figure 11.4 Sites of Cultural Heritage interest in the vicinity of the subject site

Apart from archaeological sites uncovered as part of the motorway construction, there are two Bronze Age standings stones noted in a field some 650 m to the west (ME020-041---- and ME020-030----) with a ring ditch also noted in the vicinity of the stones (ME020-025003).

The later pre-historic period in not particularly well represented in the vicinity of the subject site, neither is the early historic period, apart that is from an enigmatic site discovered in the course of the works undertaken in advance of the North-South Gas Pipeline, which ran immediately west of the M1 motorway (Figure 11.5 overleaf). Here in the north east corner of the field immediately to the south of the Sheephouse Road, a large feature, defined by two concentric ditches was recorded in the course of a geophysical survey, which together enclosed a roughly circular area some 75 m in diameter (ME020-008----). It is possible that this might be the site of the rath, or Early Medieval farmstead, which gave its name to nearby townland of Rathmullan.

In addition to the possible rath site, there is a souterrain (ME020-004----), located some 600 m to the west of the subject site. The souterrain consists of a Y-shaped, dry stone-built underground passage, with a cumulative length of 6.5 m, with each prong ending in a beehive chamber.

By the 12th century, the area of the subject site was subsumed into the lands of the Cistercians who had founded their house at Melifont in 1142 on the banks of the Mattock River, 5.5 km to the north west. They subdivided their estate into granges or outlying farms, leading to the names of *Newgrange, Roughgrange, Sheepgrange* and *Littlegrange*. The area of the subject site remained under the control of the Cistercians until the dissolution of the monasteries in the mid-16th century.

The Medieval period is also represented by the remains of a church and graveyard, some 850 m to the south of the subject site, on top of the hill at Donore (ME020-011----). The church was listed in the ecclesiastical taxation of Pope Nicholas IV dated 1302-06, however, the presence of a cross on the site might indicate an earlier date for its foundation.

Although there were a number of battles along the Boyne, for example during the Confederate Wars of 1641-49, by far the most historically important was the Battle of the Boyne between the forces of William of Orange and James II, which took place in July 1690 (Figure 11.6 overleaf). Considerable archaeological and historical work has been undertaken to identify archaeology associated with the battle (ME020-025----). The recent opening of the Battle of the Boyne heritage centre at Oldbridge Estate is a testament to this work, which has identified the 'core' of the Battle of the Boyne to an area immediately east of the entrance to the estate. The battle however spread some considerable distance from the main site of the fighting. The Williamite, Meinhard Schomberg, crossed the river at Rossnaree, some 6.3 km upstream to the west, while William himself crossed the river at Mill Ford (ME020-034----), some 1.5 km downstream to the east.

It is this crossing at Mill Ford which is important to the present proposal. The fording point is located at the river immediately to the north of the subject site. William approached the ford from the north, down a narrow gully known as Drybridge, accompanied by mounted troops, which included the Enniskilleners cavalry and dragoons. This manoeuvre was spotted by Jacobite mounted piquets who were positioned on the high ground overlooking the crossing, which is the now the northern field in the subject site. The piquets engaged and also raised the alarm, but by the time any Jacobite counteraction could be mounted, William and his troops were across the river and advancing up the ravine, *Pass-if-you-can*. It was this flanking movement, and the success of Schomberg on the western flank which caused the Jacobites to pull back from Oldbridge to Donore Church, where after a rather confused but bloody clash, the Jacobites retreated towards Duleek, leaving the field to William.

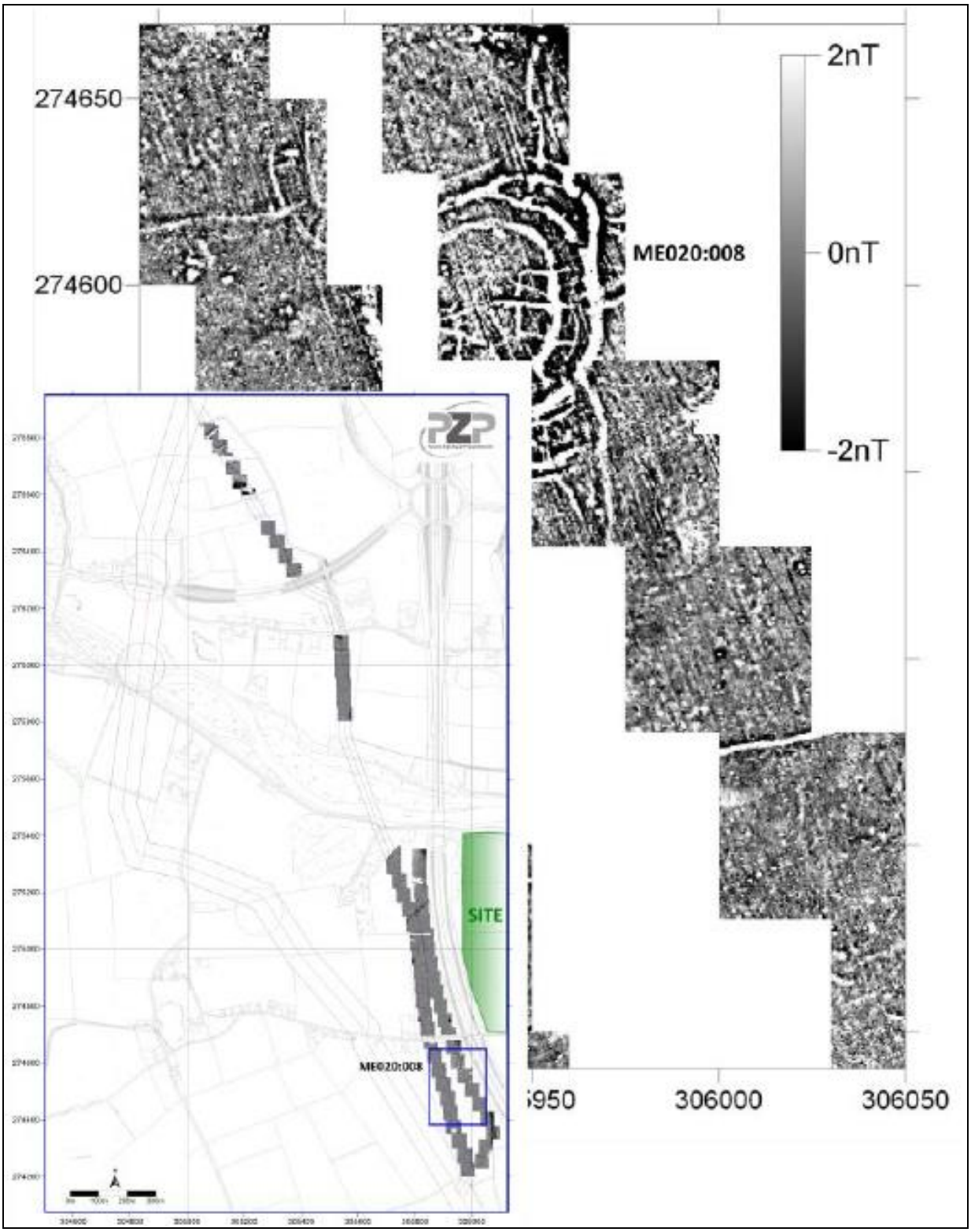


Figure 11.5 Location of geophysical anomaly ME020:008 to the southwest of the subject site

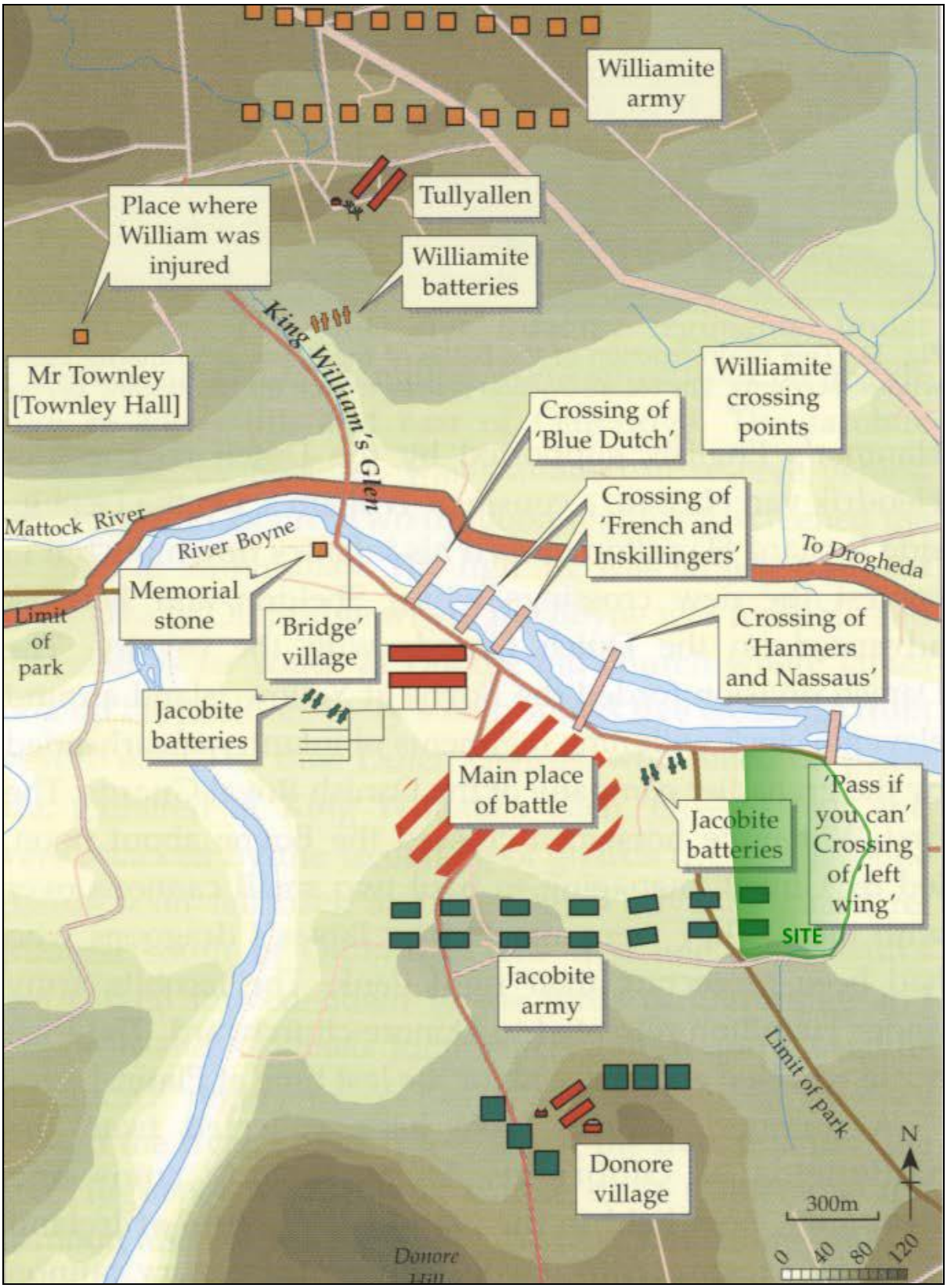


Figure 11.6 Battle of the Boyne with location of subject site indicated

The lands at Oldbridge, including the subject site, were held by the Moore family (later Earls and Marquesses of Drogheda) in the 17th Century. The Coddington family were established in North County Dublin since the 17th Century. In 1729, John Coddington purchased the Oldbridge Estate from the 5th Earl of Drogheda and the family made their home there until a series of raids on the house in the 1970's forced them to leave.

The area of the subject site was part of the Coddington estate, which was recorded as still being in the ownership of Henry B. Coddington, in the Griffith Valuations of the mid 1850's. The subject site while in the ownership of Henry Coddington, was being rented by a Thomas Hammond who had a house, offices and land and also a Bridget Mathews, who rented a house. It is likely that these buildings are those which still partially survive on the eastern edge of the development lands, and it is probable that the surviving older elements within this complex are those of a 'small farm' as defined by Stout (Stout, 2002; p152).

There is one known site of architectural interest in the vicinity of the subject site. Drybridge House (National Inventory of Architectural Heritage (NIAH) Ref 13902409; Protected Structure Ref: LHS024-008) is located on the north bank of the river, some 750 m to the northwest. It is a detached five-bay two-storey house, built c. 1820. In its appraisal of the building and its associated out-building the NIAH notes that this attractive complex of structures makes a positive contribution to the architecture of County Louth. Though modest in their design, the proportion and scale are enlivened by the retention of original and early features. The farm complex is a good example of this type of architecture and the whole group of structures makes a positive addition to the built heritage of the area. This is a fine example of a local 'Strong farmer's house' as defined by Stout (ibid; p 151).

Boyne Navigation: The Boyne, one of the earliest navigation schemes in Ireland, was canalised between 1748 and 1790 in order to encourage trade with the Dublin market and to transport commercial goods to the port at Drogheda from inland markets. The Lower Boyne Navigation was heavily subsidised because of the benefit it would bring to the Slane mills. In 1756 the Inland Navigation Corporation set up a body of local noblemen and gentry to oversee the ongoing work of making the Boyne navigable. Eight locks were built between Drogheda and Slane to be made of the largest 'rude stones' available and the 'walls of lime and stone [made] in the best manner'. However due to fluctuations in water levels, the canal was only usable for eight months of the year and below the sea lock at Oldbridge, the nearest Boyne Navigation element to the proposal, the navigation is subject to tidal rise and fall as well as river flow, which would have imposed a time window on traffic to and from Drogheda. These factors would have reduced the commercial viability of the system, with the navigation eventually succumbing to competition from roads and railways. In 1902, James McCann of Ardsallagh, Navan, took over the canal from the Boyne Navigation Company on a lease of 7 years, with a pleasure cruiser, the 'Ros na Ree', operating a passenger service in the summer months between Oldbridge and Navan during the years 1905-1914. The canal still did not pay so the Boyne Navigation Company went into liquidation in 1913, and was bought by John Spicer, son-in-law of James McCann. The canal continued in operation until 1923 when it was abandoned. An Taisce bought the canal from John Spicer for £1 in 1969.

'The Emergency' 1939-1945: There were two perceived threats in the run up to the outbreak of WWII, that from the Germans and that from the British. The Boyne played a pivotal role in the defence strategy to counteract the latter threat. The Boyne / Blackwater was considered a 'good line' because they acted as a 'tank obstacle'. All crossings were to be covered by 'blockhouses' and 'machine gun pits'. The blockhouses are more usually referred to as pillboxes and there are fourteen recorded between Rathmullan in the east and Rossnaree in the west. They are concrete built low squat structures, generally square or trapezoidal in plan, with sides of roughly 4 m in length. The two nearest sites are at Rathmullan, some 300 m to the northeast and the second is located in Oldbridge some 500 mm to the northwest.

ADDITIONAL DATA SOURCES

11.6 Cartographic Record

The Larkin map of 1812, the 1st edition Ordnance Survey (OS) of 1837 and the 4th edition of 1909 were consulted.

The Larkin map (Figure 11.7 below) shows the subject site as open ground, with a cluster of buildings recorded along the eastern side.

Figure 11.7 Location of the subject site on a detail of William Larkin's 1812 map of County Meath

The 1st edition OS map shows the proposed site as farmland divided into nine fields (Figure 11.8 overleaf).

The cluster of farm buildings on the east side of the subject site is recorded, consisting of group of five separate buildings. The main one appears to be aligned east west along the south side of the group, with another main building, aligned north south to the north east of the first. Three smaller buildings are recording dotted around the two main structures.

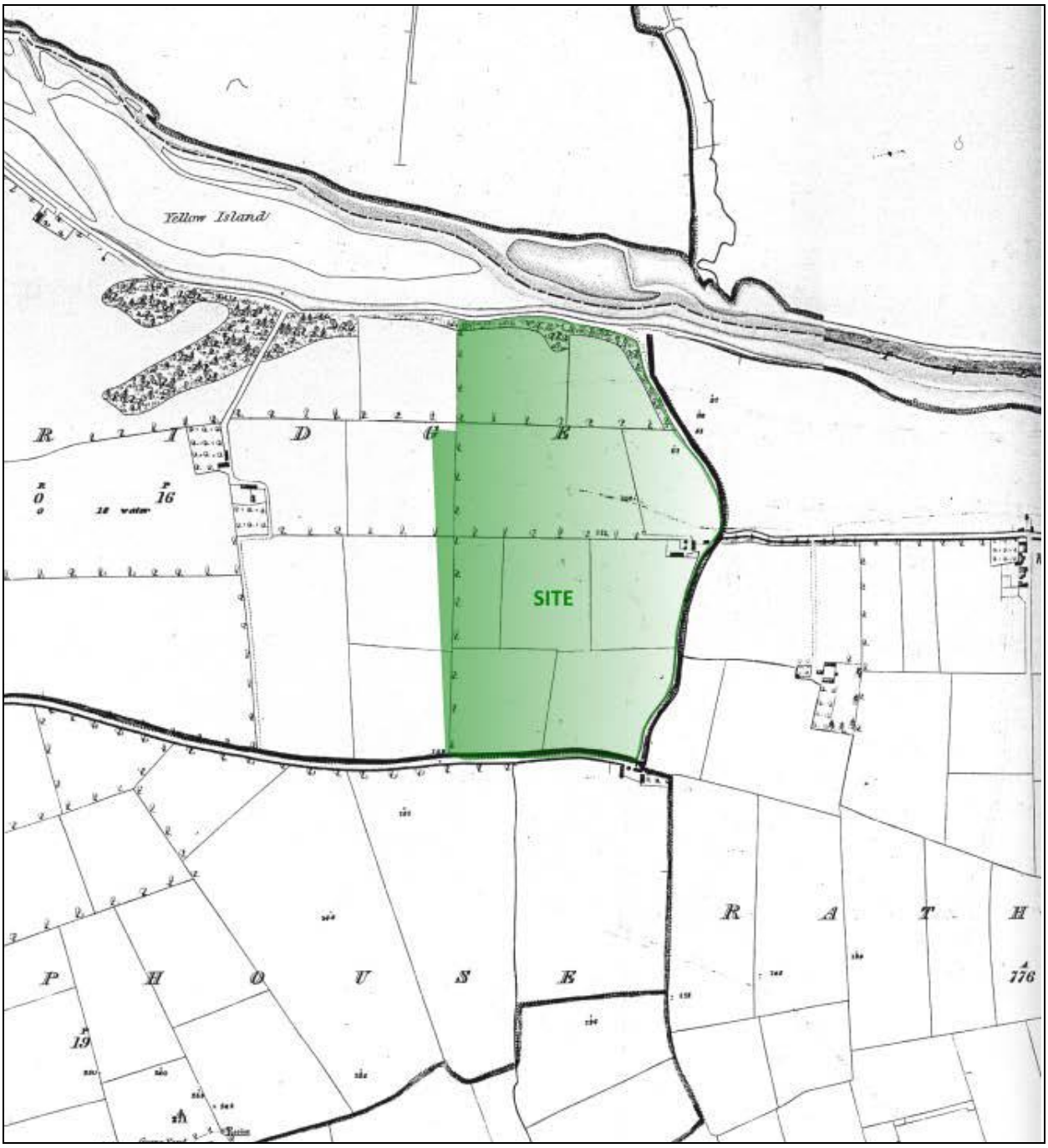


Figure 11.8 Subject site on OS map of 1837

The 4th edition map (Figure 11.9 below) shows land improvements have reduced the number of fields to four. The cluster of farm buildings to the east has also been modified, with the main east-west aligned building extended to an L shape, with the addition of an extension on its west end, the north south aligned building remains unaltered, however the group of three smaller buildings have been removed.

The layout of roads, north and south of the River Boyne and around the subject site, is depicted on the 1st edition much as it exists today with the obvious exception of the recently constructed M1 motorway.

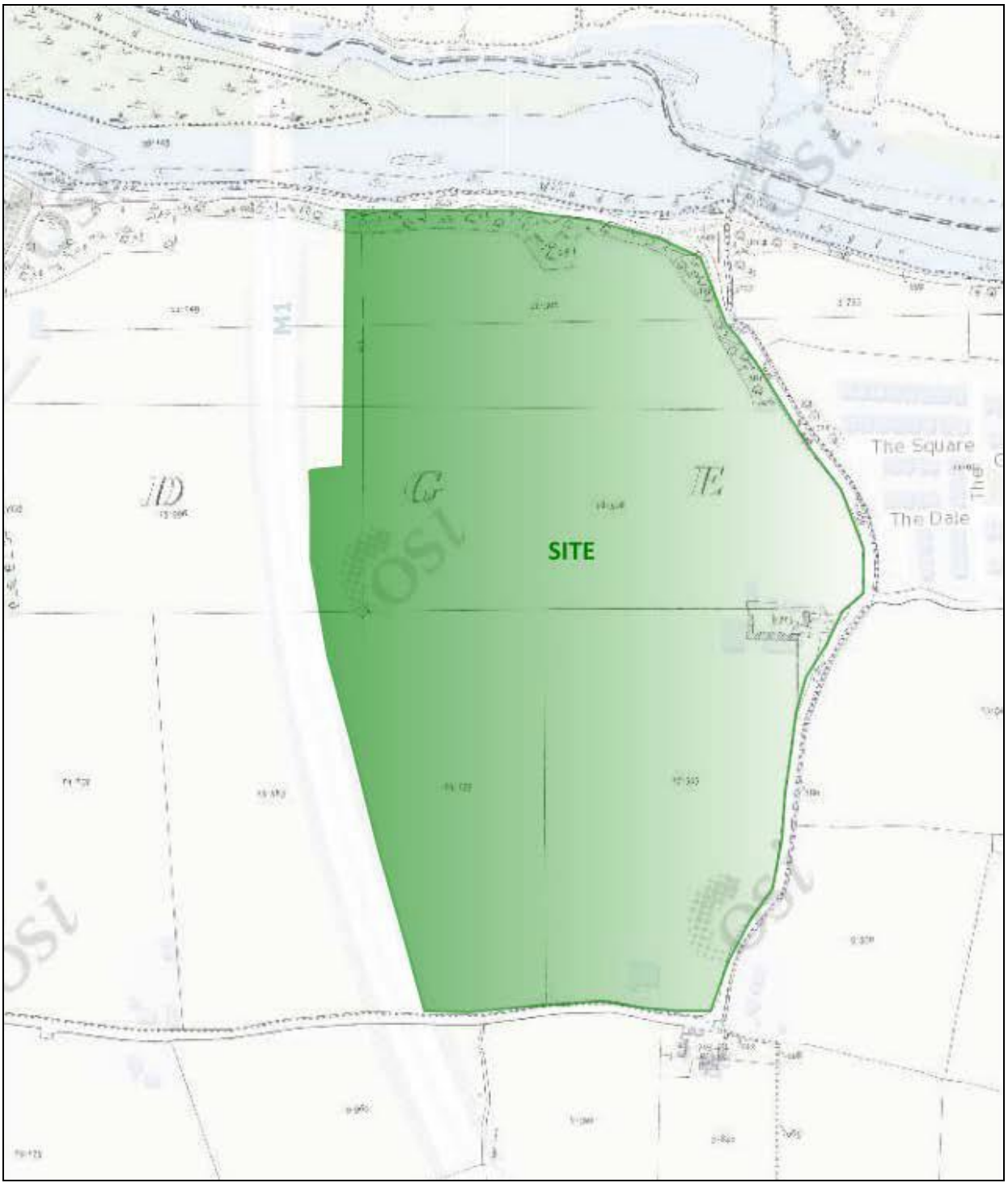


Figure 11.9 Subject site on 4th ed OS map of 1911

11.7 Aerial Photographic Record

The aerial photographs (APs) of the Rathmullan and Oldbridge areas were examined using those held in the Geological Survey of Ireland (GSI), as well as those on the Historic Environment viewer and those available on the web, including a Lidar image of the site.

The relevant photograph from the GSI covers the area west of Drogheda and shows both sides of the river Boyne. It was taken in April 1973 (ref: 036). The area of the subject site is substantially as it is today with the exception that the middle field is divided into two smaller fields, with the western of the two apparently either under grassland or winter wheat at the time of the aerial photograph. The circular feature noted in the site visit in this field is clearly visible on this photograph, and is undoubtedly the same feature recorded on Lidar (Figure 11.7) and noted in the SMR as ME020-072---- (Figure 11.10 below).

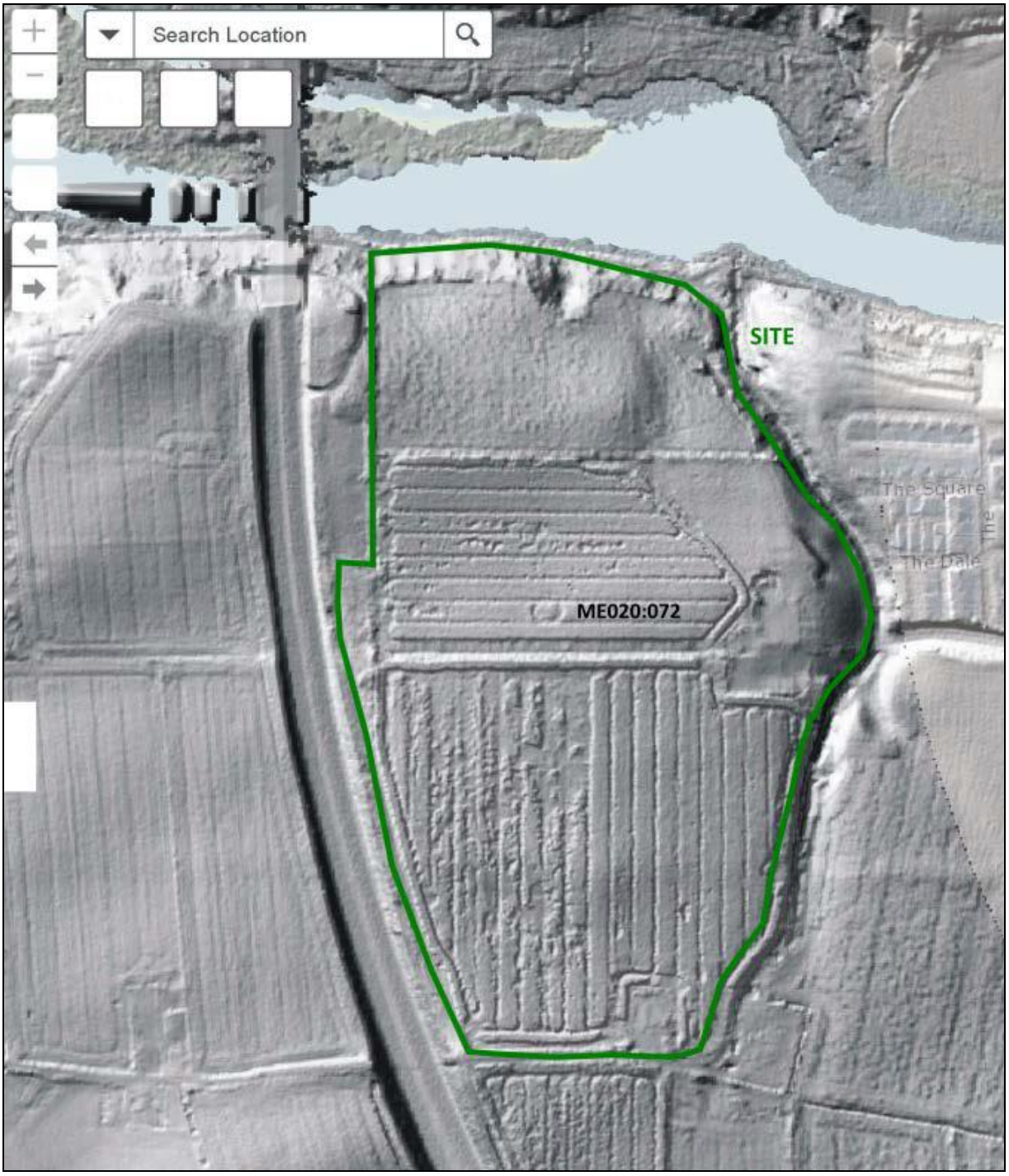


Figure 11.10 Lidar survey of the subject site, with location of ME020:072 indicated

APs available for review on the web date from 2005, 2007, 2009 (B&W) and 2017 (Figure 11.11 below). These show that the field boundary which once divided the middle field in two was removed after 2009. The circular feature, probably ME020-072----, is visible on the 2005, 2007 and 2017 APs, with evidence for the archaeological test trenching visible on the 2009 photograph. Away from the subject site, evidence for the route of the North-South gas pipeline is clearly visible running to the west of the M1 motorway on the 2007 AP.

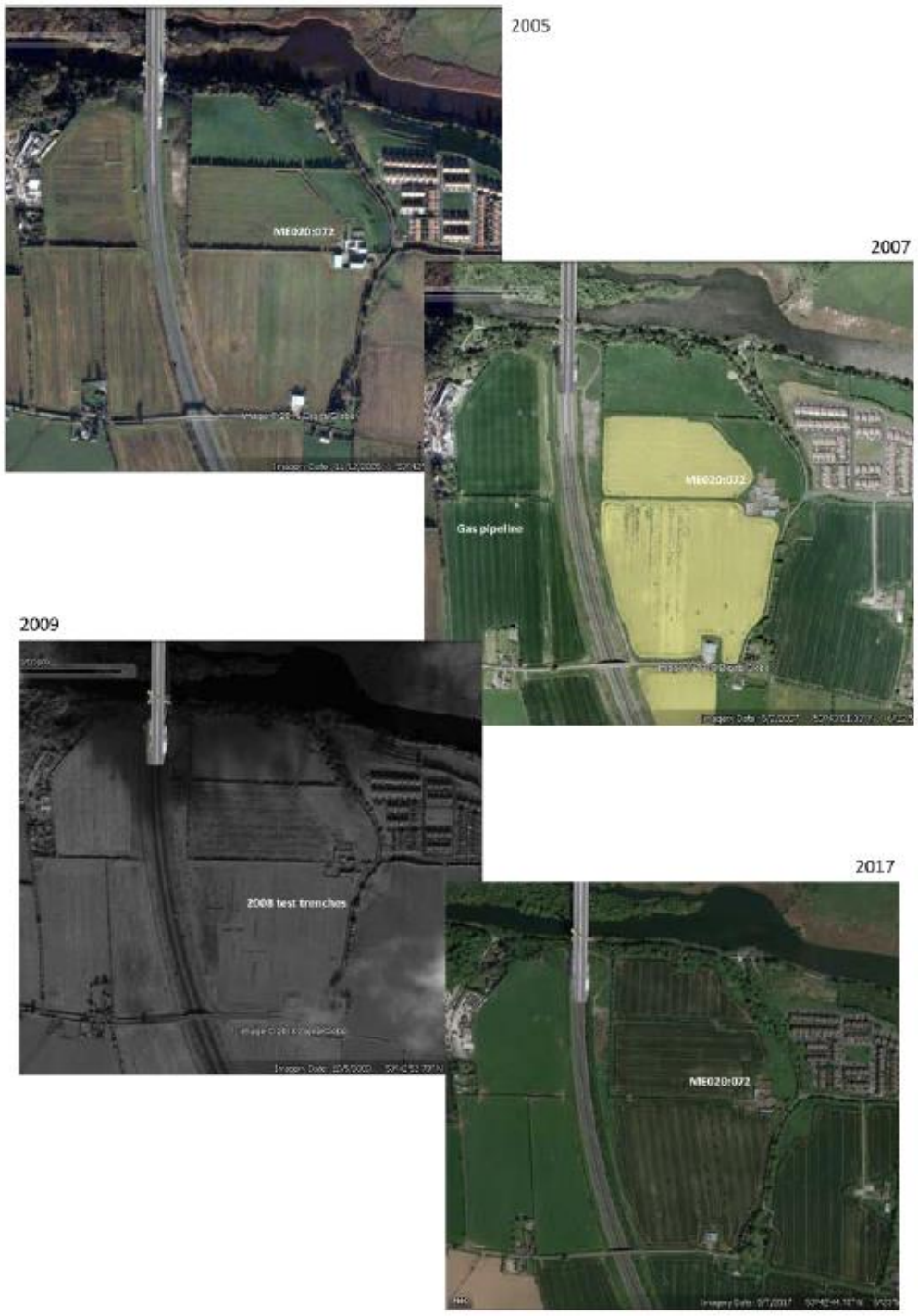


Figure 11.11 Aerial photographs

Nothing new of Cultural Heritage significance was noted in the examination of the APs.

11.8 Topographic Files, National Museum of Ireland

The following town lands were searched for reference to the discovery of any artefacts or finds: Oldbridge, Rathmullan, and Sheephouse. A number of stray finds have been recorded from the vicinity, however, it should be noted that in the main these records do not include finds from the recent spate of archaeological excavations in the area

Oldbridge
Monument: Double cist.
Find: Two food vessels, jet necklace, human skull, five boxes of teeth.
Found: Mound in the grounds of Old Bridge House
Refs: Coffey, G, PRIA III (1893-6), 747-52.
Haddon, A, PRIA IV (1896-98), 570-585a.

Sheephouse
Monument: Double cist, in a mound in the grounds of Old Bridge House
Find: Bronze processional cross, pricket candlestick, and bronze bell.
Description: Old bridge is only a short distance from Mellifont, and these artefacts may have formerly belonged to the monastery, and were perhaps removed during the dissolution of the monasteries. Found: In a quarry, a few feet below the surface.
Refs: Royal Society of Antiquaries of Ireland, Part I, Vol. XCV, Series VI (Vol. V.).

No stray find are noted from the subject site.

11.9 Recent Archaeological Work in the Vicinity

Until 2009, reports of excavation were recorded annually in the Excavation Bulletin published by Wordwell and edited by Isabel Bennett. These volumes contained short summaries of all excavations carried out in Ireland. Since 2009, these have been published to the web on *www.excavatione.ie*. A full list of the summary details of excavations carried out in the vicinity of the subject site is listed in Appendix 11.4, with a note, where applicable of the associated SMR reference number (Figure 11.4).

The only excavation which has a direct bearing on the subject site was that which took place in 2008, and involved the testing of the subject site, consisting of 99 machine dug test trenches spread across the footprint of the proposed development area. A summary is presented below with a copy of the full report reproduced in Appendix 11.3.

Oldbridge, Co Meath (Fig 11.12),ME020-088----,2008:0997, 08E0506
The study area was located immediately east of the M1 motorway and south of the River Boyne. It comprised four fields, covering an area of c. 64 acres, under grassland and tillage. The works under this licence included the excavation of 99 no. test-trenches (50 by 2m) and the metal detecting of all resultant spoil (see Figure 11.12). This work was preceded by a desk-based assessment and a geophysical survey (07R190 see Appendix 11.2 for full report). It is notable that the site lies within the wider Battle of the Boyne landscape, some 350m east of the core area (ME020-025----), and may be where King William crossed the river. The density of known prehistoric remains within the locality, particularly of Bronze Age date, found during the pre-construction stages of the adjacent M1 motorway, is also pertinent.A large Middle Bronze Age enclosure was discovered in the northern field (Field 3). A ring-ditch and two cremations, also of likely Bronze Age date, were discovered in the southernmost (Field 1).

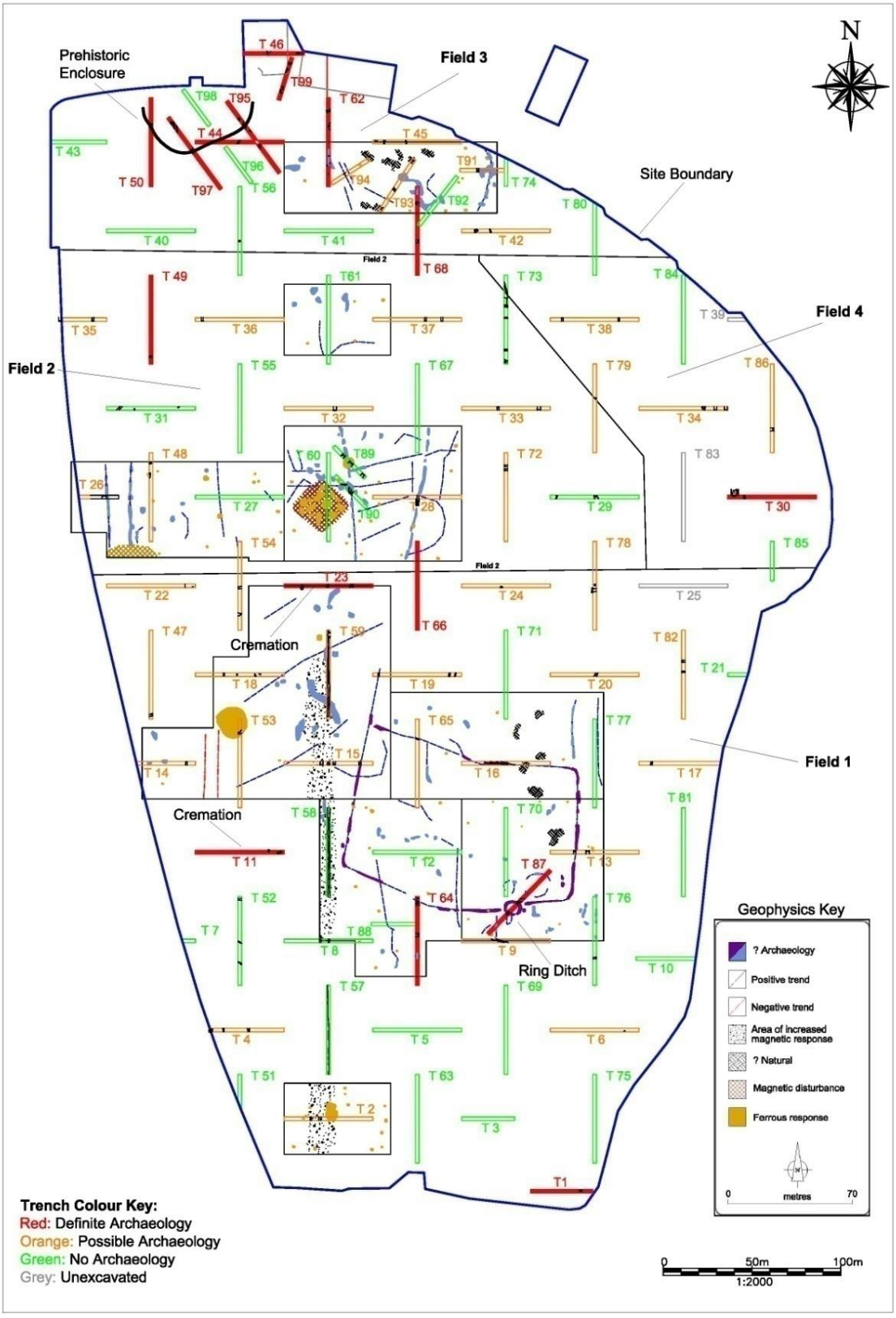


Figure 11.12 Extent of archaeology uncovered across the subject site, including results of geophysical survey and archaeological test trenching

Field 1 contained 48 no. of the trenches. Six contained definite archaeology, 22 no. contained remains of potential archaeological interest and 20 no. contained no remains of archaeological interest. The definite remains comprised two cremations, a ring-ditch, a pit containing prehistoric pottery, a pit containing a cache of prehistoric worked flint and a pit with in situ burning. The potential remains comprised ditches and pits of unknown antiquity, many of which may be of post-medieval or modern date. It is notable that a number of those undated ditches in the north-east of the field did appear to be sealed beneath the non-natural subsoil, suggesting some antiquity. Along with the ring-ditch and a number of other smaller anomalies, the geophysical survey revealed a rectangular relic field system in the centre of the field. It was encountered seven times and excavated in six cases but did not reveal any dating evidence. An additional trench was stripped along a length of this feature and a further 3m section was excavated by hand, specifically to attempt retrieval of dating evidence, but none was discovered. It was found to cut the ring-ditch and consequently post-date it. It probably originates from the medieval to post-medieval period and remains of uncertain archaeological significance.

Field 2 was in the centre of the development and contained 20.5 no. trenches. Only one of those contained definite archaeological remains, 9.5 no. contained potential remains and 11 no. contained no remains of archaeological interest. The definite archaeological feature comprised a ditch terminus or elongated pit containing a fragment of burnt bone. A number of geophysical anomalies were noted in the field, but, where dating evidence was retrieved, all were proven to be post-medieval.

Field 3 was the northernmost field and was located just south of the Boyne River. It contained 22 no. trenches, 8 no. with definite archaeological remains, 5 no. with potential archaeological remains and 9 no. with no remains of archaeological interest. A prehistoric enclosure, of probable Middle Bronze Age date (c. 1500 BC) and c. 70m in diameter, was discovered in Field 3. An impressive array of Middle Bronze Age pottery was retrieved from a single slot excavated to its base. A relatively dense cluster of archaeological remains was also encountered, mostly to the exterior of the enclosure. The potential archaeological remains comprise undated ditches and pits. The geophysical report proved of limited value in Field 3 with most anomalies proving of relatively recent or non-archaeological origin.

Field 4 was located to the north-east of the development and contained 6.5 no. trenches. It contained one trench with definite archaeological remains, 3.5 no. with potential archaeological remains and two with no archaeological remains. The remains labelled definitely archaeological in Field 4 comprised a metalled surface and adjacent post-hole. Its date remains unknown, but the only artefact retrieved from its surface was a pottery crumb of potentially prehistoric date. The potential archaeological remains once again comprised undated ditches which do not match any previous maps but are of probable post-medieval date.

IMPACTS

11.10 Characteristics of the Proposed Development

The Strategic Housing Development comprises the demolition of two sets of existing farm buildings and the construction of a residential development, comprising 661 no. dwellings; a retail unit, a café and a creche.

In addition, there are proposed traffic and carriageway improvements and reconfiguration to Rathmullan Road and to Sheephouse Road including the provision of new vehicular access points to the site at Rathmullan Road (via a new signalized junction) and at Sheephouse Road.

There is also a provision for extensive landscape proposals across the site.

IMPACTS CONSTRUCTION PHASE

11.11 Potential Impact of the Proposed Development: Construction Phase

At the outset it should be noted that even within a development site where public open space is to maintained at within the overall development, it is impractical to attempt to protect these areas as green spaces in the course of construction, particularly those within the main part of the development and therefore for the purposes of this impact assessment the entirety of the subject site is considered the development area. However, it should be noted that it is proposed to protect the zone of archaeological potential associated with the Bronze Age enclosure, ME020-088----, located in the relatively undeveloped northern end of the subject site (see 11.13.14 below).

The construction phase will involve the extensive disturbance of the existing ground within the subject site. This will include extensive topsoil stripping and landscaping, the excavation of foundations for buildings and roads, with extensive trenching for all associated services, including attenuation tanks and pumping stations. Consequently, any sites or features of cultural heritage interest will be negatively impacted upon.

11.11.1 Archaeology – Construction Phase

There are two known sites of archaeological interest from within the boundaries of the subject site. The first, recorded as ME020-072---- on the SMR, was noted on a recent Lidar survey of the area, it was also noted from various APs of the site and was visible in the course of the field inspection. In addition, it was further recorded in the geophysical survey of the subject site which was undertaken in 2008. Here it was described as an unusual ferrous response which appeared to be composed of multiple ferrous anomalies forming a rectilinear area of magnetic disturbance approximately 23m x 23m. The surveyor noted that the shape of the disturbance was curious, adding that although the ferrous nature of the response was 'typical of modern disturbance' a definitive interpretation was not possible.

The feature was further examined in the course of the phase of archaeological test trenching which also took place across the subject site in 2008 (08E0506). Trench 60 was opened across the anomaly which revealed the feature to be a dump of modern construction material and that no remains of an archaeological nature were revealed. As a consequence of the geophysical survey and the follow-up archaeological test trenching, the feature ME020-072---- can be discounted from further impact analysis.

The other known SMR site within the boundaries of the subject site, ME020-088----, refers to an enclosure uncovered in the north eastern corner of the area, which the excavator described as a prehistoric enclosure, approximately 70m in diameter, of probable Middle Bronze Age date (c. 1500BC) In addition a relatively dense cluster of archaeological remains, consisting of undated ditches and pits, was also encountered, mostly to the exterior of the enclosure. It is proposed to preserve the Bronze Age enclosure in situ, maintaining the area as a green space within the development.

Elsewhere the archaeological works undertaken in 2008 revealed extensive previously unrecorded archaeological features and deposits across the remainder of the subject site (see Figure 11.12). At the southern end of the subject site the archaeology uncovered in the test trenching consisted of the remains of two cremations, a ring ditch, a pit containing prehistoric pottery, a pit containing a cache of prehistoric worked flint and a pit containing in-situ burning. In addition, some further potentially important archaeological remains were uncovered, comprising of ditches and pits of unknown antiquity many of which may be of post-medieval or modern date. It was noted that a number of the undated ditches appeared to have been sealed beneath the non-natural subsoil, suggesting some antiquity. Along with the ring ditch and a number of other smaller anomalies, the geophysical survey revealed a rectangular relic, but undated, field system. However, the field system was noted to cut the ring ditch and consequently postdates it. The excavator noted that it was likely that the system dated from the Medieval to post-Medieval period but remained of unsure of its archaeological significance.

Towards the centre of the subject site further archaeological deposits were encountered, consisting of a

ditch terminus or elongated pit that contained a fragment of burnt bone and was sealed beneath a layer of non-natural subsoil, a metalled surface and adjacent undated posthole, however a small sherd of pottery was retrieved from the surface which was of potentially prehistoric date. In addition, a series of undated ditches were uncovered, which were not noted to match any previous maps but were considered by the excavator of probable post-Medieval date.

As the construction phase will involve the extensive disturbance of the existing ground within the subject site, which will include extensive topsoil stripping, excavation of foundations for buildings and roads, with extensive trenching for all associated services, all of the surviving sub-soil archaeological features will be severely adversely impacted upon by the construction phase of the proposed developments on the subject site.

At the north end of the development, the area of the Bronze Age (BA) enclosure ME020-088---- and a 10 m wide buffer zone, will be physically protected in the course of construction works, with the surrounding area used for relatively low impact development in the form of green spaces, pathways, play areas and landscaping with the planting of trees and shrubs. The impacts from this aspect of the development will therefore be slightly adverse. These impacts will however be off-set by the development in this area of view points and public information signage, highlighting the historic role that area played in the Battle of the Boyne.

It is proposed that prior to construction commencing on site, the line of the BA enclosure and associated buffer zone be surveyed, with temporary protective fencing (Harras or similar) erected around the enclosure boundary. This protection will be maintained until such time as the construction is complete and the permanent protection measures, preservation in situ, are in place.

In regard to archaeological sites outside the subject area, particularly the UNESCO World Heritage Site and its associated buffer zone. It is considered that the construction phase of the proposed development will cause very minor changes to the historic landscape of the buffer zone, with virtually unchanged visual effects but with very slight changes in noise levels, together resulting in a very small change to historic landscape character. As such there will be negligible impacts to the buffer zone associated with the World Heritage site. In addition, as there will be no change to elements, parcels or components of the historic landscape, with no visual or audible changes and no changes in amenity or community factors to the core area of the World heritage site, there will be No Change in terms of impacts from the construction phase on the Core Area of the World heritage Site (ICOMOS 2011 and Appendix 11.6).

There will be no impacts in the construction phase of any other sites of archaeological interest

11.11.2 Architecture – Construction Phase

In addition to the known archaeological component to the subject site, there is also an architectural aspect, in the form of the cluster of farm buildings located on the eastern side of the site. The original buildings appeared on the Larkin map of 1812, (Figure 11.7) OS map of 1837 (Figure 11.8) and are also referred to in the Griffith Valuations of c. 1850, it is likely therefore that they date to at least the early part of the 19th century. While it is true that they have been much modified and disturbed by later agricultural developments, particularly in the 20th century, there is still some original 19th century fabric surviving within the cluster (Plates 11.6 and 7) and it is possible that the cluster extends beyond the buildings presently visible.

As the construction phase involves the proposed levelling and removal of this cluster of buildings as preparatory ground works for the development of a new site entrance, the surviving architectural features will be severely adversely impacted upon.

In regard to architectural sites outside the subject area, there will be negligible impacts on these sites from the construction phase.

11.11.3 Cultural Heritage – Construction Phase

Finally, there is a broader cultural heritage component to the proposal, which in the case of the subject site, consists of the Battle of the Boyne. It is known that James posted mounted piquets at the northern end of the subject site to monitor the potential use of the nearby Mill Ford across the Boyne by the Williamite forces. The piquets on seeing forces advancing, offered some considerable resistance, while the alarm was being raised. However, before the Jacobites could mobilise properly, William and his accompanying forces were across the river. It is highly improbable that the Williamites scaled the steep southern river bank, rather they certainly used the more easily accessible ravine known as *Pass-if–you-can*, which runs along the eastern boundary of the subject site.

In addition, despite targeted research within the subject site, in terms of metal detector and geophysical survey backed by an extensive programme of archaeological testing, no certain physical evidence of features or artifacts were recovered which could be assigned to the battle. It must therefore be presumed that while the subject site was part of the wider Battle of the Boyne landscape, no significant engagements took place here, or at least no activity which left its mark in the physical archaeological record.

As the construction phase will involve the extensive disturbance of the existing ground within the subject site, which will include extensive topsoil stripping, excavation of foundations for buildings and roads, with extensive trenching for all associated services, the elements of the cultural heritage associated with the Battle of the Boyne will be slightly adversely impacted upon by the construction phase of the proposed developments on the subject site.

In regard to cultural heritage sites outside the subject area, there will be negligible impacts on these sites from the construction phase.

IMPACTS OPERATIONAL PHASE

11.12 Potential Impactof the Proposed Development - Operational Phase

11.12.1 Archaeology – Operational Phase

There will be no additional impacts from the operational phase on sites of an archaeological or architectural nature within the subject site.

The main site of cultural heritage interest outside the boundaries of the subject site is the World Heritage Site of *Brú na Bóinne* - Archaeological Ensemble of the Bend of the Boyne (UNESCO Ref No 659), the buffer zone boundary of which runs parallel to the western edge of the M1 motorway, some 150 m from the western edge of the subject site. The buffer zone which extends to some 2,500 hectares surrounds the core area and extends to the Mattock and Delvin Rivers in the north and as far as Platin and Red Mountain to the south. The boundaries of the buffer zone were set having taken into account views into and out of the core area, and there will be no impacts on the core area from this development.

There will however be limited views from the buffer zone into the subject site and out of the subject site into the buffer zone, in the operation phase. Any adverse impacts to the west will be reduced to a negligible level by the presence of existing and proposed landscape planting along this boundary. The subject site will however be overlooked from the south by the hill at Donore which is within the buffer zone and has located on its summit the SMR site ME020:011, the Medieval Church and Graveyard of Donore and which was also the site of the Jacobite camp at the Battle of the Boyne (Plate 11.8). At over 800 m distant, it is considered the proposal extends existing developed areas rather than effects a fundamental change and as such any adverse impacts on the World Heritage Site buffer zone and the archaeology associated with the hill at Donore are slight.

The buffer zone is not significantly visible from the site elsewhere.

Of the other archaeological sites outside the subject site's boundary, six, ME020-035----, 036----, 040----, 049----, 054---- and 063----, were uncovered in the course of the construction of the M1 Drogheda by-pass and therefore no longer exist, having been archaeologically excavated and preserved by record. There will therefore be no impacts on these sites from the operational phase.

Of the remainder, ME020-:008---- is an enclosure which was discovered in the course of a geophysical survey undertaken in advance of the construction of the North-South Gas Pipeline, and as such has no surface expression. However, the operation of a housing estate of 661 units, with associated infrastructure some 150 m to the north east in what were once green fields, will have a negligible to slight adverse impact on the setting of this site.

The other sites, the standing stones (ME020-030---- and 041----), the souterrain (ME020-004----) and the ring ditch (ME020-025003) are all located on west facing ground some 700 m to the west and will not be impacted upon by the operation phase of the development.

11.12.2 Architecture - Operational Phase

There is only one recorded site of architectural interest in the vicinity, that of Drybridge House, located on the north side of the river some 750 m to the north west of the subject site. The house now has the north-south line of the M1 motorway and the substantial structure of the Mary MacAleese Bridge, between it and the subject site (Plate 11.13). The impacts of the operational phase of the development on the house will therefore be negligible to slightly adverse.

The nearest site associated with the Boyne Navigation proper is Oldbridge lock 750 m to the north west, as a consequence there will be no impacts on the Boyne Navigation from the development proposal.

Similarly, the nearest sites associated with 'The Emergency' are two pillboxes, the first located along the Rathmullan ramparts, is located some 300 m to the northeast, while the other pillbox, located at Oldbridge is some 500 m to the north west. There will be no impacts from the proposal on these sites.

11.12.3 Cultural Heritage - Operational Phase

The Battle of the Boyne site (ME020-025----) runs to over 2,500 ha in extent, from the Williamite camp near Tullyallen in the north, to the Jacobite camp at Donore to the south, and from the crossing of the Boyne by Schomberg at Rosnaree to the west, to William's river crossing at Mill Ford to the east. The subject site is located on the extreme eastern edge of the wider battlefield landscape, with the presence of a group of mounted piquets recorded as having been stationed at the north end of the subject site.

Story's map of 1693 (Figure 11.13 overleaf) is interesting in regards to the layout of the battle. There are three main aspects which are notable from the Story map; the first is his indication that William took up a position on high ground to the north east of his main camp from where Story records '*A hill from whence his Majesty first saw the Irish camp*'. Comparing Story's map to the modern OS, it is apparent that William took up a position on Red Mountain some 2km to the north east of Tullyallen, and from where today there are commanding views across the Boyne valley to the site of the Jacobite camp at Donore (Plate 11.9). The subject site is also visible from this commanding location, and the operation phase will have negligible to slight adverse visual impacts on the general setting of the Battle of the Boyne site from this location.

The second aspect of Story's map is the depiction of the Jacobite camp at Donore, the impacts from this site have been dealt with in para 11.10.3 above.

The final noteworthy detail recorded by Story is the location of the crossing point of '*The left wing of our horse*'. It was at the point immediately below the subject site, at Mill Ford, (Plate 11.10 and 11) that the left wing of the Williamite forces, under the command of William himself crossed the river, and approached the Jacobite camp at Donore via the deep and wooded ravine of *Pass-if-you-can* (Plate 11.12). Due to the local terrain, with the subject site positioned on high ground above the crossing point

with the ground between which will remain densely wooded, there will be no adverse impacts from the operational phase of the development on this area of the battlefield.

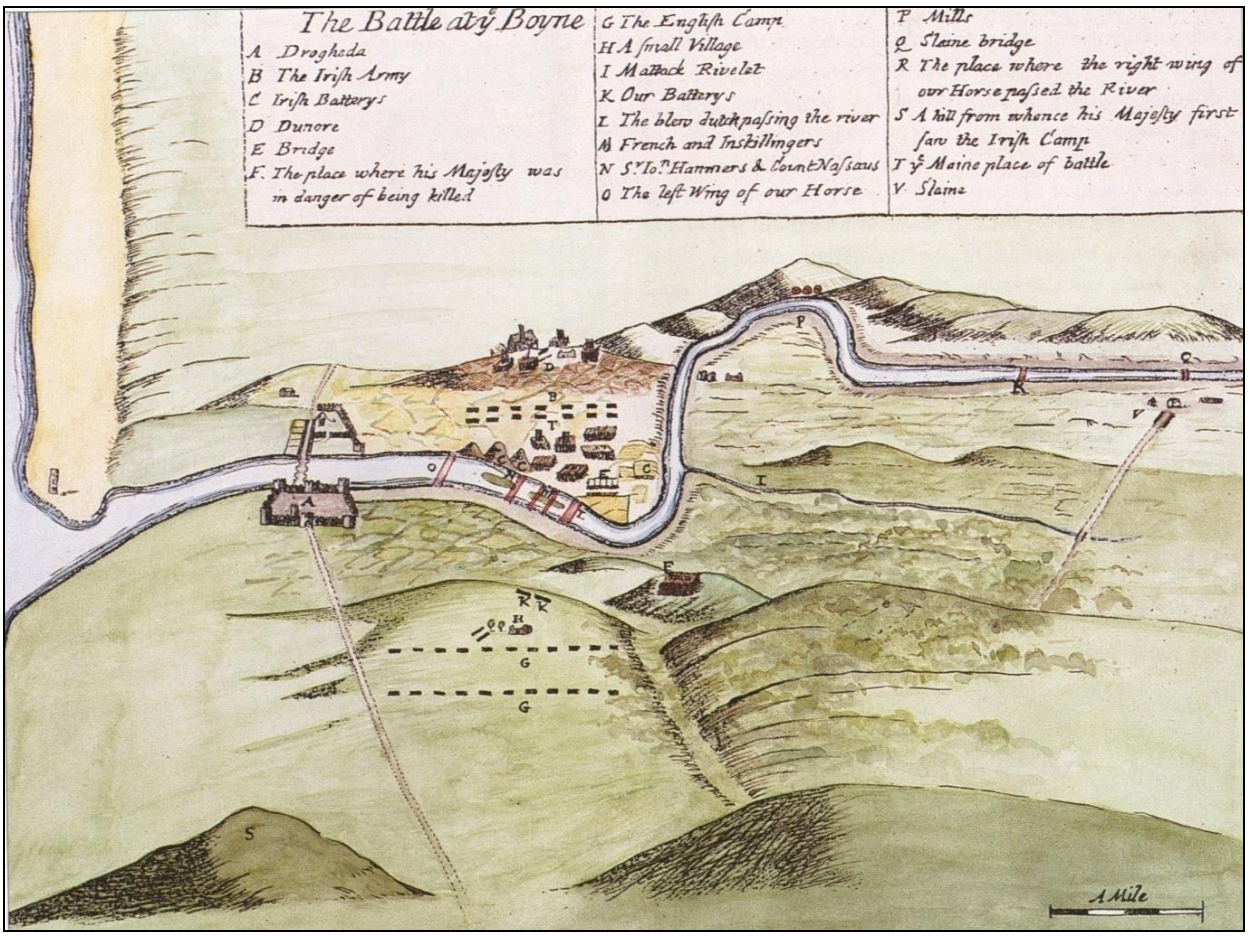


Figure 11.13 Story's 1693 map of the Battle of the Boyne site

MITIGATION

11.13 Mitigation – Construction Phase

The proposed developments will negatively impact on the various archaeological features and deposits uncovered in the course of the testing phase and any other surviving archaeological remains. However, the assessment revealed that the surviving archaeological remains on site have suffered from significant plough truncation and by and large survive as sub soil cut features.

It is therefore recommended that pre-development mitigation takes place in the form of archaeological excavation and preservation by record apart from the BA enclosure at the north end of the subject site, which will be the subject of a specific targeted mitigation strategy (see 11.13.14 below).

It is recommended that in the southern field an area of approximately 50 m by 50 m be topsoil stripped by mechanical tracked excavators fitted with toothless bucket under licensed archaeological supervision, centred over the site of the ring ditch and related field system and all features uncovered be excavated and recorded.

In addition, it is recommended that the smaller isolated features, including the cremations, uncovered in

the course of the 2008 assessment also be the subject of pre-development investigations consisting of the monitored topsoil removal by mechanical tracked excavators fitted with toothless bucket under licensed archaeological supervision of a 10 m by 10 m area centred on each feature and their subsequent archaeological excavation and recording. Topsoil stripping should continue around each feature until a 5 m buffer zone of sub soil free of archaeological features has been achieved. This is to ensure that the features are in fact 'isolated' and not part of a larger archaeological complex.

All topsoil should be spread out at the side of the cutting and examined with the aid of a metal detector, under a separate metal detector licence.

An archaeologist with battlefield archaeology experience should be available for regular consultation to aid in the identification of all metal work recovered in this phase and all additional phases of archaeological works.

Further topsoil stripping should be archaeologically monitored preferably in a pre-construction phase of works, in concert with the proposed phasing of the overall development, to allow time to undertake any additional archaeological investigations which may be required.

All topsoil stripping archaeological works should be carried out by mechanical tracked backacter excavators fitted with toothless bucket under the supervision of a qualified licensed archaeologist. Despite the lack of certain artefactual evidence uncovered in the 2008 assessment works, it is recommended that, due to the location of the proposal within the wider landscape of the Battle of the Boyne, all topsoil stripping undertaken in association with any developments of the site be further surveyed by a licensed metal detector, assisted by an experienced battlefield archaeologist.

The substantially older architectural elements within the cluster of farm buildings along the eastern boundary of the subject site are undoubtedly the partial remains of the buildings recorded on Larkin and the first edition OS maps. This indicates that these remains are of at least early 19th century date. Such is the state of disrepair and later modifications that it is not considered that preservation in situ is appropriate, however, it is recommended that an historic building survey (Level 2), is undertaken in advance of their demolition (Historic England p26). This should consist of both a written and photographic record, with detailed measured survey drawings where necessary.

In addition, the area around the cluster of buildings should be the subject of targeted pre-development test trenching, to examine the possibility that the cluster extends beyond the buildings currently upstanding and to record the full extent and layout of the buildings.

11.14 Mitigation – Operational Phase

The main concern within the operation phase is that of adverse visual impacts, from the various vantage points associated with the Battle of the Boyne and the views from the World Heritage site (see the Visual Impact chapter in the regard)

It is recommended that the proposed planting design for the development should establish tree and shrub-lined boundaries to the north and south and add to the existing tree lined boundary to the west utilizing an appropriate variety of native species. (See the Landscape Strategy and Design chapter in this regard)

It is also recommended that trees and shrubs should form an important element within the boundaries of the subject site, to soften the hard lines which will result in the construction of the buildings and associated road network within the development (see the Landscape Strategy and Design Report, prepared by Cunnane Stratton Reynolds, which accompanies this application for further information).

THE BRONZE AGE ENCLOSURE

The enclosure is located in the north-west corner of the subject site and was uncovered in four separate trenches in the course of the testing undertaken in 2008. It was defined by a 2 m wide and an average 550 mm deep U-shaped ditch which was filled with a series of deposits, the lowest of which produced a substantial quantity of sherds of pottery, the form and decoration on which suggests a middle Bronze Age date. Although only the southern half of the site was uncovered in the testing, the projected line would appear to describe a sub-circular enclosure some 60 m in diameter. The soil profiles in each of the four test trenches where evidence for the enclosure was found revealed some 500 mm of topsoil / ploughsoil over the enclosure. The surface of the ploughsoil varied in height from 23.1 m OD at the west end of the enclosure to 21.6 m OD on its eastern side.

In the first instance, it is proposed that the full extent of the enclosure be ascertained. This to be achieved by the opening of two targeted test trenches, excavated down to the top of archaeological deposits, revealing the northern extent of the enclosure. Once known, the full extent of the enclosure will be staked out on the ground, which will inform stage two.

It is then proposed to preserve the enclosure *in situ* and develop the area as a green space, limiting any development on the site. The first phase of the works on site will involve the laying down of geotextile matting across the footprint of the enclosure, to include a 5 m wide buffer zone around the enclosure. The matting will be laid directly down onto the top of the existing ground surface, and then covered with topsoil. The topsoil will be added to create a low embankment running around reflecting the line of the enclosure ditch. The profile of the embankment will have sides at a slope of 1:4 and the surface grassed over to allow for easy maintenance.

It is also proposed to develop a path way running around the perimeter of the newly formed enclosure, with the addition of benches and signage to inform the visitor of the buried archaeology and its significance.

11.15 General Mitigation Recommendations

All ground works will be carried out using backacter tracked machines equipped with toothless buckets which are under the constant supervision of a suitably qualified and licensed archaeologist. The archaeologist will monitor the works until either the surface of glacial subsoil, formation level or the surface of archaeological remains is uncovered, whichever is encountered first. Archaeological works should, if possible be phased in line with the overall phasing of the development programme, and if possible stay one phase, at least ahead of the construction works, in order to avoid any potential conflicts between archaeology and construction.

It is recommended that all archaeological deposits uncovered during monitoring be recorded and investigated to best archaeological practice. They will in the first instant be cordoned off using high visibility tape and access to these areas by machinery and personnel denied until the deposits have been fully resolved.

The licensed archaeologist on site is responsible, on behalf of the developer, for the identification and appropriate treatment (e.g. excavation and recording) of all archaeological remains encountered. In order to fulfil the responsibilities of the developer therefore, the licensed archaeologist will have the authority to temporarily stop machining where potential archaeological material has been identified, in order to evaluate the character of said remains. It should be possible for work to continue (under archaeological supervision) in areas where no archaeological deposits have been encountered. Should archaeological remains be present, the licensed archaeologist will be responsible for communicating this to the client or appointed representative, as well as to the relevant Heritage Authorities.

In the event of the discovery of any archaeological remains during the monitoring, the deposits will be hand excavated to assess their nature date and extent and time will be allowed for the archaeologist to undertake the appropriate level of recording. The level of recording will depend on the complexity of the

archaeological remains encountered and, in all cases, sufficient time will be allowed by the developer for this purpose.

If human remains, or any suspected grave cuts, are observed, machine excavation will cease, the statutory authorities and development sponsor will be informed immediately and a suitable methodology for dealing with the human remains or grave cuts will be agreed in writing with the heritage authorities. Work will not recommence in the area containing the human remains until such a methodology has been agreed, and all works subsequently undertaken in this area will be in accordance with this methodology.

During all archaeological works, recording will be by means of the standard methods employed during archaeological fieldwork. A day book will be maintained while all archaeological features will be recorded in writing utilising pro forma context sheets by means of scaled field illustrations and by appropriate photography.

It is recommended that the developer allow enough time in the development programme for any archaeological excavations. It should be noted that the results of all excavation including site evaluation and monitoring, must be compiled into a fully illustrated report.

In the course of the archaeological works all finds will be logged according to context, washed (if appropriate), bagged and catalogued prior to dispatching to the various specialists. A contract conservator will be on hand if necessary. All artefacts will be numbered and treated in accordance with National Museum guidelines and will be processed to a standard acceptable for deposition to the State's Cultural Resource Centre in Swords, Co. Dublin.

As with the finds, the site archive will also be processed to a standard acceptable for deposition to the State's Cultural Resource Centre in Swords, Co. Dublin.
A comprehensive final archaeological report will be compiled that will set out the results of the archaeological works in accordance with the terms of the National Monuments Acts and best professional practice. It will address the archaeological and historical background of the site. The location and levels (corrected to Ordnance Datum) of any archaeological deposits found will be clearly shown.

11.16 Bibliography

Boulger, D. 1911 *The Battle of the Boyne.* London. M. Secker.

Cooney, G., Byrnes, E., Brady C. 2002 'The Archaeology of the Battle of the Boyne at Oldbridge, Co. Meath' *Archaeology Ireland* Vol. 16 No. 4 Winter 2002

Brady, C., Byrnes, E., Cooney G., O'Sullivan, A. An archaeological study of the Boyne at Oldbridge, Co. Meath. Journal of Conflict Archaeology 3 (1), 53-77.

Childs, J. 2007 The Williamite wars in Ireland, 1688-1691. London. Continuum Books

Hays-Mcoy, G.A. 2009 *Irish Battles - A military history of Ireland* Appletree Press

Historic England 2006 *Understanding Historic Buildings A Guide to Good Recording Practice*

ICOMOS 2011 Guidance on Heritage Impact Assessments for Cultural World Heritage Properties. A publication of the International Council on Monuments and Sites 2011

Lenihan, P. 2005 *1690 Battle of the Boyne* Tempus Publishing

Macaulay T.B. 1979 The History of England. Penguin Classics

McNally, M 2005 *Battle of the Boyne 1690 – The Irish campaign for the English crown*. Osprey Publishing

Moraghan, M. 2007Impact Assessment Report for a Proposed Housing Development Oldbridge/Rathmullan,Co. Meath(Unpublished Report, ADS Ltd)

Murtagh, H. 2006 The battle of the Boyne 1690: A guide to the battlefield. Drogheda. The Boyne Valley Honey Company

Smyth, J. 2007 Brú na Bóinne World Heritage Site. Archaeology Ireland 22 (2) 28-30.

Stout, G. 1997 The Bend of the Boyne Co Meath in Aalen, F.H.A. et al *Atlas of the Irish Rural Landscape* Cork University Press

Stout, G. 2002 *Newgrange and the Bend in the Boyne*. Cork University Press

Whitaker, J. 2004 'Cultural and Heritage Assessment of a Proposed Residential Development Site at Rathmullan, Co. Meath' (Unpublished Report, ADS Ltd)

Wilde, W. 1949 *The Boyne and the Blackwater*. Dublin 3rd edition

CHAPTER 12.0 LANDSCAPE AND VISUAL AMENITY

12.1 Introduction

The Landscape and Visual Impact Assessment (LVIA) prepared by Cunnane Stratton Reynolds was informed by a desktop study and a survey of the site and receiving environment in June 2018. The report identifies and discusses the landscape and visual constraints and opportunities in relation to the proposed residential development, located on the Rathmullan Road, Drogheda, Co. Meath.

This chapter was prepared by Declan O'Leary, B.Agr.Sc. (Land Hort) UCD; Post Grad Dip in Landscape Architecture (University of Central England); MILI; and Emma Oldroyd, BA Hons, PG Diploma and MA in Landscape Architecture (Leeds Metropolitan University); CMLI of Cunnane Stratton Reynolds. Emma has worked in both public and private sectors in consultancy and as a Senior Lecturer. She is experienced in strategic design, landscape, visual and environmental assessments, planning and urban design work and projects involving green infrastructure, housing, regeneration, urban centres and area renewal and has been working in Dublin since early 2018.

12.2 Research Methodology

12.2.1 Definition of Landscape

Ireland is a signatory to the European Landscape Convention (ELC). The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. This definition is important in that it expands beyond the idea that landscape is only a matter of aesthetics and visual amenity. It encourages a focus on landscape as a resource in its own right - a shared resource providing a complex range of cultural, environmental and economic benefits to individuals and society.

As a cultural resource, the landscape functions as the setting for our day-to-day lives, also providing opportunities for recreation and aesthetic enjoyment and inspiration. It contributes to the sense of place experienced by individuals and communities and provides a link to the past as a record of historic socio-economic and environmental conditions. As an environmental resource, the landscape provides habitat for fauna and flora. It receives, stores, conveys and cleans water, and vegetation in the landscape stores carbon and produces oxygen. As an economic resource, the landscape provides the raw materials and space for the production of food, materials (e.g. timber, aggregates) and energy (e.g. carbon-based fuels, wind, solar), living space and for recreation and tourism activities.

12.2.2 Forces for Landscape Change

Landscape is not unchanging. Many different pressures have progressively altered familiar landscapes over time and will continue to do so in the future, creating new landscapes. For example, within the receiving environment, the environs of the proposed development have altered over the last thousand years, from wilderness to agriculture and settlement.

Many of the drivers for change arise from the requirement for development to meet the needs of a growing population and economy. The concept of sustainable development recognises that change must and will occur to meet the needs of the present, but that it should not compromise the ability of future generations to meet their needs. This involves finding an appropriate balance between economic, social and environmental forces and values.

The reversibility of change is an important consideration. If change must occur to meet a current need, can it be reversed to return the resource (in this case, the landscape) to its previous state to allow for development or management for future needs.

Climate change is one of the major factors likely to bring about future change in the landscape, and it is accepted to be the most serious long-term threat to the natural environment, as well as economic activity (particularly primary production) and society. The need for climate change mitigation and adaptation, which includes the management of water and more extreme weather and rainfall patterns, is part of this.

12.2.3 Guidance

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity.

The methodology for assessment of the landscape and visual effects is informed by the following key guidance documents, namely:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition 2013, published by the UK Landscape Institute and the Institute of Environmental Management and Assessment (hereafter referred to as the GLVIA).
- Guidelines on the Information to be Contained in Environmental Impact Statements, 2002, published by the Environmental Protection Agency (and the Revised Guidelines on the Information to be Contained in Environmental Impact Statements, Draft 2015).

12.2.4 Key Principles of the GLVIA

Use of the Term 'Effect' vs 'Impact'

The GLVIA advises that the terms 'impact' and effect' should be clearly distinguished and consistently used in the preparation of an LVIA.

'Impact' is defined as the action being taken. In the case of the Rathmullan Road Development, the impact would include the construction of the residential accommodation, along with the creche and retail area, as well as supporting road and utility infrastructure and public open space. In addition, there is also the localised change on the approximately 27 ha site, mostly from the existing agricultural use, and the works required to facilitate this change.

'Effect' is defined as the change or changes resulting from those actions, e.g. a change in landscape character, or changes to the composition, character and quality of views in the receiving environment. This report focusses on these effects.

12.2.5 Assessment of Both 'Landscape' and 'Visual' Effects

Another key distinction to make in a LVIA is that between landscape effects and the visual effects of development.

'Landscape' results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations of these elements and their spatial distribution create distinctive character of landscape in different places. 'Landscape character assessment' is the method used in LVIA to describe landscape, and by which to understand the potential effects of a development on the landscape as 'a resource'. Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of landscape that make a place distinctive.

Views and '*visual amenity'* refer to the interrelationship between people and the landscape. The GLVIA prescribes that effects on views and visual amenity should be assessed separately from landscape, although the two topics are inherently linked. Visual assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

12.2.6 Methodology for Landscape Assessment

In Section 12.6 of this report the landscape effects of the development are assessed. The nature and scale of changes to the landscape elements and characteristics are identified, and the consequential effect on landscape character and value are discussed. Trends of change in the landscape are taken into account. The assessment of significance of the effects takes account of the sensitivity of the landscape resource and the magnitude of change to the landscape which resulted from the development.

Sensitivity of the Landscape Resource

The sensitivity of the landscape is a function of its land use, landscape patterns and scale, visual enclosure and the distribution of visual receptors, and the value placed on the landscape. It also relates to the nature and scale of development proposed. It includes consideration of landscape values as well as the susceptibility of the landscape to change.

Landscape values can be identified by the presence of landscape designations or policies which indicate particular values, either on a national or local level. In addition, a number of criteria are used to assess the value of a landscape.

Landscape susceptibility is defined in the GLVIA as the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline scenario and/or the achievement of landscape planning policies and strategies. Susceptibility also relates to the type of development – a landscape may be highly susceptible to certain types of development but have a low susceptibility to other types of development.

Sensitivity is therefore a combination of Landscape value and Susceptibility.

For the purpose of assessment, five categories are used to classify the landscape sensitivity of the receiving environment as presented in Table 12.1 below.

Sensitivity	Description
Very High	Areas where the landscape exhibits a very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The character of the landscape is such that its capacity for accommodating change in the form of development is very low. These attributes are recognised in landscape policy or designations as being of national or international value and the principle management objective for the area is protection of the existing character from change.
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principle management objective for the area is conservation of the existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong or has evidence of alteration to / degradation / erosion of elements and characteristics. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change.
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character of the landscape is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and where the principle management objective is to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character of the landscape is such that its capacity for accommodating change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, as well as sites or areas that are designated for a particular type of development. The principle management objective for the area is to facilitate change in the landscape through development, repair or restoration.

Table 12.1 Categories of Landscape Sensitivity

Magnitude of Landscape Change

The magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape with reference to its key elements, features and characteristics (also known as 'landscape receptors'). Five categories are used to classify magnitude of landscape change as described below in Table 12.2.

Magnitude of Change	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the landscape and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the landscape.
High	Change that is moderate to large in extent, resulting in major alteration to key elements features or characteristics of the landscape and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the landscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.
Negligible	Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the landscape key elements features or characteristics of the landscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

Table 12.2 Categories of Landscape Change

Significance of Effects

In order to classify the significance of effects (both landscape and visual), the predicted magnitude of change is measured against the sensitivity of the landscape/viewpoint, using the following guide (see Table 12.3). There are seven classifications of significance, namely: (1) imperceptible, (2) not significant, (3) slight, (4) moderate, (5) significant, (6) very significant, (7) profound.

		Sensitivity of the Landscape Resource				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude of Change	**Very High**	Profound	Profound-Very Significant	Very Significant-Significant	Moderate	Slight
	High	Profound-Very Significant	Very Significant	Significant	Moderate-Slight	Slight-Not Significant
	Medium	Very Significant-Significant	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Moderate-Slight	Slight	Not significant	Imperceptible
	Negligible	Slight	Slight-Not Significant	Not significant	Imperceptible	Imperceptible

Table 12.3 Guide to Classification of Significance of Landscape Effects

The matrix above is used as a guide only. The assessor also uses professional judgement informed by their expertise, experience and common sense, to arrive at a classification of significance that is reasonable and justifiable.

Landscape effects are also classified as positive, neutral or negative/adverse. Development has the potential to improve the environment as well as damage it. In certain situations, there might be policy encouraging a type of change in the landscape, and if a development achieves the objective of the policy the resulting effect might be positive, even if the landscape character is profoundly changed.

12.2.7 Methodology for Visual Assessment

In Section 12.7 of this report the visual effects of the development are assessed. Visual assessment considers the changes to the composition of views, the character of the views, and the visual amenity experienced by visual receptors. The assessment is made for a number of viewpoints selected to represent the range of visual receptors in the receiving environment. The significance of the visual effects experienced at these locations is assessed by measuring the viewpoint sensitivity against the magnitude of change to the view resulting from the development. Definitions of viewpoint sensitivity are provided below in Table 12.4.

Sensitivity	Description
Very High	Iconic viewpoints - towards or from a landscape feature or area - that are recognised in policy or otherwise designated as being of national value. The composition, character and quality of the view are such that its capacity for accommodating change in the form of development is very low. The principle management objective for the view is its protection from change.
High	Viewpoints that that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features focused on the landscape). The composition, character and quality of the view may be such that its capacity for accommodating compositional change in the form of development may or may not be low. The principle management objective for the view is its protection from change that reduces visual amenity.
Medium	Viewpoints representing people travelling through or past the affected landscape in cars or on public transport, i.e. viewing but not focused on the landscape which is regarded as moderately scenic. The views are generally not designated, but which include panoramic views or views judged to be of some scenic quality, which demonstrate some sense of naturalness, tranquillity or some rare element in the view.
Low	Viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping, or on heavily trafficked routes etc. The view may present an attractive backdrop to these activities but is not regarded as particularly scenic or an important element of these activities.
Negligible	Viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping where the view has no relevance or is of poor quality.

Table 12.4 Categories of Viewpoint Sensitivity

Magnitude of Change to the View

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral, or glimpses). It also takes into account the geographical extent of the change, the duration and the reversibility of the visual effects.

Five categories are used to classify magnitude of change to a view as described overleaf in Table 12.5:

Magnitude of Change	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes the dominant the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

Table 12.5 Categories of Visual Change

Significance of Visual Effects

As for landscape effects, in order to classify the significance of visual effects, the magnitude of change to the view is measured against the sensitivity of the viewpoint, using the guide in Table 12.5 above.

12.2.8 Quality and Timescale

The predicted effects are also classified as beneficial, neutral or adverse. This is not an absolute exercise; in particular, visual receptors' attitudes to development, and thus their response to the impact of a development, will vary. However, the methodology applied is designed to provide robust justification for the conclusions drawn. These qualitative impacts/effects are defined as:

- Adverse – Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape(townscape)/view to be diminished;
- Neutral - Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;
- Beneficial – improves landscape (townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.

Impacts/effects are also categorised according to their longevity or timescale:

- Temporary – Lasting for one year or less;
- Short Term – Lasting one to seven years;
- Medium Term – Lasting seven to fifteen years;
- Long Term – Lasting fifteen years to sixty years;

- Permanent – Lasting over sixty years.

A statement is made as to the appropriateness of the proposed development based on the combined assessment of the predicted landscape and visual effects. This methodology, in accordance with the various guidelines for LVIA, results in a conclusion as to the appropriateness of the proposed development based on objective assessment of its likely landscape and visual impacts.

12.3 The Proposed Development

The development is described in detail in Chapter 2.0 of the EIAR and also in the accompanying Design Statements. Those elements that have landscape and visual impacts include the:

- Construction of 12 new residential neighbourhoods of predominantly 2-3 storey housing and duplex units with apartment buildings rising to 5 storeys to be delivered over 5 phases.
- Proposed materials for the architecture which include 3 types of brink (Ibstock West Hoathly, Commercial Red and Coleridge Yellow) with a creamy light grey render designed to mimic lime.
- The windows to the front and back will be a light grey to mimic matt stainless steel. The front doors and adjoining timber panels will be painted white.
- Construction of a community hub containing retail and a creche off Sheephouse Road, south of the proposed roundabout.
- Construction of the proposed roundabout where the two spurs of Rathmullan Road meets
- Sheephouse Road with associated engineering works.
- Widening of Rathmullan Road from the proposed roundabout to the river to accommodate a pedestrian pathway.
- Construction of a new section of road north of Sheephouse Road
- Construction of all associated internal roads, parking, cycleways and pedestrian pathways
- Construction and planting of a periphery of all new parkland, woodland, public open spaces, swales and play facilities increasing diversity, accessibility and connectivity.
- Construction and planting of a 4m high bund to the west of the site to reduce noise impacts from the M1 motorway and further screen and soften views from the west and southwest.
- Retained woodland blocks, verges and hedgerows
- New tree and shrub planting throughout the development.
- Trees to be removed to facilitate the development and which need to be removed due to poor condition in accordance with good arboricultural practice and/or facilitate landscape, ecological or habitat renewal.
- The expression of a new bronze age enclosure which to date has been invisible to the untrained eye.
- New interpretation features to express the historical and cultural value of the site.
- Construction of 4 attenuation tanks throughout the development.
- Loss of open agricultural land.
- Loss of internal hedgerows and hedgerows to the south east and south of the subject lands.

12.4 Receiving Environment

12.4.1 Relevant Planning Policy

The following statutory plans are referenced in this section, owing to their relevance to the site location and its proposed development:

- Meath County Development Plan 2013-2019;
- Louth County Development Plan 2015-2021; and
- Drogheda Development Plan 2011-2017.

12.4.1.1 Meath County Development Plan 2013-2019

The Meath County Development Plan (MCDP) contains a range of policies relevant to establishing the landscape and visual values and sensitivities for the site and site environs. These are set out below.

Core Strategy and Strategic Goals

The county's core strategy includes the following relevant aims which outline the need to facilitate sustainable, compact development and protect and support environmental resources;

- *"To facilitate the development of sustainable and socially inclusive communities which generate pride, a sense of place, and a healthy lifestyle; are safe, well connected, well served, environmentally sensitive, thriving and well designed.*
- *To support the sustainable heritage of the County by safeguarding the cultural, natural and built heritage and natural resources, including biodiversity, of the County.*
- *To support the creation of a compact urban form in all settlements in Meath.*
- *To protect and support rural areas though careful management of physical and environmental resources and appropriate, sustainable development" (p8).*

Drogheda is identified County Settlement Hierarchy as one of the county's "Large Growth Towns I", which are described as being a, *"key destination, economically active supporting surrounding area, located on multi-modal corridor in metropolitan hinterland" (p.10).*

Secondary to Navan, the Drogheda Core Economic Area, which encompasses the M1 Dublin Belfast Economic corridor, is a stated economic centre in the County. These economic centres have the potential to *"provide for the integration of employment, population and transport in accordance with proper planning and sustainable development principles" (p.19).*

The strategic objective to focus economic development in the Drogheda environs is outlined in policy CS OBJ 2 which states the requirement, *"to facilitate and encourage the sustainable development of designated core economic areas, such as would allow the creation of a critical mass, in terms of residential population and economic activities, sufficient to service the proposed expanded economic function of such centres. The promotion and facilitation of large-scale employment generating developments will occur within the Primary Economic Areas/ Primary Economic Growth Areas and Secondary Economic Growth Areas" (p.12).* Progress towards achieving such a critical mass involves the development of and change in land use according to and in keeping with Development Plans.

Sustainable Heritage

County Meath is home to a range of unique heritage sites of national and international importance, which contribute to its identity and character. The Development Plan notes the intrinsic link between the County's character and cultural assets and economic success. Two core goals are to;

"To ensure that features of Meath's natural heritage and green infrastructure that provide ecosystem services are protected and that tourist and recreational uses are facilitated in a sustainable manner.

To protect the landscape character, quality and local distinctiveness of County Meath." (p.22).

Rural Areas

The proposed development is located on the urban fringe of Drogheda. Although the lands are zoned for residential use, the existing use is primarily agricultural. MCDP identifies three types of rural areas. According to Map 10.1 Rural Area Types Development Pressure, the development site under review is categorised as a 'Rural Area Under Strong Urban Influence' (shown in pink on Figure 12.1, right).

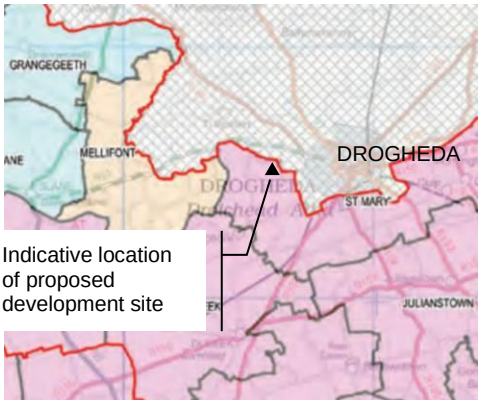


Figure 12.1 Excerpt from Meath County Council's Map 10.1 Rural Area

Development Pressure

Policy relating to Rural Areas Under Strong Urban Influence seeks, *"to facilitate the housing requirements of the rural community as identified while directing urban generated housing to areas zoned for new housing development in towns and villages in the area of the Development Plan"* (RD POL 2) (p.25), while seeking, *"protect areas falling within the environs of urban centres in this Area Type from urban generated and unsightly ribbon development and to maintain the identity of these urban centres."* (RD POL 3) (p.25).

Land Use Zoning

The following land use objectives relate to the proposed residential development site and indicate future land uses;

- A1 Existing Residential; *"To protect and enhance the amenity of developed residential communities"*.
- A2 New residential; *"To provide for new residential communities with ancillary community facilities, neighbourhood facilities and employment uses as considered appropriate for the status of the centre in the Settlement Hierarchy".*
- E1 Strategic Employment Zone: *"To facilitate opportunities for high technology and major campus style office-based employment within high quality and accessible locations".*
- F1 Open Space; *"To provide for and improve open spaces for active and passive recreational amenities".*

These are mapped on Figure 12.2 below.

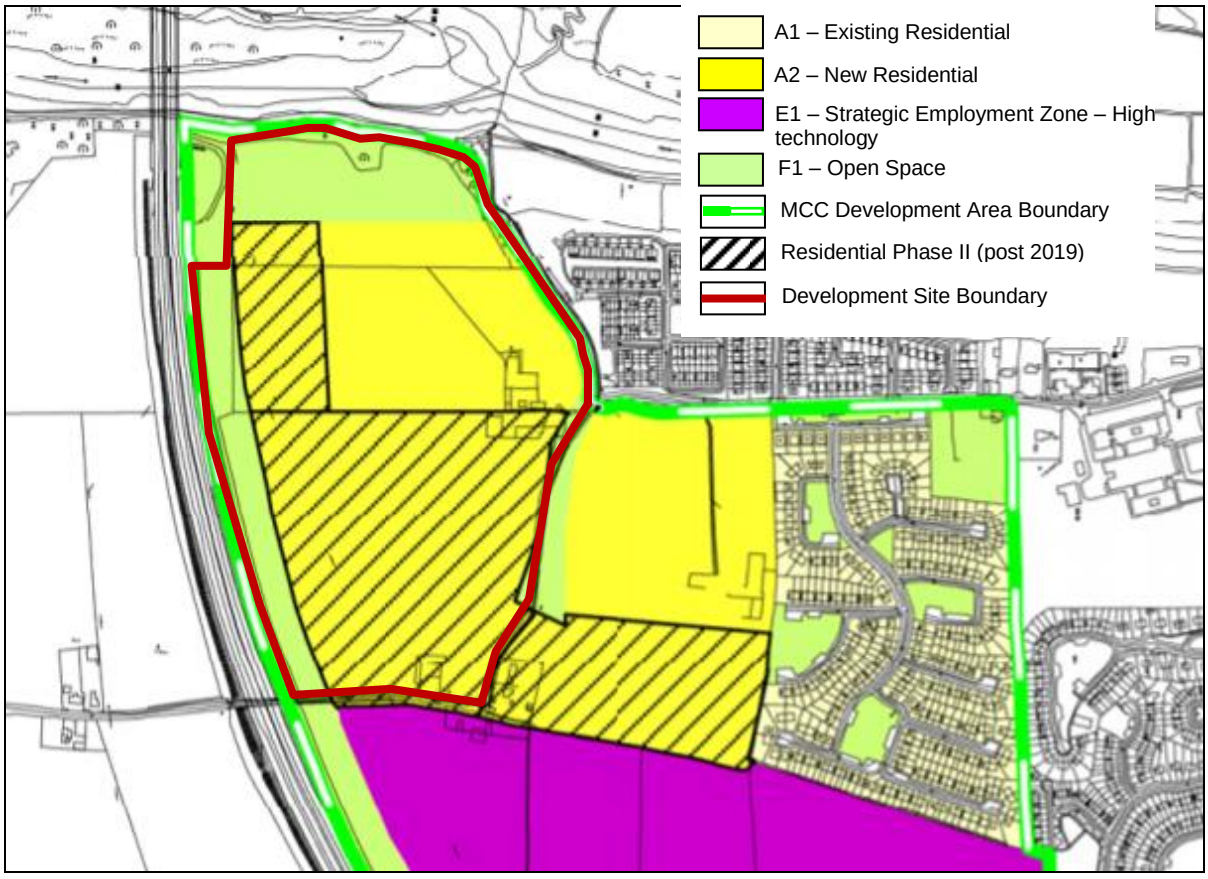


Figure 12.2 Excerpt from Meath County Council's Development Plan Map for Drogheda Southern Environs

Settlement Planning

Policy on settlement planning seeks to consolidate development to achieve a more compact urban form and maximise the potential of rural areas as evidenced in SS OBJ 3, 4 and 5. SS OBJ 8 stares the policy; *"To develop Navan and the Drogheda Environs as the primary development centres in Meath and to ensure that the settlements grow in a manner that is balanced, self-sufficient and supports a compact urban form and the integration of land use and transport" (p.45).*

Housing

The Development Plan states that *"the primary aim of the Planning Authority in relation to residential development is to deliver high quality living environments to serve the needs of residents" (p.53).* In relation to the assessment of the impact of residential development on landscape and visual amenity, the following policies are relevant;

- HS POL 2 states that it is policy; *"to require a high standard of design in all new residential schemes that are built in a style and scale that is appropriate to the landscape setting".*
- HS POL 3 states that it is policy; *"to integrate new housing into the existing social and urban fabric of the County's settlements" (p.55).*

Tourism

The development proposal includes the introduction of new walking and cycling routes that connect existing facilities. Therefore, Policy ED POL 45 is relevant which supports, *"developments which will enable and encourage countryside recreation and an increased appreciation of the natural environment, through facilitating the development of community walks, off road trails / rural trail developments, parks and other outdoor amenities and recreational infrastructure" (p.82).*

Sporting and Leisure Facilities/Recreation/Open Space

The Development Plan recognises the growing need for and emphasis on *"the requirement for quality designed open space and recreational opportunities for residents, especially those living in urban areas".* SOC POL 32 states it is it policy; *"to promote the development of high-quality open space areas, for both active and passive use, and formal and informal activities in accordance with the Core Strategy and Settlement Strategy"* (p.98).

The value of public and private open space is defined and iterated within the development along with its benefits to quality of life, the environment and ecology. The Development Plan states *"Accessible, useable, dedicated open spaces and recreational facilities to meet both passive and active recreational needs are vital for residential and recreational amenity"* (p.99). SOC POL 41 states it is policy, *"to facilitate the development of children's play areas and playgrounds in proximity to existing and proposed neighbourhood centres, where feasible".*

Public Art

The Development Plan recognises the role that public art can have in developing a sense of place and its role in providing identity and character. It describes the widening definition and duration of public art. SOC POL 53 states it is policy, *"to incorporate works of public art into the overall scheme of major new commercial and private residential developments in the County in order to enhance the amenities of the local environment" (p.105).*

Cultural and Natural Assets

MCDP outlines the wealth of cultural and natural assets found in County Meath including the UNESCO World Heritage Site of Brú na Bóinne. Policy exists to protect cultural and natural assets. Three types of cultural designations are relevant to this site:

1. The World Heritage Site (WHS) of Brú na Bóinne.
2. Architectural Conservation Areas.
3. Archaeological Sites and Monuments.

UNESCO World Heritage Site of Brú na Bóinne

The World Heritage Site (WHS) on the Bend of the Boyne or Brú na Bóinne, refers to the area within the bend of the river Boyne around Newgrange, Knowth and Dowth. The core World Heritage Site Area is 780ha and is mapped below in Figure 12.3. The centre of the WHS is located approximately 4km west of the site. The shortest distance between the site and the WHS Core Area is approximately 1.64km. The 2500ha buffer zone around this core represents carefully mapped views in and out of the site and contains many important heritage sites and features itself. The proposed development site is located approximately 130m west of the western boundary of the World Heritage Site Buffer Zone over the M1 motorway.

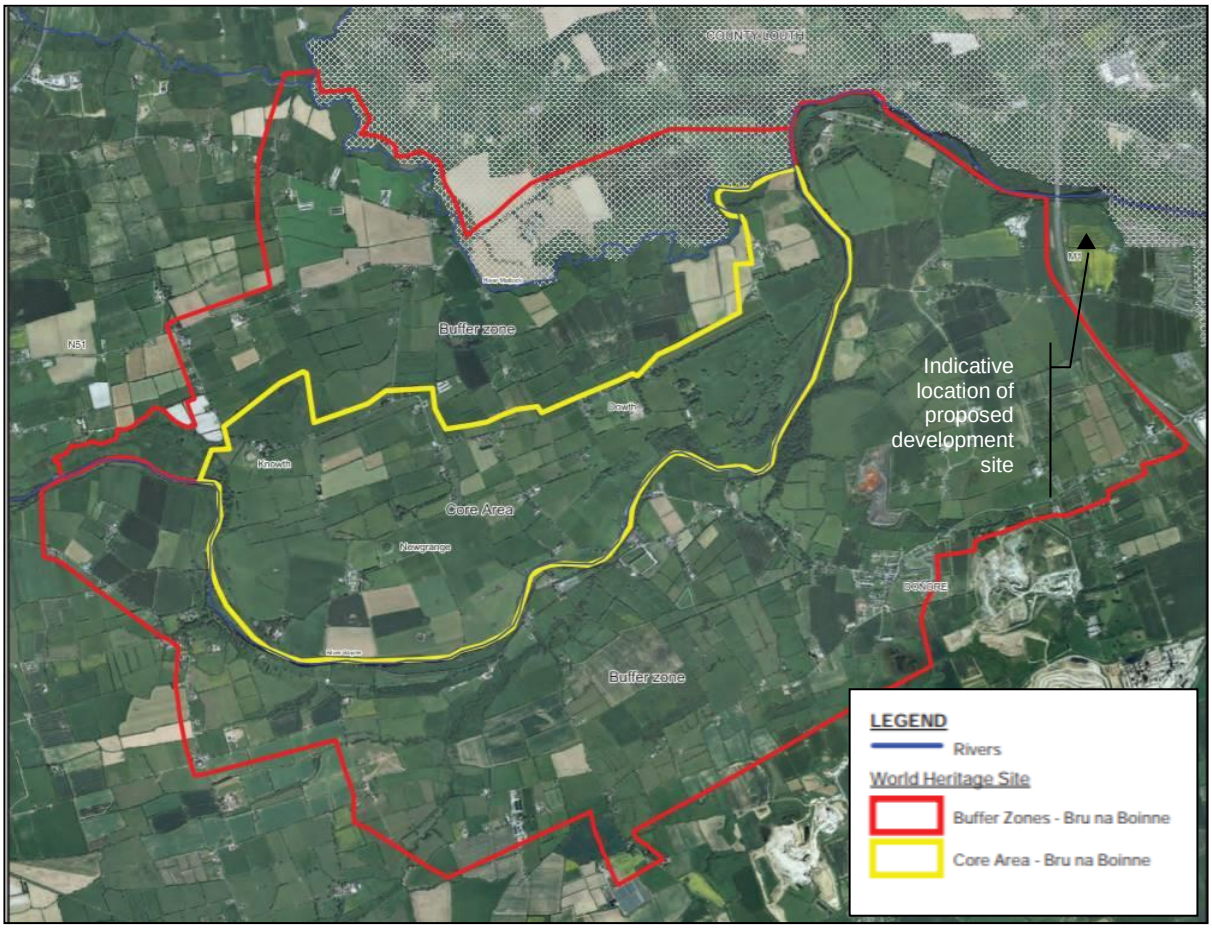


Figure 12.3 Excerpt from Meath County Council's Brú na Bóinne World Heritage Site Map 9.1

CH OBJ 1 states the policy *"to protect and enhance the Outstanding Universal Value of the cultural landscape in the UNESCO World Heritage Site of Brú na Bóinne in accordance with the relevant guidelines and national legislation, so that its integrity, authenticity and significance is not adversely affected by cumulative inappropriate change and development, and to enhance views within and adjacent to the site"* (p.170).

The WHS and Brú na Bóinne Management Plan (Appendix 10 of the Development Plan) note that some views from within the buffer zone have been affected by developments such as the M1, the Mary McAleese Bridge, the addition of a third chimney and other structures to the cement factory near Dunleek, an incinerator stack near Carranstown and a housing development. The management plan notes, *"the ambiance of the ritual centre is vulnerable to such disturbances which could potentially threaten the integrity of the property"* (p.544).

Four records of National Monuments exist on the zoned site (see Figure 12.4). It is Council Policy, *"to protect archaeological sites and monuments, underwater archaeology, and archaeological objects, which are listed in the Record of Monuments and Places, and to seek their preservation in situ (or at a*

minimum, preservation by record) through the planning process" (CH OBJ 7)(p174). The National Monuments are not visible to the untrained eye and therefore do not contribute to landscape character and views.

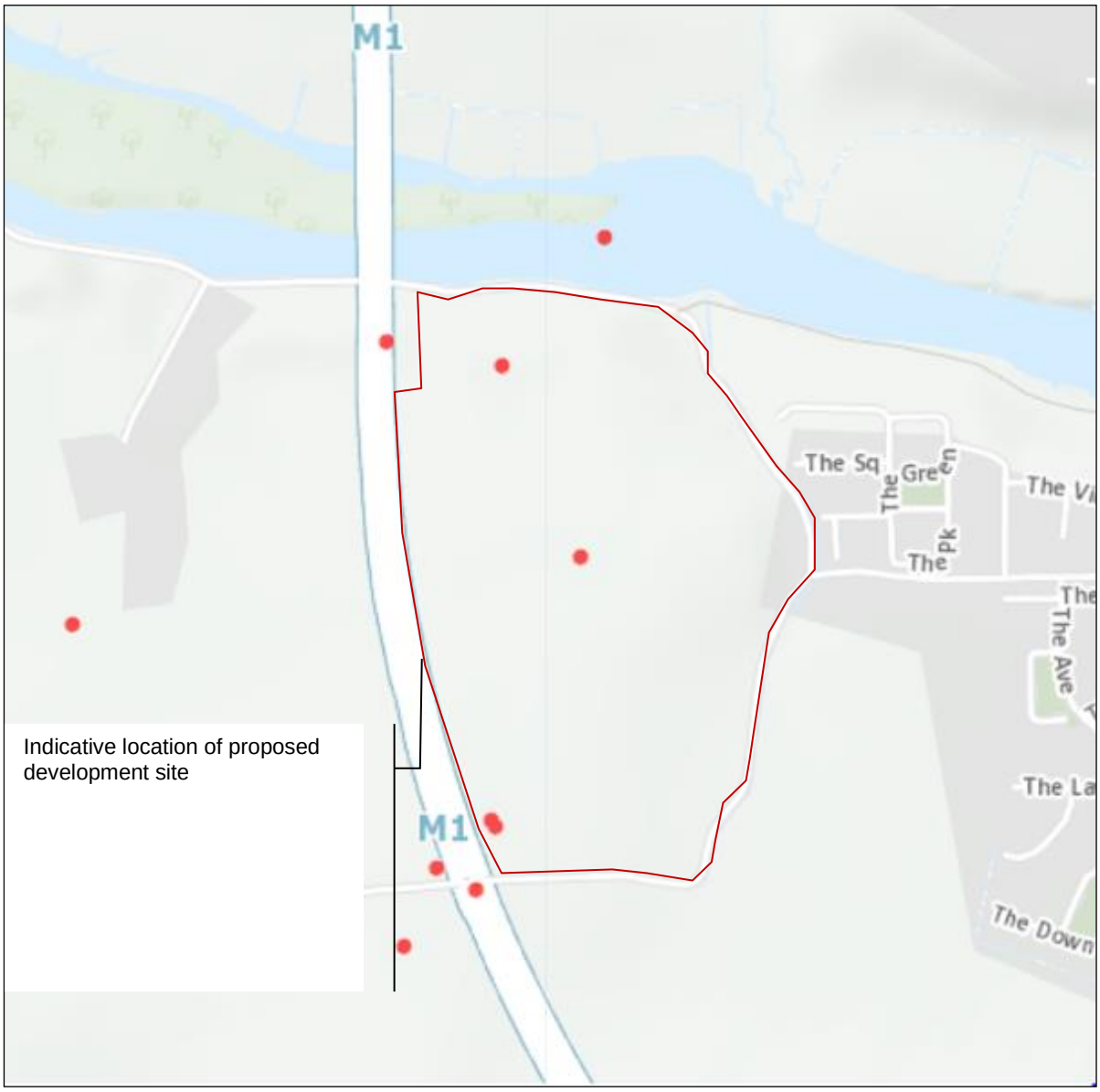


Figure 12.4 Excerpt from Geohive showing the location of National Monuments in the area.

Architectural Conservation Areas ("ACA"s)

There are no ACAs in the immediate vicinity of the development site. Oldbridge Estate is the closest ACA to the site located approximately 1260m to the NW of the development site. It is Council Policy, *"to ensure that any new development within or contiguous to an ACA is sympathetic to the character of the area and that the design is appropriate in terms of scale, height, plot density, layout, materials and finishes"* (CH OBJ 21)(p.178). The estate gardens are also protected by Policy CH OBJ 22, which seeks, *"to discourage development that would lead to a loss of, or cause damage to, the character, the principal components of, or the setting of historic parks, gardens and demesnes of heritage significance*" (p.178).

Natural Heritage and Designated Sites

MCDP describes the County's natural heritage to include scenic river valleys, rolling farmland, a network of mature hedgerows and diverse coastal habitats. The River Boyne is a valuable natural and

cultural asset. The northern boundary of the proposed development site abuts a Special Area of Conservation ("SAC") and a proposed National Heritage Area ("NHA") and is very close to a Special Protection Area ("SPA") boundary (see Figures 1.2.5-12.7).

The value of Green infrastructure, woodlands, trees and hedgerows are supported by the MCDP. It is noted that Meath is one of the least wooded counties in Ireland. Small and fragmented woodlands are located particularly along the lower stretches of the river Boyne as found in the northern area of the development site. As such, the following policies are relevant:

- NH POL 1 is policy, *"to protect, conserve, and seek to enhance the County's biodiversity"* (p.181).
- NH POL 2 is policy, *"to promote measures to protect biodiversity in the development management process by creating and improving habitats, where possible"* (p.182).
- NH POL 5 is policy, *"to permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, National Heritage Area or those proposed to be designated over the period of the plan, only where an assessment carried out to the satisfaction of the Meath County Council, in consultation with National Parks and Wildlife Service, indicates that it will have no significant adverse effect on the integrity of the site"* (p.183).
- GI POL 2 is policy, *"to protect existing green infrastructure within the County and to provide additional green infrastructure, where possible*" (p.184).
- NH POL 13 states the policy, *"to encourage the retention of hedgerows and other distinctive boundary treatments in rural areas and prevent loss and fragmentation, where possible. Where removal of a hedgerow, stone wall or other distinctive boundary treatment is unavoidable, mitigation by provision of the same type of boundary will be required"* (p.186).
- NH POL 14 policy, *"to promote and encourage planting of native hedgerow species of local provenance"* (p.186).
- NH POL 16 policy, *"to seek to maintain the natural heritage and amenity of the county by promoting the preservation and enhancement of native and semi-natural woodlands, groups of trees and individual trees"* (p.186).
- NH POL 18 policy, *"to encourage the retention of mature trees and the use of tree surgery rather than felling where possible when undertaking, approving or authorising development"* (p.187).

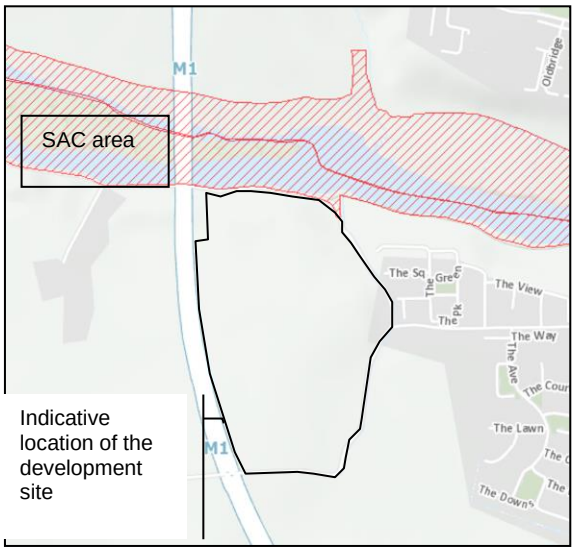


Figure 12.5 Excerpt from Geohive showing the location of the SAC in relation to development site

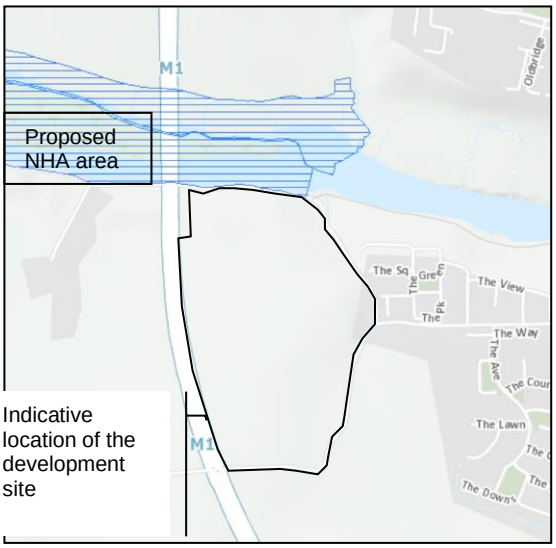


Figure 12.6 Excerpt from Geohive showing the location of the Proposed NHA in relation to development site.

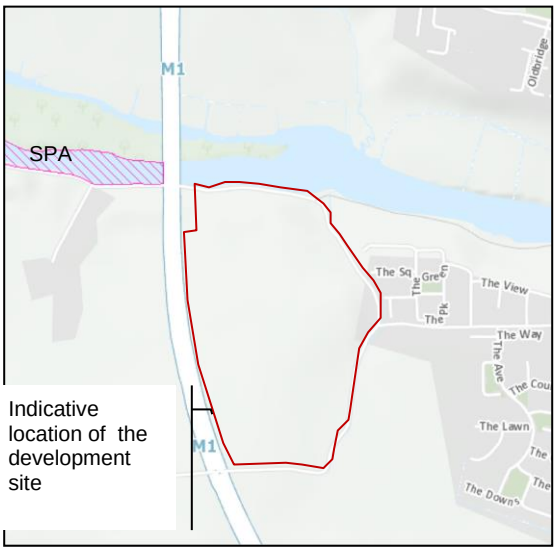


Figure 12.7 Excerpt from Geohive showing the location of the SPA in relation to development site

Landscape Character

The Development Plan outlines the importance of landscape on a European and National Level. At a County Level, Meath has embedded landscape within policy and has undertaken a Landscape Character Assessment that has identified landscape character types, areas sensitivity and capacity for change. It is strategic policy *"to protect the landscape character, quality, and local distinctiveness of County Meath in accordance with relevant government policy and guidelines and the recommendations included in Meath Landscape Character Assessment (2007) in Appendix 7"* (LC SP 1)(p.191). It is an objective of Meath County Council "*to seek to ensure the preservation of the uniqueness of all landscape character types, and to maintain the visual integrity of areas of exceptional value and high sensitivity"* (LC OBJ 1)(p.191).

According to the Meath Landscape Character Assessment, the Rathmullan Road development site is location within Landscape character Area 7 "Coastal Plain" (see Figure 12.8 overleaf).

Figure 12.8 Excerpt from Meath County Council's Landscape Character Assessment

Characteristics of the area include:

- Settlements such as Drogheda and Bettystown and built structures such as the Mary McAleese Bridge and the M1 within long established mixed scale farmland, the river Boyne, estate, coastal and estuary landscapes.
- Ground conditions suit those trees that thrive in free-draining soil such as Beech, Oak, Ash and Lime.
- Mix of small - medium rough pasture fields.
- Stands of pine and mixed woodland adjacent to estuaries.
- 1 proposed Special Protection Area (SPA) Boyne Estuary.
- Overgrown scrappy hedgerows.
- Long established mixed scale farmland.
- Bettystown, Laytown and Drogheda environs are the largest settlements.
- River Boyne.
- Estate landscapes.
- Boyne estuary is an attractive area sustaining a variety of habitats.

- The **Landscape Value** of this LCA has been assessed as **Moderate**
- The **Landscape Sensitivity** of this LCA has been assessed as **High**
- The **Landscape Importance** of this LCA has been assessed as **Regional**

The potential capacity of the LCA in relation to the proposal is as follows:

"Medium potential capacity to incorporate multi-house residential developments as they are part of the existing character. However, particular attention must be paid to design, location, scale and materials so as to avoid adverse cumulative effects" (p.51).

The following strategic policies note the importance of Meath's landscape character:

- Strategic Policy CSA SP 2 states it is policy, "*to ensure that features of Meath's natural heritage and green infrastructure that provide ecosystem services are protected; that biodiversity is conserved and where possible enhanced, and; that the character of landscapes are maintained and enriched, and that tourist and recreational uses are facilitated in a sensitive manner"* (p.166).

- CSA SP 2 states it is policy, *"to promote the understanding of County Meath's landscape in terms of its inherent and unique character and to recognise what elements should be preserved, conserved or enhanced"* (p.167).

Views and Prospects

The Development Plan highlights the importance of views and prospects in the County. It is an objective of the Council; *"to preserve the views and prospects and the amenity of places and features of natural beauty or interest listed in Appendix 12 and shown on Map 9.5.1 from development that would interfere with the character and visual amenity of the landscape"* (p.192). Importantly, the Development Plan notes that, *"in assessing the potential impacts on views and prospects of development proposals, it is not proposed that this should give rise to the prohibition of development in these locations. Rather such development, where permitted, should not hinder or obstruct these views and prospects and should be designed and located so as not to be intrusive in the landscape as seen from these vantage points"* (p.192).

View 61 from Donore Cemetery is a protected viewpoint that from which it is possible to see the proposed development site south of Rathmullan Road (see overleaf). According to Appendix 12 of the Development Plan, this view is of international significance with views to the north, east and west. It includes an, *"expansive view of settled lowland with extensive urbanisation and industry visible to the east and north. Views to the north are extensive and encompass important cultural landscape of significance. Much woodland to north and west"* (p.566).

RUR SEV SO 6 states the Council's policy to *"to protect and enhance the visual qualities of rural areas through sensitive design"* (p.196).

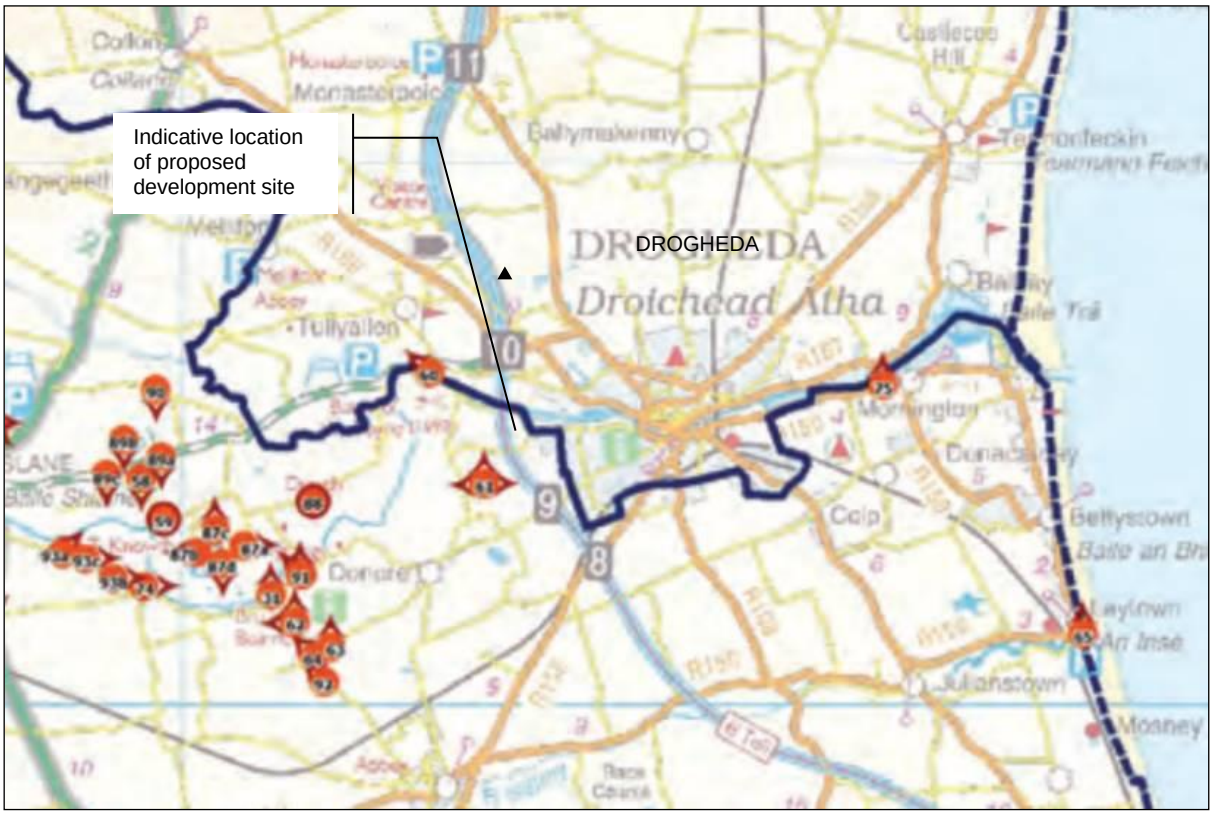


Figure 12.9 Excerpt from Meath County Council's Map 9.5.1 Views and Prospect Rural Development

12.4.1.2 Louth County Development Plan 2015-2021

The site of proposed development almost abuts the County Louth border which follows the Rathmullan Road. Hence, it is appropriate to briefly explore here policy in the Louth County Development Plan 2015-2021 that may be relevant to the proposed development.

Strategic Aims

Relevant strategic aims of the Council are to:

- *"Prioritise sustainable development at appropriate locations within the towns of Dundalk and Drogheda as economic drivers for the County;* and
- *To support the creation of a compact urban form in all settlements in County Louth"* (p.11).

In keeping with County Meath and Regional Planning Guidelines, Drogheda is identified as a Large Growth Town 1. It is Council policy, *"to maintain the settlement hierarchy within the County and to encourage residential development within each settlement that is commensurate with its position in the hierarchy and the availability of public services and facilities"* (Policy SS1)(p.29).

Roadside Verges

The Development Plan recognises the importance of roadside verges and vegetation and the conflict that occurs when making provision for access. The following are relevant:

- SS 63 states it is policy "*to require that new accesses are located having regard to both road safety and the protection of existing roadside hedgerows, trees and boundaries"* (p.56).
- SS 64 states it is policy *"to require, where it is necessary to modify or remove the existing roadside boundary in the interest of traffic safety, that the new boundary is located behind the*

visibility sight line and that a new boundary consistent with the nature and character of the area is planted behind the visibility sight line" (p.56).

Development Zones

Louth County Council have identified 6 no. development zones. The following excerpt from the zoning plan illustrates those adjacent to the proposed development site (see Figure 12.10). The subject is closest to Zone 2 and 'Drogheda Urban Centre'.

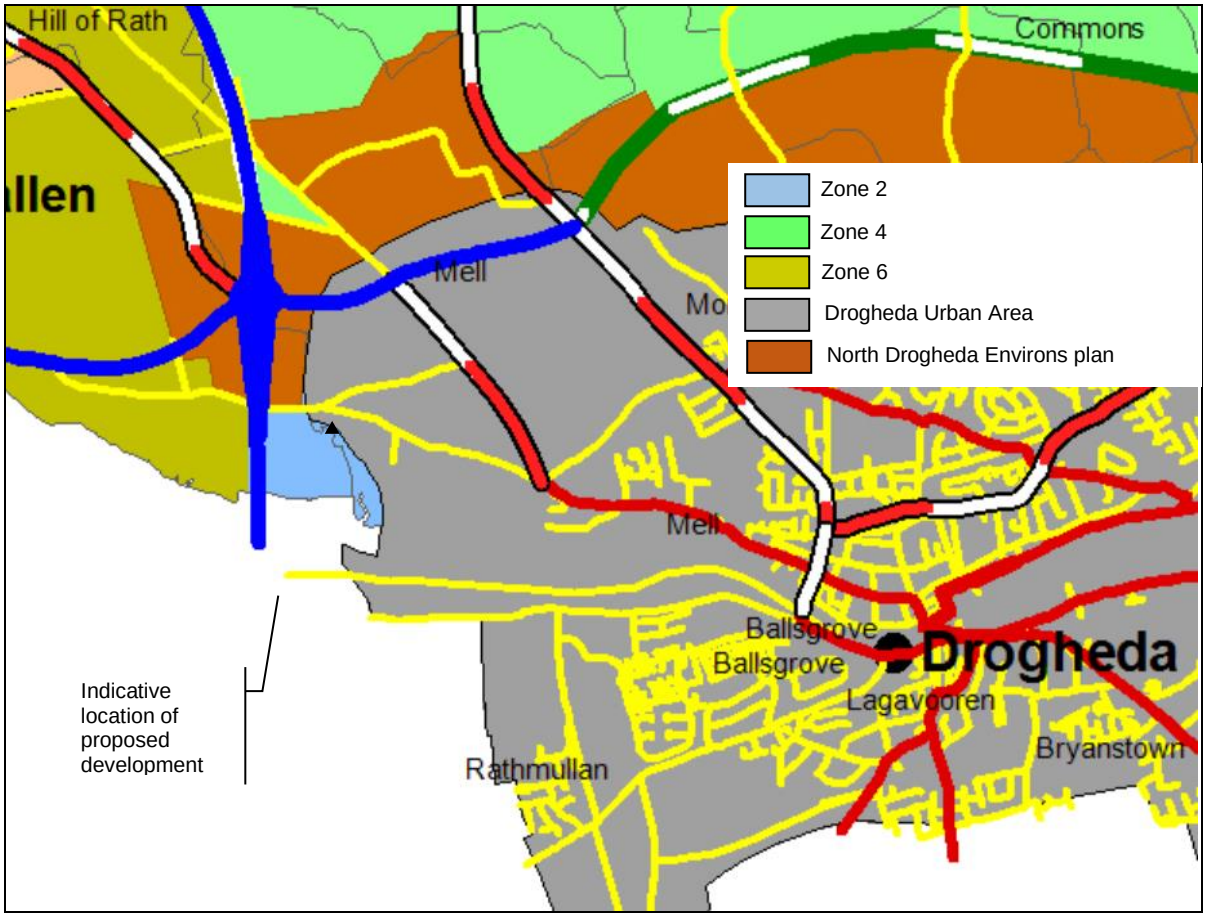


Figure 12.10 Excerpt from Louth County Council's Development Zone Map 3.1

Development Zone 2 aims to ***"****protect the scenic quality of the landscape and facilitate development required to sustain the existing rural community". The Development Plan states, "the area covered by this development zone contains landscapes of high scenic quality which the Council considers should be protected"* (p.85).

Development Zone 4 aims to ***"****provide for a greenbelt area around the urban centres of Dundalk, Drogheda, and Ardee"* (p.85).

Development Zone 6 aims to ***"****preserve and protect the heritage and cultural landscape of the UNESCO World Heritage Site of Brú na Bóinne, the UNESCO (Tentative) World Heritage Site of Monasterboice and the Site of the Battle of the Boyne"* (p.89).

Urban Design Guidance

No part of the proposed development site will occur on lands within the Louth County Council Local Authority area. However, it worth including the council's Policy on Urban Design because it refers to context, connectivity and local distinctiveness (which relates to landscape character). Policy RES 10 requires, *"all new residential developments are consistent with the guidelines and best practice manuals issued by the DECLG in the planning for and provision of sustainable communities within*

new residential areas" (p.95).

Pedestrian and Cycle Infrastructure

Policy RES 15 requires, *"masterplans and planning applications for residential developments identify where appropriate, pedestrian and cycle paths within the site and externally to adjoining residential areas, existing services and community facilities"* (p.97).

Natural Heritage and Biodiversity

Policy HER 6 states the need, *"to co-operate with the Regional Planning Authority and adjoining local authorities, public agencies and community interests to protect regionally significant heritage assets, environmental quality and to identify threats to existing environmental quality in a transboundary context throughout the region"* (p.128).

The Boyne Coast and Estuary (NH1957) has or will be designated as a Natural Heritage Area as will the Boyne River Islands (NH1862) in recognition of their unique nature or outstanding importance at a national level either ecologically or geologically.

Policy HER 7 will *"resist any development that would result in a significant deterioration of habitats or a disturbance of species in the pNHA"* (p.129).

Landscape Character Areas

The Louth Landscape Character Assessment was undertaken in 2002 not including major towns. The proposed development site is located to the south of the Boyne and Mattock Valley LCA which was assessed as being Nationally important.

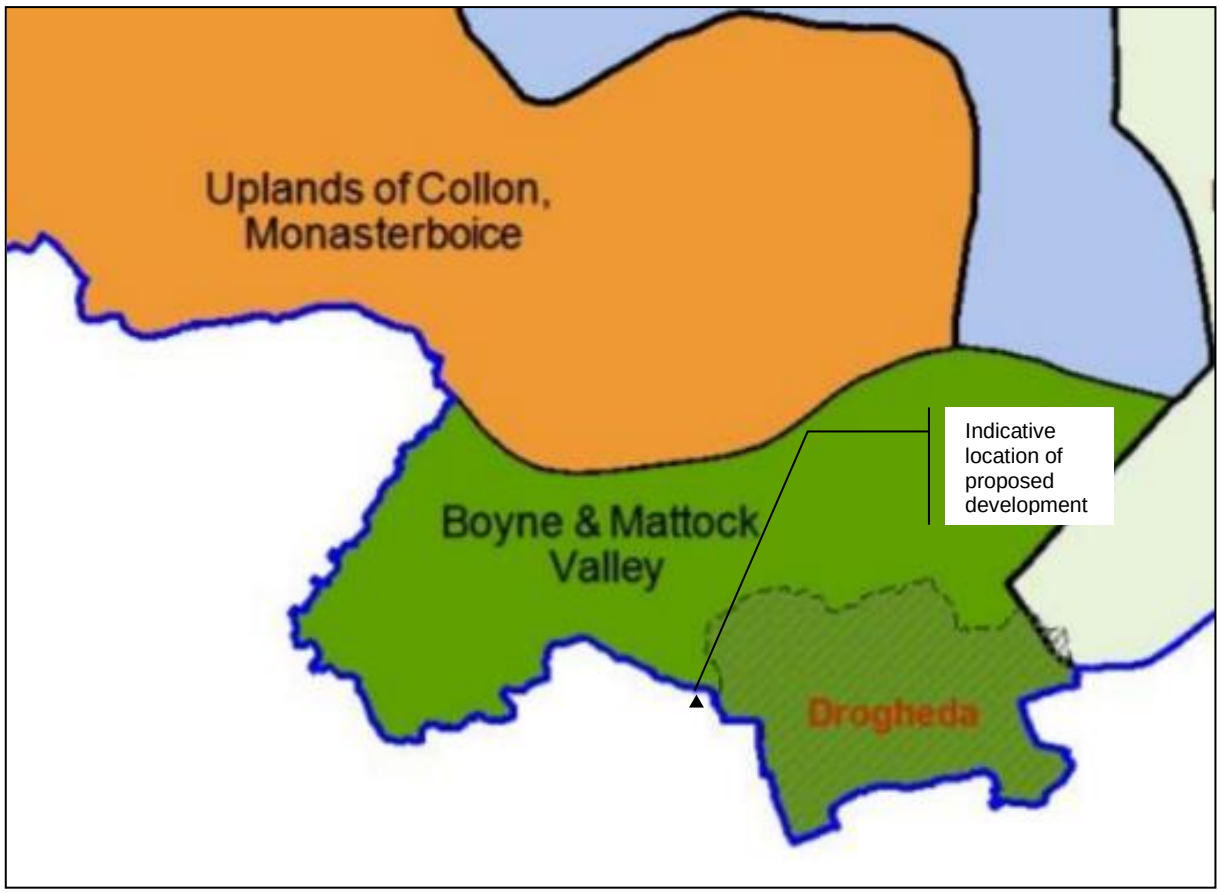


Figure 12.11 Excerpt from Louth County Council's Development Zone Map 3.1

The following policies are relevant to Landscape Character:

Policy HER 10 states the requirement, "*to afford protection to the landscapes and natural environments of the County, by permitting only those forms of development that are considered sustainable and do not unduly damage or take from the character of the landscape or natural environment"* (p137).

Policy HER 11 states the requirement, *"to co-operate with adjoining local authorities, both north and south of the border, to ensure that the environment is maintained in a sustainable manner and to support the coordinated designation of sensitive landscapes and policy approaches with adjoining areas and on all aspects of environmental protection, particularly where transboundary environmental vulnerabilities are identified"* (p137).

The key characteristics of the Boyne and Mattock Valley are as follows:

- Land tends to slope southward presenting panoramic views of Drogheda, the Coast and the plains of Meath. This landscape area should be considered as one which includes the southern side of the Boyne as defined by Meath Co. Council.
- Noted for its archaeological, historical and landscape values.
- New motorway Mary McAleese Bridge has already become a dominant landscape icon. New interchanges will attract new commercial and industrial development.
- Drogheda town is recognised as being within the commuter belt for the greater Dublin region where in-migration is expected to increase at an even greater pace than in the past.
- Hinterlands of Drogheda are subject to pressures for further isolated housing development, mainly generated from within the town itself.
- The area is quite extensively covered with broadleaf trees and fine hedgerows.
- Popular Tourist destination particularly for bus tours from Dublin and beyond.
- Disused quarries tend to degrade the landscape qualities.

The following relevant recommendations are made in relation to Landscape Values;

- Panoramic views across the town of Drogheda into plains of Meath - *Conserve*
- Landscape quality has largely remained intact, in terms of field patterns, hedgerows and stone walls. *Conserve / Enhance*
- Rich in archaeological features which include old Mellifont along with St. Lawrence's Gate. *Conserve*
- Scenic quality is enriched by the groups of mature broadleaf trees. *Conserve & Restore*
- Steeped in important religious and military historical events. *Conserve / Enhance / Restore*
- Potential for recreational opportunities (particularly water based) *Conserve / Enhance*
- Listed Scenic routes to the west of Drogheda *Conserve / Enhance.*

Battle of the Boyne Sites

County Louth have mapped the Battle of the Boyne Sites, which include the proposed development site south of the Rathmullan Road (see Figure 12 overleaf). Policy HER 23 aims, *"to work in partnership with Meath County Council and the relevant agencies and the public to promote, understand, conserve and sustainably manage the Battlefield site of the Battle of the Boyne and to protect and enhance the cultural landscape of the Battle of the Boyne Battlefield Landscape"* (p.152).

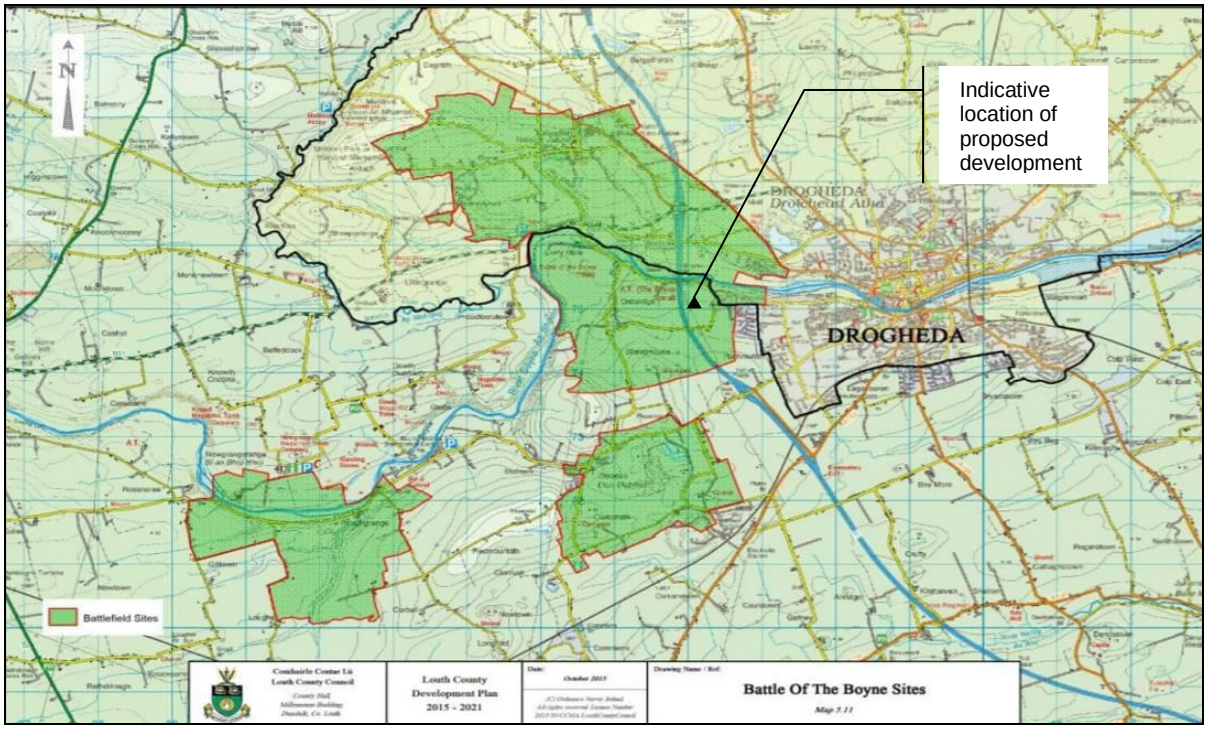


Figure 12.12 Battle of the Boyne Sites Map 5.11 (p.153 of the Development Plan)

Areas of High Scenic Quality

The Development Plan notes 6 areas that are designated Special Areas of High Scenic Quality (AHSQ). From the diagram below (see Figure 12.13), The Boyne Valley / King William's Glen AHSQ (3) appears to extend to the River Boyne. It is policy *"to protect the unspoiled rural landscapes of the AHSQ for the benefit and enjoyment of current and future generations"* (HER 61)(p.175).

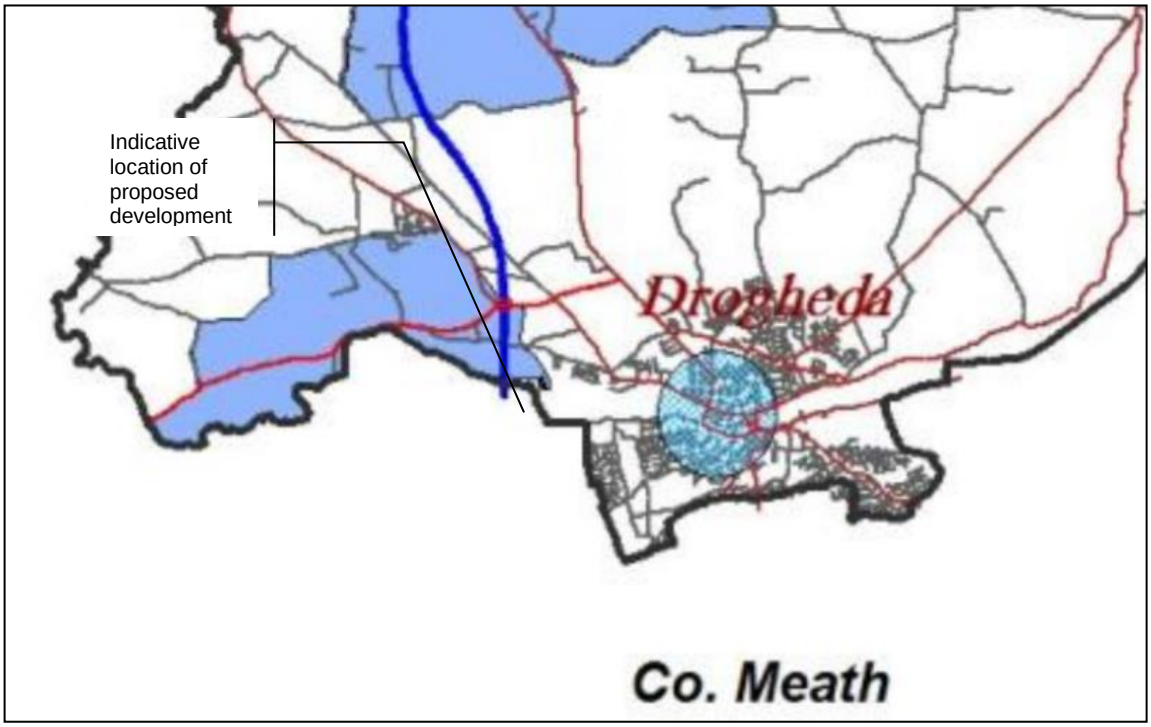


Figure 12.13 Special Areas of High Scenic Quality 5.16 (p.176 of the Development Plan)

Views and Prospects of Special Amenity Value

It is Policy *"to preserve the views and prospects of special amenity value"* (HER 63)(p.179). Protected view 29 (shown in Figure 12.14 below), looks south from the N51 at the M1 Retail Park, M1 and Motorway Bridge. There is a ravine visible from this point which was the route of the Williamite army from their camp at Tullyallen Hill to cross the Boyne River. Impacts upon this view will be considered as part of this assessment.

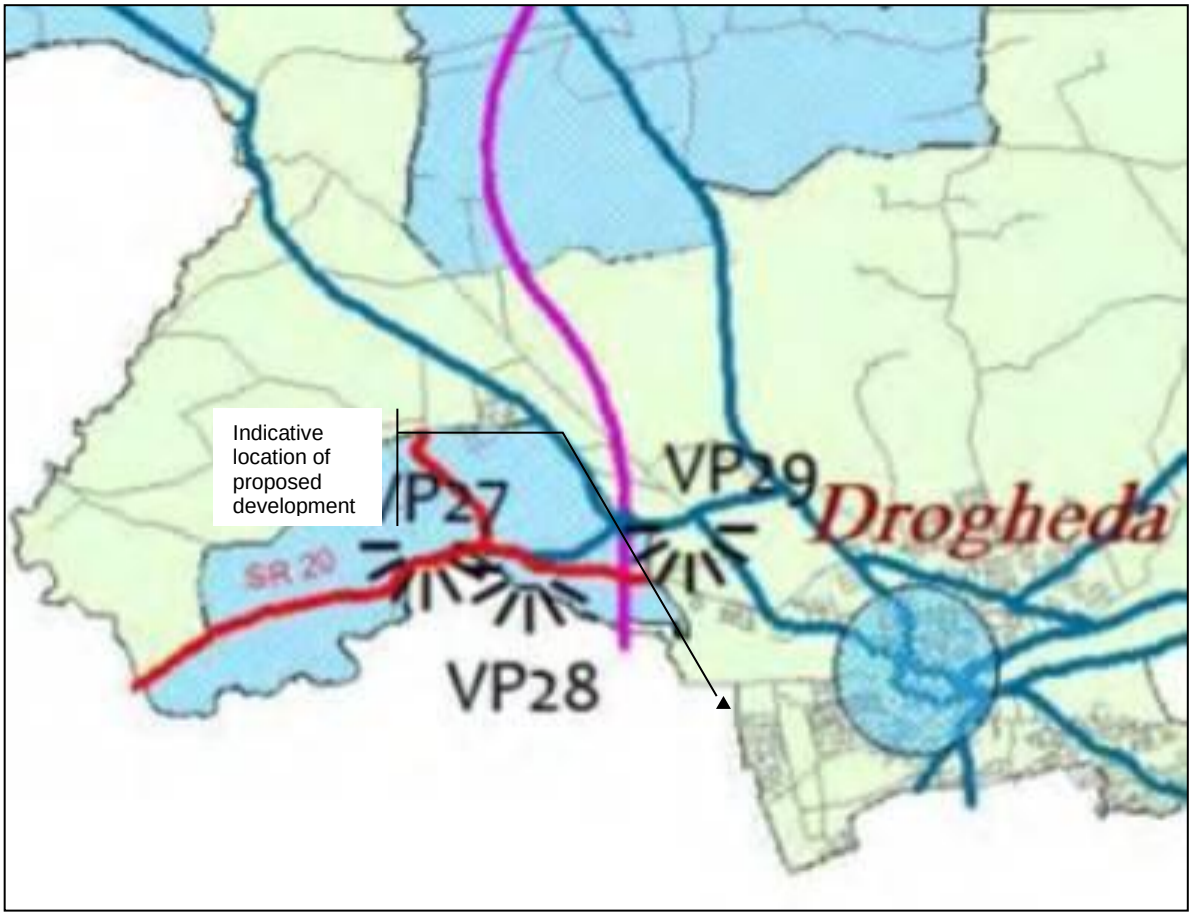


Figure 12.14 Excerpt of County Louth's Views and Prospects Map 11.1

Green Infrastructure

It is Policy *"to require the use of the green infrastructure network as a supplementary guide for the protection and conservation of the Natura 2000 sites in County Louth"* (HER 66)(p.180).

12.4.1.3 Drogheda Development Plan 2011-2017

The vision for Drogheda Borough is, *'to promote Drogheda as the principal urban centre between the Greater Dublin and Border regions and as a key settlement along the eastern corridor, an inclusive flourishing urban community providing a high quality built and natural environment attractive to residents, visitors and investors alike"* (p.20).

The vision is articulated through 10 strategic objectives. Strategic Objective 1, 7 and 8 are relevant to the landscape and visual impact assessment of the development proposal and are quoted below.

Strategic Objective 1 outlines aims, *"to provide the highest quality living environment possible for all the citizens of Drogheda by ensuring that the Borough will evolve in a sustainable, dynamic and environmentally sensitive manner thus enhancing its pivotal role along the Eastern Corridor and with due regard for its distinguished history"* (p.21).

Strategic Objective 7 outlines aims to, *"protect and enhance existing recreation and amenity facilities within the Borough and secure the provision of additional facilities subject to demand and availability of land and resources"* (p.21).

Strategic Objective 8 outlines aims to; *"protect and enhance the natural and built environment as an inherent part of the heritage of the Drogheda Borough Council Plan"* (p.21).

Character Areas

The development strategy for the Plan identifies seven distinct development areas covering the plan area (see Figure 12.15). The proposed development site is located to the east of the Rathmullan / Lagavoureen character area which is to the southeast of the town.

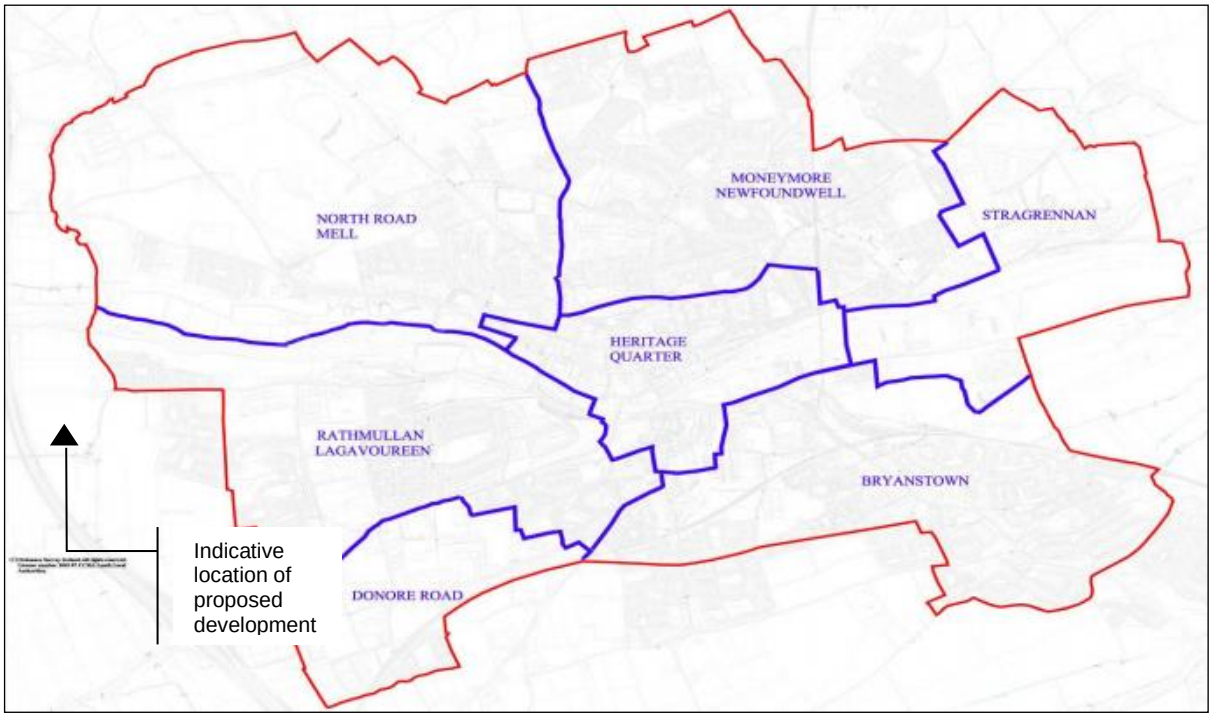


Figure 12.15 LCC Character Area Plan included in the Drogheda Development Plan 2011-2017

The objectives of this character area are to:

> *"Provide for new residential development and supporting community facilities and to facilitate seamless, sustainable expansion into the adjacent southern environs.*
>
> *To consolidate the existing residential development including support for additional community facilities and infrastructures."* (p.26).

Policies within the Drogheda development plan reinforce Louth County Council's Policies to protect Natura 2000 sites and sites of conservation value. The development plan states that *"any proposals for walkway development must comply with policy HC 12 (Chapter 4) with respect to design and impact on Natura 2000 sites beyond the Heritage Quarter"* (p.155).

12.4.2 Landscape Baseline:- Description of the Proposal Site and Environs

The site and its environs is described below in terms of:

- Location and overview;
- Site Boundaries, Landcover, Field patterns and Vegetation
- Topography and Drainage;
- Access;

- Built and Cultural Heritage;
- Landscape character;
- Landscape and visual amenity;
- Landscape Value and Susceptibility; and
- Visibility.

Location and Overview

The site is located on the western fringe of Drogheda town and immediately East of the M1 Motorway in County Meath. The site's eastern-most point is located approximately 2.5km from the centre of Drogheda. It lies to the south of the Boyne River and on the border between Counties Meath and Louth (see Figure 12.16 below).

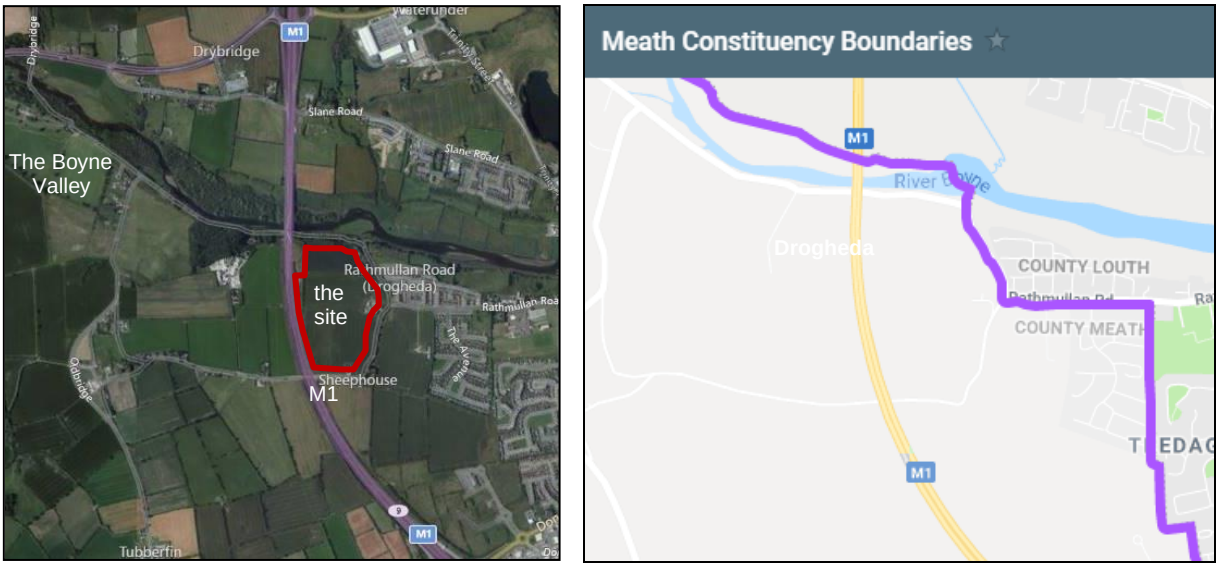


Figure 12.16 Aerial photograph showing the proposed development site in its landscape context (left) and excerpt of Meath County Council's Constituency Boundaries (right)

The total area of the site is 26.2 ha. The site predominantly comprises three medium-large sized agricultural fields divided by hedgerows that range in maturity, quality and consistency. Two dilapidated farm complexes exist on the site, the largest, and oldest of which is located near the Rathmullan Road junction. The smaller series of barns and outbuildings are located on Sheephouse Road to the south of the site. To the very north of the site, on the very steepest of the slopes there is a stretch of woodland separating the fields from the Rathmullan Road and Boyne River.

Photo 12.1 View across internal hedgerows (left) and view north through existing barn on Sheephouse Road (right)

Field patterns, Site Boundaries, Landcover, and Vegetation

The site comprises three medium to large sized fields which are in keeping with the surrounding field pattern. The fields measure as follows:

- Northern-most field – 3.7ha;
- Middle field – 6.8ha; and
- Southern-most field – 11.3ha.

At the time of the site visit, the fields were planted with an arable crop.

The subject site is bounded to the north by Rathmullan Road which wraps around the northeast corner of site, and up would have been a narrow ravine, before turning at 90° towards Drogheda town centre approximately halfway along the western site boundary. The eastern boundary continues to be formed by Sheephouse Road which subsequently wraps around the southern edge of the site. Established native hedgerows contain the site almost all the way along the eastern and southern edges. The western boundary is formed by the M1 verge planting.

Photo 12.2 View south along Sheephouse Road (left), view east along Rathmullan Road (centre) and western boundary (right)

To the north of the Rathmullan Road lies the River Boyne, which at this point, is wider and tidal and flows around the eastern extent of Yellow Island and at least one other small vegetated mudflat. An off-road pedestrian and cycle route flanks the southern bank of the river which leads into Drogheda town centre and out towards Oldbridge. The wooded slopes of the site to the south and southeast of the Rathmullan Road form an important woodland corridor that is rare across both County Meath and County Louth.

The lower elevations of the Rathmullan Road are rural in character with mature native hedgerows and views through woodland to rising banksides and fields. As the road rises in a southerly direction, an adjacent housing estate is visible through the trees to the east, which extends to the junction where the Rathmullan Road continues towards Drogheda. The remaining lands to the east of the site are currently fields but are zoned for housing and planning permission has been approved for a proposed development there. As such, most of the lands to the east of the site will be urban in character and function.


Photo 12.3 The Boyne River and its Island to north of site (left) and view along the Boyne River boardwalk (right)

The settlement to the southeast of the site consists of one private residence and a dilapidated cluster of farm buildings. The stand of mature trees and mown or grazed verge located on the curve of the road punctuates the otherwise narrow and mostly enclosed feeling country lane here. As Sheephouse Road returns west, the hedgerow bounding the site becomes wider, gappier and less dense comprising predominantly of Hawthorn. As Sheephouse Road rises to cross over the M1, the road is flanked on both sides by low timber fencing. To the south of Sheephouse Road, lie adjacent fields, which are zoned as employment lands for high-technology use.


Photo 12.4 Sheephouse Lane looking west (left) and bend in road on Sheephouse Road (right)

Land Use and Green Infrastructure

The M1 is located immediately to the west of the site, the verges of which are planted with semi-mature trees and vegetation. Beyond this, further west, lies the Brú na Bóinne World Heritage site and buffer zone. The motorway creates a clear divide between the urban and rural characters of this area although the River Boyne and its banks is an established green corridor that stretches in and through Drogheda town centre, emerging and merging into a low-lying estuary landscape.

Photo 12.5 View over the WHS from Dowth (left) and view from the site the over the urban fringe of Drogheda (right)

The edges of Drogheda are characterised by ribbon and infill residential, commercial and community developments that follow field boundaries and parcels of land. While the site lands currently sit adjacent to two fields, these are zoned for urban uses in the future. To the west of the site, the landscape becomes immediately urbanised with housing and community facilities present along the Rathmullan Road. The lands between the site and Drogheda contain a mixture of amenity green spaces, local parks and predominantly private gardens. To the north and west the landscape becomes increasingly wooded as it rises away from the river valley and towards Tullyallen, with Louth Hill (116m AOD) in the north-west and Red Mountain (134m AOD) in the north.

Landform, topography and drainage

The highest point of the site is located in its south-western corner at a level of 39.9mAOD. The land is immediately banked down towards the fields which lie at approximately 37mAOD, five metres from the southern boundary of the site. From this point, the land slopes very gently in a northerly direction towards the Boyne River. The gradient of the first field is shallow at approximately 2%. The gradient of the middle field is slightly steeper at approximately 3%. The northern-most field falls at a gradient of approximately 7.5%. The gradient of the wooded bank ranges between 24% and 50%.

Run off all appears to be directed towards the River Valley with no evidence of drainage ditches within the fields. There is however a ditch or gully located to the northwest of the Rathmullan Road which carries water collected from the site lands into the River Boyne. This continues south of the Rathmullan Road junction to the east of Sheephouse Road

An outfall is located on Sheephouse Road. The condition of the pipework is poor and therefore creates groundwater discharge.

Access

As the site has historically been largely in private agricultural use, there is currently no lawful public access to it. It is possible to access the lands from the farm on Sheephouse Road and from the access track and farm gate off the Rathmullan Road. There are no existing tracks or trails on the site. The steep topography and dense woodland south of the Rathmullan Road prevents access at this point.

Built and cultural heritage

The Boyne Valley has long attracted human settlement evidence for which dates to pre-historic eras. On the subject site, there is evidence of an enclosure from the Middle Bronze Age (c.1500BC) in the northern-most field and in the southern-most field, there is evidence of a ring ditch and two cremation sites. These are marked in Figure 12.17 overleaf.

Rathmullan:

1. Bronze Age enclosure in **red** - suggested protection zone in **yellow**
2. Area of Bronze age ring ditch (burial)
3 & 4. Areas of cremation burials

Figure 12.17 Location of archaeological features – Prepared by AHC Ltd.

Sporadic activity continued around these sites through the Iron Age and grew from the early ages of Christianity. The subject site was part of Mellifont Abbey's monastic lands until the 16th century. The abbey dates from 1142 and is located approximately 5.25km NW. The Cistercians were influential in shaping the landscape and agricultural development in their lands which were subdivided into granges or outlying farms.

Donore cemetery is visible from the subject site and is located 787m SW from it at Highlands (83m AOD). The remains of the Medieval church there and the graveyard adjacent to date back to at least 1302-06. Donore Cemetery played an important role in the Battle of the Boyne which took place in 1690 between the Jacobite and Williamite armies. The core battle site is immediately east of the entrance to the Oldbridge estate however the battle spread 6.3km upstream and 1.5km downstream. The crossing at Mill Ford to the immediate north of the subject site was used by the Williamite Army as they advanced down the Drybridge gulley to the north, over the Boyne River and up the ravine where the Rathmullan Road is now, towards the Jacobites, who had lookouts positioned on the high ground overlooking the crossing. The Jacobites pulled back from Oldbridge to Donore Church and then Dunleek.

The subject site was then part of the Oldbridge Estate. A small farm is noted to have existed on the subject lands on the Griffith Valuations of the mid 1850s, the remains of which are likely part of the farm complex to the east of the site. The farm along the southern boundary of the site is more modern and not considered to hold any archaeological or cultural value.

Landscape Character

The landscape character of the subject lands is of a greenfield site containing strong urban influences. It is defined by its:

- rolling landform that slopes gradually and then steeply towards the Boyne River;
- existing arable use of the three fields for a single crop;
- gappy internal hedgerows running east-west;
- generally well-vegetated site boundaries comprising the mature woodland to the north and north-west, the younger woodland verge planting along the M1 to the west and the hedgerows to the south and east, which are significantly more established to the east;
- visual dominance of the elegantly designed Boyne gateway bridge to the NE of the site;
- proximity to the M1 motorway and residential areas to the east;
- limited access to the landscape due to its arable use and private ownership;
- limited landscape features within the site itself; and
- long distance views north towards the M1 retail park and more contextually the rising land towards the northern escarpments, and south towards Donore Hill and Cemetery with limited views to the east and west.

Landscape and visual amenity

The site offers landscape amenity as a backdrop to publicly accessible places around its periphery and makes a contribution to the wider landscape character of the area however offers negligible immediate amenity value because the lands are in private property.

The site environs are generally more visible from distances over 600m due to topography and peripheral vegetation. At this distance, the site generally is perceived as part of the wider landscape and townscape. Closer partial views of the site are available from the upper floors of some of the properties to the east of the site and from along and close to the M1 motorway. A more detailed description of visual influence and the views themselves is found below and in Section 12.4.4.

It is not possible to see the River Boyne from within the subject site. From within the lands, views are available north towards the rising escarpment and aforementioned hills and south towards Donore Hill and Donore cemetery. The Mary McAleese Bridge is an attractive urban feature that is present in and sometimes dominates many of the views from within the site boundary. These views are currently not available to the general public.

12.4.3 Value and Susceptibility

The values and characteristics of the site are listed below and can be categorised in two ways – values which should be conserved, and those that provide opportunity for enhancement.

The values to be conserved indicate those aspects of the receiving environment which are valued and sensitive and could be negatively impacted on by the proposed development. These include:

- Recognition of this area's cultural significance, ecological features and designated sites (SPA, NHA and SAC) in Policy.
- Mature woodland to the north of the site and established hedgerows and roadside verges around the periphery of the site.
- Retention or enhancement of landscape character. It is important to note that multi-house development is considered a characteristic of Drogheda's hinterland.
- Medium and long-distance views from the surrounding area especially views that are designated as being important or those that are located with the WHS buffer zone but also residential properties and everyday views.

- The aesthetic quality derived from the site currently being vegetated contributes to the scenic qualities of the area from particularly from the north. The northernmost field is visible from the highest number of viewpoints.
- The views from the (currently private and therefore inaccessible) site towards Donore Cemetery, across the Boyne Valley (although some detractors are visible here) and towards the Mary McAleese Bridge.
- Built and cultural heritage of the subject site including the bronze age enclosure and its role and relevance in the Battle of the Boyne.

The values to be enhanced represents the site's capacity to accommodate change and therefore reflects landscape susceptibility. These include:

- Objectives for Drogheda as an expanding town and designated Large Growth Town I Zoning of lands for residential development.
- Objectives to support compact, well-connected, high quality urban development with a strong sense of place.
- Objectives for development to improve public access to open space and the countryside.
- Objectives to improve the diversity, quality and recreational value of open space.
- The degraded nature of some of the site's characteristics including the existing farm buildings, the internal hedgerows and the presence of pylons and overhead wires.
- The site has been in long standing agricultural use which has therefore limited the accessibility and diversity of the lands.
- The site is immediately east of the M1 motorway which separates it from the World Heritage Site buffer zone.

The enhancement values reflect change that is occurring in the landscape and its inherent robustness – this includes the location on the edge of the urban area.

12.4.4 Zone of Visual Influence and Potential Visual Receptors

Based on the assessment of the landscape characteristics, values and sensitivities, 13 no. representative viewpoints were selected to assess the visibility of the site, visual impact and effects. The 26 no. views are listed below in Table 12.6 with a brief description, a rationale for the selection of the viewpoint and a brief indication of the extent of the site visible from the viewpoint. Grey shading illustrates a lack of visibility from the selected viewpoint. The subject lands were visible from 17 no. of the 26 receptors identified. All views are recorded in Figure 12.17 overleaf. View P was assessed in two locations along the streets hence the P1 and P2 entries in forthcoming tables.

Vwpt Ref.	Short description of receptor and view	Rationale for selection	Approx. Distance from site	Site visibility
A*	View NE from Sheephouse Road bridge	Nearby view on WHS buffer zone boundary.	30m SW	Yes - partial
B*	View NE over gate to the west of cluster of homes_on Sheephouse Road	Representative of views from residential receptors within the WHS Buffer Zone	335m SW	Yes - partial
C	View NE from Oldbridge – between properties on Sheephouse Road	Representative of views from residential receptors.	710m SW	No
D*	View NE from Donore cemetery	Protected viewpoint (61, MCC), Battle of the Boyne landmark and elevated viewpoint. National Monument ME01029 in WHS Buffer Zone.	800m SW	Yes
E*	View east from Battle of the Boyne viewpoint, Oldbridge	Battle of the Boyne viewpoint in the WHS buffer zone	835m W	Yes - partial
F	View east from the Battle of the Boyne visitor centre fields	Part of public walkway through landscape associated with a visitor destination	950m W	No
G	View SE from the driveways of Bloomsbury Cottage and 'Bouvinda'	Representative of views from residential properties in Oldbridge	920m NW	No

H	View SE from the Battle of the Boyne visitor centre approach	Viewpoint in WHS buffer zone, is the setting of an ACA and is a popular visitor destination	1460m NW	No
I*	View SE from Battle of the Boyne visitor centre hub	Viewpoint in WHS buffer zone and ACA and is a popular visitor destination. Noted on the National Inventory of Architectural Heritage (Ref 14402016)	1890m NW	Yes-partial
J	View SE from N151 at the driveway of Townley Hall	Viewpoint from LCC's Scenic Route (20) and located in a Special Area of High Scenic Quality and representative of views from Townley Nature Reserve (protected VP27 LCC)	2295m NW	No
K*	View SE from Drybridge House	Residential receptor noted on the National Inventory of architectural Heritage (Ref 13902409) and representative of views from the Drybridge Escarpment (protected VP28 LCC)	730m NW	Yes
L*	View S from the Boyne River walkway on Rathmullan Road	Representative of the view experienced by users of the public footpath and road.	15mN	Yes
M*	View south from road bridge on Hill of Rath Road	Representative of views experienced by road users	1917m N	Yes
N*	View SE from Mary McAleese Bridge	Public road on Mary McAleese Bridge providing a gateway experience for users	80m NW	Yes
O	View west from The Square (north)	Elevated public of views from residential receptors	85m E	Yes - partial
P1*	View south from The Square (south)	Representative of views from residential receptors	119m E	Yes-partial
P2*	View south from The Square (south + east)	Representative of views from residential receptors	35m NE	Yes-
Q	View west from The Dale	Representative of views from residential receptors	35m E	Yes - partial
R*	View west from Rathmullan Road	View experienced when approaching the site from Drogheda	95m E	Yes - partial
S	View west from The Way	Representative of views from residential receptors	270m	No
T	View west from The Lawn	Representative of views from residential receptors	375m	No
U	View SWW from Willow Grove	Representative of views from residential receptors	1635m NEE	Yes - partial
V	View SW from Boyne Hall	Representative of views from residential receptors	740m NE	Yes - partial
W*	View S from Tullybrook Housing	Representative of views from residential receptors	550m NNE	Yes - partial
X*	View south from N51 at Mell	Protected Viewpoint 29 (LCC)	1227m N	Yes
Y	View NE from motorway junction	Representative of views from road user receptors	1235mSW	No
Z	View NW from Dowth	View from WHS	3790m	No

Table 12.6 Schedule of viewpoints visited. * denotes 13 no. viewpoints selected for full assessment.

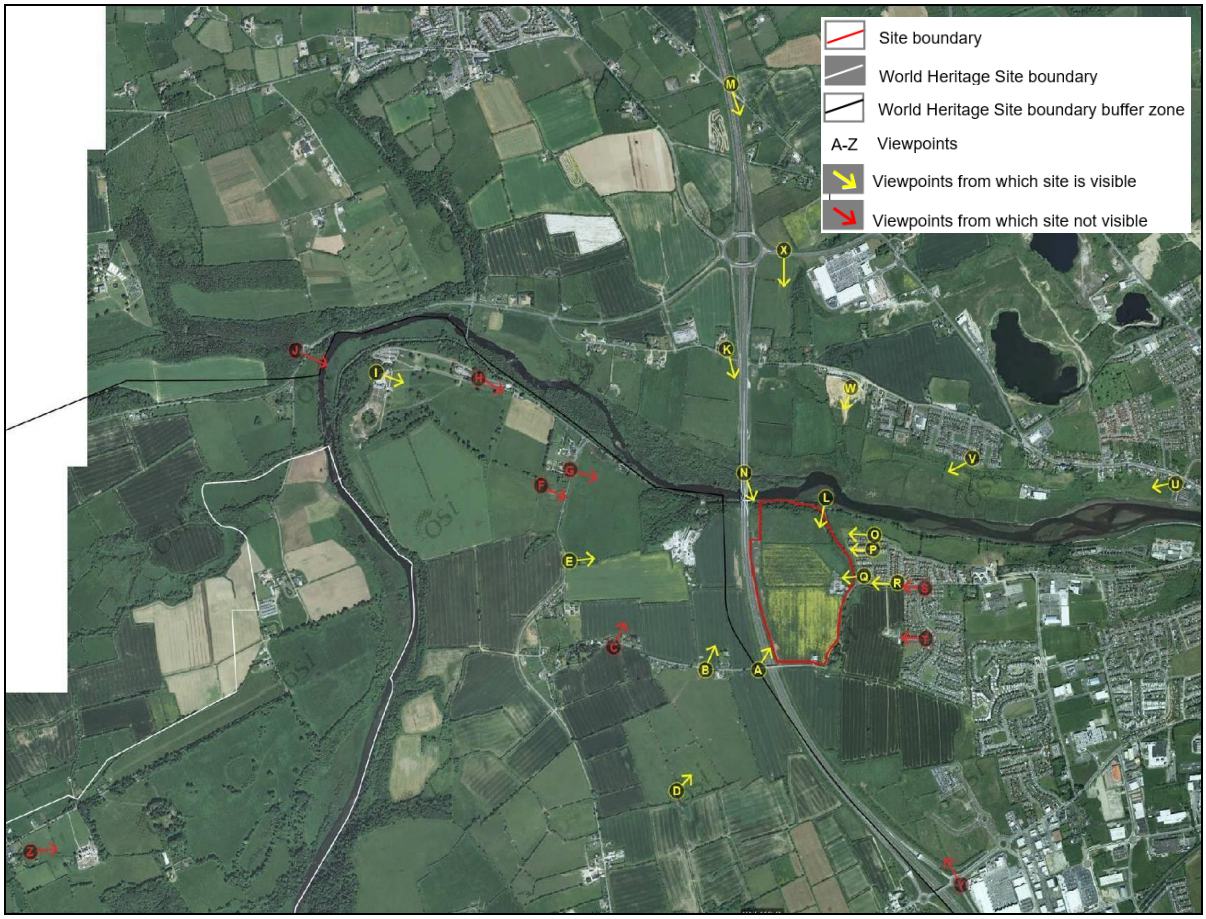


Figure 12.17 Visibility of the site from selected viewpoints.

In summary, the visual analysis undertaken to date concludes the following:

- The site is not visible from any of the viewpoints assessed within the World Heritage Site boundary.
- There are four receptors identified within the world heritage site buffer zone that will receive partial views of the development. The views of the development are in the opposite direction from the WHS. Of these, the view from Donore cemetery is the most expansive. The planning inspector's report on the previous submission noted, *"These views do, however occur at a distance of over one kilometre, and given the backdrop of the existing suburbs, the impact of the proposal would be to extend the existing developed area rather than effecting a fundamental change in the character of the landscape. Views from the point have also previously been altered by the construction of the M1 motorway."*
- The site is visible from close proximity – albeit at speed when travelling south on the M1 motorway and from other localised views to the north (e.g. From Drybridge House).
- The site is visible in close proximity, through well-established boundary vegetation from the adjacent housing areas to the east.
- The site is visible from residences to the north and NE on the opposite side of the valley.

It important to note that the visibility of the site or the scheme is not necessarily problematic. An impact assessment of 13 no. selected viewpoints is provided in Figure 12.7. The viewpoints have been selected to provide a good representation of visual impacts and effects from around the subject lands. Sensitive viewpoints and those suggesting more rather than less visibility have been prioritised.

12.5 Characteristics of the Proposed Development

The proposed development is described in Section 2.0 of the EIAR. The proposed landscape characteristics are defined by:

- Neighbourhoods that are focussed around and draw their identity from their relationship with open space.
- A clear grid of streets oriented and organised to create vistas towards the Mary McAleese Bridge.
- Direct pedestrian connections through a range of interesting and varied parks, streets and squares.
- Cycle route running around the periphery of the site and across it.
- The provision of a range of parks, open spaces and habitats that offer different qualities and have their own identity. These include:

    - Boyne Valley Park which includes feature mounding ('The Rath') to express Bronze Age archaeology a large play area and significant areas of existing and proposed tree planting.
    - The West Woodland which includes a 4m high wooded bund designed to mitigate internal noise interspersed with a series of informal play opportunities at cul-de sac ends.
    - Rathmullan Green, Sheephouse Green and Mary McAleese Bridge Park are three parks, all of differing characters, containing play areas.
    - Remaining open spaces, squares and pocket parks contribute to the proposed open space network, which is further connected by a distinct network of proposed trees.
    - There are swales proposed along 3 of the principle connecting streets within the development.

All the edges around the development are soft in their treatment and include new areas of hedgerow, tree and woodland planting.

12.6 Predicted Landscape Effects

The subject lands directly affect the physical character of:

- Meath CC LCA 7 – Coastal Plain; and
- The subject lands itself.

The predicted landscape effect on the two character areas listed above is assessed below.

The subject lands are adjacent to the following character areas.

- The World Heritage Site Buffer zone;
- Louth CC Character Area Boyne and Mattock Valley; and
- Drogheda Character Area Rathmullan & Legavoureen.

None of the above three character areas adjacent to the subject lands will change in any physical way. A review of the extent to which the development will affect the views experienced from the three character areas are examined in Section 12.6 on this report.

12.6.1 Landscape Sensitivity Assessments

The Landscape Sensitivity of the baseline landscapes defined in Section 12.6 is as follows:-

- The landscape sensitivity of **Meath CC's LCA 7 - Coastal Plain LCA** is **High** in accordance to the MCC's assessment (see Section 12.4.1); and
- The landscape sensitivity of **the subject lands** is **Medium** in accordance with the landscape conservation and enhancement values described in Section 12.4.3.

12.6.2 Construction Impacts and Effects on the Landscape

Construction Impacts

The construction stage will result in ongoing infrastructure, building and related works for approximately 5 years. This will entail:

- The protection of the majority of the trees on site.
- The removal of selected mature trees, small groups of young trees, all internal hedgerows and the majority of peripheral hedgerows along Sheephouse Road.
- The temporary movement and stock piling of earth and materials (avoiding cordoned off protected archaeological areas).
- The temporary movement of machinery in and out of the site.
- All engineering, building and landscape works required with associated site infrastructure, fencing and plant.
- The proposed development will be set back from the road edge as described above. This will ameliorate the impact of construction works.

Qualitative Assessment

Qualitatively, it expected that all construction works would have an adverse impact. Although valued features would be protected, the works would change and degrade the lands until they are re-made into the proposed neighbourhoods.

Longevity Assessment

The construction works are expected to take approximate 5 years and therefore are considered to be short-term.

Effects, Magnitude of Change and Landscape Impact Assessment during Construction

Whilst this landscape would continue to be a worked landscape, it would change from being an agricultural landscape to a construction site. This would have the following effects on the baseline landscape areas as follows:-

MCC LCA 7 – Coastal Plain: The effects during construction would relate to a very small geographical extent of this LCA, which in its totality includes lands along the coast between Gormanstown, Naul and Drogheda. However, the site is located in the LCA's north-western corner and is visible, albeit fleetingly from the M1 motorway. As such, it could be perceived as gateway site to the urban extent of Drogheda and it will be seen by many passers-by. In addition, the site is visible from a number of long-distance viewpoints predominantly located north and north-east of the site. The presence of a construction site in an otherwise established landscape would draw attention to it, despite the relatively small proportion of the view it would accommodate. Despite this, it is somewhat expected to see urban expansion on the periphery of towns and the type of development is in keeping with the characteristics of the area.

As such, the following assessment of *Magnitude of Change* is Low

Landscape Impact Assessment at Construction** on **MCC LCA 7 – Coastal Plain
Significance of Effects during Construction: **Moderate-Slight**
Qualitative rating during Construction: **Adverse**
Longevity rating during Construction: **Short-term**

The Subject Lands: The effects during construction would be phased, so not all the site would partially and in sections. The northernmost field and the existing mature woodland on the northern slope towards the Boyne River would be retained and protected. The field would then be enhanced. The remainder of the site would, over time be subject to major alterations to key elements during the construction process.

As such, the following assessment of *Magnitude of Change* is High

Significance of Effects during Construction: **Significant**
Qualitative rating during Construction: **Adverse**
Longevity rating during Construction: **Short-term**

12.6.3 Operational Impacts and Effects on the Landscape

Operational Impacts

- The impact of the development is the change of the site from arable land to a new residential area close to the M1 motorway and on the western edge of Drogheda in keeping with local development plans and policy.

- Whilst some trees and hedgerows will be affected, the new development has been laid out to safeguard almost all of the mature woodland on the site and where hedgerows and verge planting is lost, it is proposed to be replaced.

- The development includes a well-structured network of parks and open spaces offering active and passive recreation opportunities. There is a periphery woodland recreational route and cycle track that connects with a new neighbourhood park overlooking the Boyne Valley and softens all its edges.

- The main streets have swales running along them and there is a strong network of a range of different types of trees proposed.

- The site of the Bronze Age enclosure will be preserved and made a feature of within the public parkland.

- Further planting within the northern slopes of the parkland will soften views from the north.

Longevity Assessment

The development is expected to last over sixty years and therefore is considered permanent.

Effects, Magnitude of Change and Landscape Impact Assessment Impact at Operation

MCC LCA 7 – Coastal Plain: The effects of the development at operation would relate to a very limited geographical extent of this LCA. Key characteristics of the LCA that will be retained are the woodland. Key characteristics that will be lost include the gappy internal hedgerows and the agricultural land. New characteristics gained include a well-designed housing development which has a strong legible structure with new, connected pedestrian and cycle routes and new active and passive recreational facilities. Multi-house residential developments are one of the key characteristics of this LCA and the subject lands are zoned for this use.

As such, the following assessment of *Magnitude of Change* is Low

Qualitatively the landscape effect is Neutral because the, "s*cheme complements the scale, landform and pattern of the landscape and maintains landscape quality".* This recognises that, whilst the change in character from agricultural to urban is substantial, it reflects land use policy for the site and has been applied to the site in accordance with best practice in terms of urban design, open space development and Green Infrastructure policy. The resultant scheme is likely to better the design of residential areas close by.

Landscape Impact Assessment at Operation** on **MCC LCA 7 – Coastal Plain
Significance of Effects at Operation **Moderate-Slight**
Qualitative rating at Operation: **Neutral**
Longevity rating at Operation: **Medium term**

Subject Lands: The effects of the development at operation would relate to a moderate extent of the subject lands. The character of the northernmost field would change moderately from being a private, open, arable field to a public park that with open views across the valley. The character of the middle

and southernmost field would be significantly altered from farmland to a residential neighbourhood, change which is characteristic in context. Although the (private) agricultural lands will be lost as part of this development, these will be replaced with a high-quality series of parks and habitats providing more diversity and more accessible countryside and greenspace. However, at operation, this will be a newly built neighbourhood and vegetation will not yet be fully grown or established.

As such, the following assessment of *Magnitude of Change* is High

Qualitatively the landscape effect is Neutral because the, "s*cheme complements the scale, landform and pattern of the landscape and maintains landscape quality".* This recognises that, whilst the change in character from agricultural to urban is substantial, it reflects land use policy for the site and has been applied to the site in accordance with best practice in terms of urban design, open space development and Green Infrastructure policy.

Landscape Impact Assessment at Operation** on **the Subject Lands
Significance of Effects at Operation: **Significant**
Qualitative rating at Operation: **Neutral**
Longevity rating at Operation: **Medium term**

12.6.4 Effects on the Landscape at Maturity (15 years old)

Impacts at Maturity

In addition to the impacts described in section 12.6.3, the landscape would now contain a well-established network of parkland, public realm, street and garden trees.

Longevity Assessment

The development is expected to last over sixty years and therefore is considered permanent.

Effects, Magnitude of Change and Landscape Impact Assessment Impact at Maturity

The landscape change will be from established agricultural landscape to an established residential neighbourhood with a strong network and range of trees, woodlands, grasslands and parks. Garden vegetation will have matured and will have been diversified softening and providing change throughout the whole development. This would have the following effects on the baseline landscape areas:

MCC LCA 7 – Coastal Plain: The effects of the development at maturity would still only be experienced in a very localised part of the LCA. At maturity, although the character is a change from the present landscape, the established vegetation would serve to knit the development into the wider landscape fabric.

As such, the following assessment of *Magnitude of Change* is Negligible

Qualitatively, the scheme complements the scale, landform and pattern of the landscape and improves upon local townscape quality and therefore has been assessed to have a Neutral qualitative impact.

Landscape Impact Assessment at Maturity** on **MCC LCA 7 – Coastal Plain
Significance of Effects at Maturity: **Slight / Not significant**
Qualitative rating at Maturity: **Neutral**
Longevity rating at Maturity: **Permanent**

Subject lands: The effects of the development at maturity result in change that is moderate in extent with major alterations to the existing landscape and its character. The resultant character will be one that is more diverse, more accessible and better celebrates the cultural history of the area. Although the character of the landscape will be changed, this change would be mostly perceived from around the site because it is currently in private use.

As such, the following assessment of *Magnitude of Change* is High

Qualitatively, the scheme complements the scale, landform and pattern of the landscape and improves upon local townscape quality and therefore has been assessed to have a Neutral qualitative impact.

Landscape Impact Assessment at Maturity *on* ***Subject lands***
Significance of Effects at Maturity: **Significant**
Qualitative rating at Maturity: **Neutral**
Longevity rating at Maturity: **Permanent.**

12.6.5 Summary of Effects on the Landscape

The following table (Table 12.7) summarises the results of the assessment of the effects of the proposed development on the landscape resource.

Landscape area	Project Stage	Magnitude of Change	Significance of Effects	Qualitative Assessment	Longevity Assessment
MCC LCA 7 – Coastal Plain	**During Construction**	Low	Moderate -Slight	Adverse	Short-term
	At Operation	Low	Moderate -Slight	Neutral	Medium-term
	At Maturity	Negligible	Slight / Not significant	Neutral	Permanent
Subject Lands	**During Construction**	High	Significant	Adverse	Short-term
	At Operation	High	Significant	Neutral	Medium-term
	At Maturity	High	Significant	Neutral	Permanent

Table 12.7 Summary table of the of the effects of the proposed development on the landscape resource

The proposed development is expected to have an adverse effect on the landscape resource during construction, despite the most valuable of the site's features being preserved. Over time, while the characteristics of the landscape will change significantly on the subject lands, the overall landscape effect is expected to be Neutral which is defined as a scheme that complements the scale, landscape, quality and pattern of the landscape and maintains its quality. This reflects the proposed pattern of the development which responds to the existing field patterns, topography and views both in and out of the site and omits existing detractors on the site such as the existing pylons and dilapidated farm buildings. It reflects a final scheme that is more diverse, more accessible, makes more provision for active and passive recreation and better celebrates the cultural history of the area. The scheme improves upon local townscape quality and is in keeping with future planning objectives for the area.

12.7 The Visual Assessment

The assessment of each view is as provided as described in the Methodology Section of this chapter. The potential impacts on the views are presented below during construction, at operation and at maturity (15 years after completion). The effects of these impacts are presented for each visual receptor identified.

12.7.1 Construction Impacts on Views

Construction Impacts

The construction stage will result in ongoing infrastructure, building and related works for approximately 5 years. This will entail:

- The protection of the majority of the trees on site.
- The removal of selected mature trees, small groups of young trees, all internal hedgerows and the majority of peripheral hedgerows along Sheephouse Road.

- The temporary movement and stock piling of earth and materials (avoiding cordoned off protected archaeological areas).
- The temporary movement of machinery in and out of the site.
- All engineering, building and landscape works required with associated site infrastructure, fencing and plant.
- The proposed development will be set back from the road edge as described above. This will ameliorate the impact of construction works.

12.7.2 Operational Impacts on Views

Operational Impacts

- The impact of the development is the change of the site from arable land to a new residential area close to the M1 motorway and on the western edge of Drogheda in keeping with local development plans and policy.

- Housing will be present in some close-up views from the east and south.

- The development will be visible in some middle-far distance views, between and through existing vegetation from some views to the north and west.

- Whilst some trees and hedgerows will be affected, the new development has been laid out to safeguard almost all of the mature woodland on the site and where peripheral hedgerows and verge planting is lost, it is proposed to be replaced.

- The development includes a well-structured network of parks and open spaces offering active and passive recreation opportunities. There is a periphery woodland recreational route and cycle track that connects with a new neighbourhood park overlooking the Boyne Valley and softens all its edges.

- The main streets have swales running along them and there is a strong network of a range of different types of trees proposed.

- The site of the Bronze Age enclosure will be preserved and made a feature of within the public parkland.

- Further woodland planting within the northern slopes of the parkland and along the eastern edge of the site will soften views from the north.

12.7.3 Impacts on Views at Maturity

- The proposed woodland and network of trees and hedgerows will have become established accommodating a higher proportion of all views looking into the scheme.

- Woodland would be established on top of the 4m high berm along the western edge of the site.

- Woodland would have become established to the very northern edge of the site – thickening out the existing woodland.

- Street trees will be visible between the houses in all views looking in from any higher elevation and in certain close-proximity views.

12.7.4 Assessment of Visual Effects

In order to avoid repetition, the following assessments will be common to all assessments during the construction phase:

- *Longevity Assessment*

The construction works are expected to take approximate 5 years and therefore are considered short-term.

The operational phase has been assessed as being medium-term as it will take some 10-15 years for trees to mature.

The effects at maturity have been assessed at permanent

- *Qualitative Assessment*

  Qualitatively, it expected that all construction works would have an adverse impact. Although valued features would be protected, the works would change and degrade the lands until they are re-made into the proposed neighbourhoods.

  Each view will now be assessed to ascertain the visual effects during the construction phase, at operation and at maturity.

Photography

All photographs and montages were taken using verified view methodology (see Appendix 12.1 for a transcript). For safety reasons, viewpoint N, the view from the M1, has been represented using the 3D model with an eye level height of 1.5m. Full A3 versions of the photographs are provided in the photomontage booklet, prepared by Chris Shackleton Consulting, which accompany this application under a separate cover. We note, these need to be printed out and viewed at arm's length to achieve a realistic impression of what the eye sees.

Assessment of Views

View A: View NE from Sheephouse Road Bridge

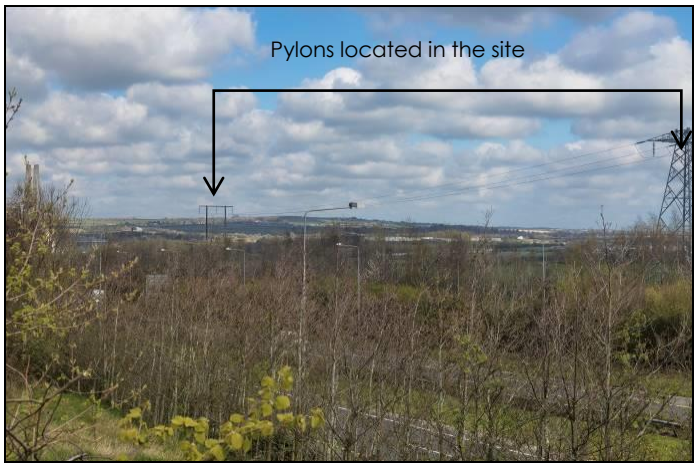
Location of the view: Located 30m SW of site boundary

Rationale for selection: Close proximity view on WHS buffer zone boundary.

Description of viewpoint: View from road bridge crossing the M1 motorway. Potentially used by pedestrians and vehicles. People using this route are likely to be noticing but not focusing on the landscape.

Visual Receptor Sensitivity Rating: Medium

The existing view



Description of the existing view: Near view towards the site over the M1 motorway and associated buffer planting and infrastructure. Further back, the view takes in safety barriers along the bridge. The subject lands themselves are barely visible between and behind the under-mature existing tree belt.

The pylons and overhead wires located within the subject lands are clearly visible above the bank Although, there are no buildings present in the existing view that suggest the urban edge of Drogheda, the presence of the motorway and its associated planting very much emphasise the transition from the Battle of the Boyne Buffer Zone towards an urbanised place.

Visual Effects and Magnitude of Change:

During construction: however, sections of the existing trees would be removed in order to construct a planted bund. Existing vegetation would screen some of the site plant and on-ground changes to the site. The construction of some of the nearer buildings and higher parts of the apartment / higher buildings are likely to create a partial intrusion into the view over the treeline and would introduce some movement. Therefore, the impact of these changes has assessed to be adverse and to a low extent.

At operation: the buildings would be complete and would be partly visible over the existing treeline introducing a partial addition to the view in the middle distance. The rising escarpment to the north would still be visible over the roofscape and the horizon would not be broken. The houses would create an element of human scale and repetition in a foreground which is currently mostly dominated by large scale elements associated with the motorway, more clearly signalling the western edge of Drogheda. The introduction of these elements is not uncharacteristic in the context of the area. As such, although the proposed development would be visible, and would accommodate some of the view, elements of it play a beneficial role in defining the townscape. As such, the visual effects are expected to be neutral and to a medium extent.

At maturity: the view would be almost entirely softened and screened by the proposed planting on top of the 4m bund along the western edge of the site. This would introduce more variance in the vegetation. Only glimpses of the proposed buildings are likely through the trees, which would, where present, read as the western edge of Drogheda and would provide a more human scale of intervention. There would be a low level of change to the characteristics of this view at maturity. The changes made are characteristic of the wider landscape. Increased tree planting would screen the industrial sheds on the northern side of the valley. As such, at maturity, the effects of the development on this view have been assessed as being positive.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint A	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Medium*	*Medium*	*Low*
Significance of Effects	*Moderate*	*Moderate*	*Slight*
Qualitative Assessment	*Adverse*	*Neutral*	*Beneficial*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.8 Visual impact assessment for Viewpoint A

View B: View NE over gate to the west of cluster of homes on Sheephouse Road

Location of the view: Located 335m SW of site boundary

Rationale for selection: Representative of views from rear elevations of residential receptors within the WHS Buffer Zone.

Description of viewpoint: View over gate and fields from Sheephouse Road between two rows of residential properties.

Visual Receptor Sensitivity Rating: Medium

The existing view

Description of the existing view: Oblique views available towards the site accommodating the treeline of the under-mature woodland belt along its western edge and the power lines routed alongside it. The proportion of the view accommodated by the site is very small. An (off-site) agricultural field dominates the foreground of the view. The Mary McAleese bridge is the principle visual feature, breaking the sky to the left-hand side of the view. To its right, it is possible to clearly see the M1 retail park. Motorway signage, lighting and pylons are other detractors within this view. Any views from gardens and ground floor rooms of residential properties would be further interrupted by rear property boundaries, hedging and out-buildings.

Visual Effects and Magnitude of Change:

During construction: The construction of the upper stories of the apartments, roofscape and associated high site plant would be visible above the treeline obliquely to the right of this view, extending the extent of the proportion of the site visible. This extension, in total, however, would still accommodate only a small proportion of the full extent of this view. Much of the activity at ground and first floor would be screened by the existing tree belt and therefore, the extent of change predicted here is low. The effect, although adverse, would be temporary.

At operation: The roofscapes of some of the nearest houses and the upper 1-2 storeys of the proposed apartment blocks to the NW of the site would be visible above the existing tree-line. Visually, the development connects across the valley with the M1 retail park and reads as the western edge of Drogheda. The apartment blocks do stand proud of the tree line and bring the urban effect / character closer to this viewpoint. Much of the remaining development will be softened and screened by existing vegetation, which, at operation, will have grown higher than currently shown. The change in the view, accommodates a minor proportion of the view, and the negative effects of site plant and movement associated with the construction phase have been lost – therefore, the magnitude of change to the view at operation is low. Given that there has been no substantial change to wider visual amenity available from this viewpoint, the visual change has been assessed as neutral.

At maturity: The proposed wooded bund will be well-established and serve to screen much of the development visible at operation. Glimpses of the roofs of houses and the apartment blocks and likely to be visible over the tree line. The visual amenity currently experienced will not be changed and the proposed trees will serve to replicate and improve on existing conditions and will break up the linearity of motorway planting. The extent of change in the view will be perceived to be lower due to the increased maturity of existing and proposed trees. The effect will be neutral due to some positive gains associated with tree planting. The effect will be permanent.

Viewpoint B	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Low*	*Low*	*Low*
Significance of Effects	*Slight*	*Slight*	*Slight*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.9 Visual impact assessment for Viewpoint B

***View D:* View NE from Donore Cemetery**

Location of the view: Located 800m SW of site boundary

Rationale for selection: Protected viewpoint (61, MCC), Battle of the Boyne landmark and elevated viewpoint. National Monument ME01029 in WHS Buffer Zone.

Description of viewpoint: Viewpoint located on the NE boundary of Donore cemetery, which is an attractive and atmospheric place of high cultural and historical significance recognised in policy.

Visual Receptor Sensitivity Rating: High

Existing view

Description of the existing view: This expansive, busy, panoramic view over the Boyne estuary represents the changing character of the landscape into townscape with views towards the Red Mountain to the left of the view on the horizon to Drogheda Town to the right of the view in the middle to far distance. The M1 motorway and the modern Mary McAleese Bridge are visible in the middle to far distance against the backdrop of the fringes of Drogheda Town. The extent of the site is visible at a low angle, in the middle of this view. To the fore of the site, the landscape is rural in character with agricultural fields and hedgerows with hedgerow trees crossing and punctuating the view.

Visual Effects and Magnitude of Change:

During construction: Even from almost a kilometre away, it is likely that it will be possible to identify the building works on the site. It might be possible to pick out the construction vehicles and there will be a new element of movement that could be perceived at times. However, while a relatively small change in the view is expected, the overall composition and character of it will remain unaltered. As such, although adverse in nature, the visual effects are expected to be low.

At operation: The development will be visible from this distance and will be perceived as part of Drogheda's urban extent. Individual buildings and landscape features are likely to be identifiable at this distance, but the development would read as a continuum of the town. The development changes

a small proportion of the view which otherwise contains a range of features and landscapes and the changes are in keeping with the landscape character of the area. Although the change in the landscape will be new, and proposed woodland vegetation would have not yet established, existing woodland to the west of the site would be more established by this stage therefore providing a reasonable screening effect from this viewpoint. As such, the visual effects are impacts to be neutral and to a low extent.

At maturity, the significant planting along the south, west and within the internal parks and streets will soften the edges of this development when it is viewed from Donore Cemetery. Changes will be a minor intrusion into a view which contains many other features to draw the eye. It is expected to see urban expansion on the edge of existing towns and therefore is in keeping with the scale, townscape and character of Drogheda town and maintains landscape quality. As such, the visual effects are impacts to be neutral and to a low extent.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint D	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Low*	*Low*	*Low*
Significance of Effects	*Moderate-Slight*	*Moderate-Slight*	*Moderate-Slight*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium-term*	*Permanent*

Table 12.10 Visual impact assessment for Viewpoint D

NB, the previous inspector's comments on this view were that, "The planning inspector's report on the previous submission noted, *"These views do, however occur at a distance of over one kilometre, and given the backdrop of the existing suburbs, the impact of the proposal would be to extend the existing developed area rather than effecting a fundamental change in the character of the landscape. Views from the point have also previously been altered by the construction of the M1 motorway."*

***View E:* View east from the Battle of the Boyne viewpoint**

Location of the view: 800m west of the site boundary

Rationale for selection: Battle of the Boyne viewpoint in the WHS buffer zone

Description of viewpoint: The viewpoint is from a small clearing adjacent to agricultural lands that is accessed via a pathway leading from the road to the west. The purpose of the clearing and the viewpoint is to illustrate the relevance of the landscape in the Battle of the Boyne and there is an information board explaining this. The purpose of visiting this receptor is to appreciate the view and the surrounding landscape although it is not recognised in Policy.

Visual Receptor Sensitivity Rating: High

The existing view

Non verified view provided to show visual context

Description of the existing view: This view overlooks the Boyne valley. Although a wider panorama is visible from this viewpoint, the information board present encourages visitors to look northeast towards the historic point of interest – the battle route. To the far right-hand side of the view, pylons located within the subject lands and trees adjacent to the western boundary are visible over M1 screening vegetation. The Mary McAleese Bridge to the left of the view and the M1 retail centre in the far distance, the concrete works in the middle distance and the suburban edge of Drogheda clearly signal the presence of urbanity in this view.

Visual Effects and Magnitude of Change:

During construction: It is likely that some of the higher pieces of site plant will be visible during some phases of the construction process – especially along the western edge of the site. The construction of the apartment blocks will be visible behind the paving works. It is unlikely though, that with such a limited extent of the site being visible and from almost a kilometre away that many of the siteworks would be discernible and they would not detract from the focus and character if the view, which is directed more to the north. As such, the likely visual effects are assessed to be adverse and to a low extent.

At operation: It will be possible to identify some of the higher parts of the buildings located along the western edge of the proposal however the development will be mostly screened by existing landform and vegetation. In context with the wider view, the intrusions into it will be minor when considered on their own merit and in comparison, to the Mary McAleese Bridge. However, the apartment blocks to the NW of the site do break the horizon and add to the sense of urban edge suggested in the vicinity by other factors listed above. Yet, an urban edge is to be expected towards Drogheda and the proposed development is in keeping with both those expectations and the development plan. As such, the visual effects are impacts to be neutral and to a low extent.

At maturity: the proposed vegetation along the north and west of the scheme will have matured to add to the screening effect experienced at operation. This will serve to break up the linearity of the motorway verge planting and screen some of the urban backdrop. In addition, the motorway verge planting will have further matured to further screen views towards the development from this viewpoint. As such, the visual effects are impacts to be neutral and to a negligible extent.
The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint E	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Low*	*Low*	*Negligible*
Significance of Effects	*Moderate-Slight*	*Moderate-Slight*	*Slight-Not Significant*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.11 Visual impact assessment for Viewpoint E

***View I:* View south-east from the Battle of the Boyne Visitor Centre – Oldbridge House**

Location of the view: 1890m NW of the site boundary

Rationale for selection: Viewpoint in WHS buffer zone and ACA and is a popular visitor destination. The building is noted on the National Inventory of Architectural Heritage (Ref 14402016).

Description of viewpoint: Oldbridge House was built circa. 1750. It is a detached, 7 bay, 3 storey house with low storey wings. The formal gardens are located to the south of the main house. Beyond these and to the east, the landscape setting is more pastoral in character with long distance views to the wooded Boyne river valley. On the western side of the main house, where the main visitor entrance is, there is a generous courtyard space which is at the same elevation as the house, containing a number of historical artefacts and information boards.

Visual Receptor Sensitivity Rating: High

The existing view

Description of the existing view: This view is dominated by the parkland associated with Oldbridge House. The lands slope from south to north, very gently, towards the River Boyne. The open grasslands are partially mown and grazed and contain some fine specimens of mature parkland trees, which break the horizon and the eye through the view. The gatehouse is visible to the left-hand side of the view. The backdrop of the view is primarily wooded with the church spires and tall buildings of Drogheda visible in the far distance. The wooded backdrop of the view is clearly horizontally split by the Mary McAleese Bridge and M1 motorway and the bridge itself is a dominant visual feature in the view. High sided vehicles can be seen travelling over the bridge. Pylons located on the site are just discernible on the horizon in the far distance.

Visual Effects and Magnitude of Change:

During construction: the works will be barely discernible in this view except for the presence of cranes, which will accommodate a very small part of the view at almost 2km away. There are several urban elements perceptible, at this distance of or nearer, in the general direction of the proposed development from this viewpoint. The cranes associated with the proposed development would be temporarily read as part of the changing character of the landscape towards Drogheda. As such, the visual effects are impacts to be neutral and to a negligible extent.

At operation: it will be possible to identify the apartment blocks at the NW of the site. The rooftops of the houses may be discernible. These changes will accommodate a tiny part of the view and will be located further east of the Marty McAleese Bridge. The changes will not compromise the landscape setting, composition or character of Oldbridge House. As such, the visual effects are impacts to be neutral and to a negligible extent.

At maturity: tree planting on the bund to the west of the site will have established to screen the majority of views towards the rooftops of houses. The proposed apartment blocks to the NW of the development are likely to be just discernible through existing and proposed vegetation. This change will be barely discernible. As such, the visual effects are impacts to be neutral and to a negligible extent.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint I	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Negligible*	*Negligible*	*Negligible*
Significance of Effects	*Slight-Not Significant*	*Slight-Not Significant*	*Slight-Not Significant*
Qualitative Assessment	*Neutral*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.12 Visual impact assessment for Viewpoint I

***View K:* View south-east from Drybridge House**

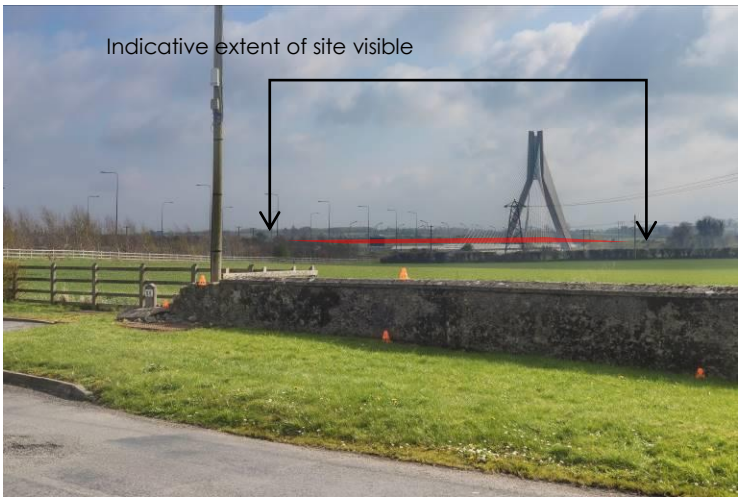
Location of the view: 730m NW of the site boundary

Rationale for selection: Residential receptor noted on the National Inventory of Architectural Heritage (Ref 13902409) and representative of views from the Drybridge Escarpment (protected VP28 LCC)

Description of viewpoint: Drybridge House is important example of heritage architecture in the form of a strong farmer's house built in 1820. Drybridge House and the adjacent property is set back from the road and there are several small and medium and one single large tree growing in the front garden of the two properties. The front gardens both have rendered boundary walls approximately 1.5m high. Opposite the houses, across the road there is a generous verge and low rendered wall.

Visual Receptor Sensitivity Rating: High

Existing view



Description of the existing view: The oblique view towards the subject lands from Drybridge House is wide and open and includes arable fields in the foreground, established hedgerows and young screening vegetation. The Mary McAleese Bridge is clearly visible in the middle distance as are the top half of lamp posts located along the M1 motorway and mark the presence of a more urban character. Electricity pylons cross the fieldscape which further detract from the rural quality of this view. In the far distance, above the hedgerows and trees, and between motorway signage and a gap

in hedge, it is possible to identify the subject lands, which accommodate a very small stretch of the view.

Visual Effects and Magnitude of Change:

During construction: The site works are likely to be visible from this distance, especially, during the first, second and last phase of construction. However, the view will not feature in direct views from the house itself and will only be experienced obliquely when using the road. The effects will accommodate a small part of the view and will be visible as a backdrop to the already dominant M1 corridor is in keeping with its industrial, urban character. In general, visual amenity will not be altered and therefore the magnitude of change has been assessed as low. These adverse impacts will be temporary.

At operation: The north-western part of the proposed development will be visible obliquely from Drybridge House through and behind existing motorway infrastructure. This will be partially screened over time but at operation, views towards the new homes and apartments will be open in places. The presence of the development serves to reduce the visual impact of the motorway infrastructure providing an urban backdrop to it, with which contrasts far less starkly than as present. Although the Mary McAleese Bridge clearly remains the most prominent architectural form in this view, the apartment blocks to the NW do catch the eye due to their size, colour and form. The highest block is most prominent due to its position on the brow of the hill. This block, will accommodate a very small proportion of the field of view. However, at operation and until tree planting becomes established, the impact on this view will be adverse to a low extent.

At maturity: Screening vegetation both in and out of the site will have matured to hide and soften much of the proposed development. The housing in-particular will feel integrated into Drogheda. In the northwestern corner of the site, the lower storeys of two of the three apartment blocks will be screened by proposed woodland. Views will remain open towards the highest block due to site restrictions – in particular, the presence of the Bronze Age archaeology. This block accommodates a very small proportion of the overall view and is behind existing motorway infrastructure. However, the highest apartment block will remain to be an eye-catching intervention in the view at variance with other structures currently present. As such it the effect of the development on this view is assessed as adverse to a low extent.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint K	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Low*	*Low*	*Low*
Significance of Effects	*Moderate-Slight*	*Moderate-Slight*	*Moderate-Slight*
Qualitative Assessment	*Adverse*	*Adverse*	*Adverse*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.13 Visual impact assessment for Viewpoint K

View L: **View south from Rathmullan Road / River Boyne pedestrian walk**

Rationale for selection: Representative of the view experienced by users of the public footpath and road.

Location of the view: 15m N of the site boundary

Description of viewpoint: Junction of the River Boyne walkway and the Rathmullan Road offering oblique views up the Rathmullan Road south and across the wooded banks of the site's north-western boundary. The view is moderately scenic and is focused on the landscape of the Boyne Valley. It is viewed by people walking, cycling, running or travelling by car. There is an area of unmade surface between the road and the pathway leading to a poured concrete section.

Visual Receptor Sensitivity Rating: High

The Existing view

Description of the existing view: Perpendicular view to the river walkway. To the left of the road, the grassy verges wide towards the river giving way to a roadside ditch and predominantly deciduous scrub and woodland. To the right of the road, lie the subject lands. The dense scrub visible in the foreground leads to deciduous woodland (which contains some non-native species such as Lime and Beech). The mature trees enclose the views around the road.

Visual Effects and Magnitude of Change:

During construction: The works will affect valued features such as the mature trees located in a group in the middle distance of the view. The loss of the trees will open up views into the development site providing more open views into the site. The reshaping of the banks will result in the loss of vegetation in the foreground. Collectively, the loss of this vegetation would result in the perception of a far less established and mature landscape. The works are oblique to the main focus of the view (which is likely to be the River Boyne itself) and its wider context but will have an impact on the composition of the view from this point – and its vegetated character. As such the visual effects are assessed to be adverse to a medium extent.

At operation: New trees will have been planted / self-seeded along the verge and woodland ground flora would have become established. The road will be wider and the footpath would be visible with associated lighting. The woodland would still look very thin at this stage and views through the woodland towards the proposed development would be readily available significantly altering the character of the view from this point. As such, the visual effects are assessed to be adverse to a low extent.

At maturity: The planting along the Rathmullan Road would have become established. Trees will still lack the maturity of the existing woodland however it will be denser and the ground flora and shrub layers will be well-established. The extent of the woodland will look dense in places with more trees located closer to the Rathmullan Road. The overall effect will have re-crated the existing characteristics of the view. Therefore the overall magnitude of change is low and neutral.
The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint K	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Medium*	*Low*	*Low*
Significance of Effects	*Significant*	*Moderate-Slight*	*Moderate-Slight*
Qualitative Assessment	*Adverse*	*Adverse*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.14 Visual impact assessment for Viewpoint K

***View M:* View south from road bridge on Hill of Rath Road**

Location of the view: 1917m north of the site boundary

Rationale for selection: Representative of views experienced by road users

Description of viewpoint: Road bridge across the M1 motorway with limited provision for pedestrians in an otherwise rural / peri-rural rural setting.

Visual Receptor Sensitivity Rating: Low

The Existing View

Description of the existing view: The view south from this viewpoint is broken by the safety barriers in the foreground but is otherwise extensive and varied and heavily dominated by the M1 motorway, its verges, infrastructure, lighting and signage. Other notable elements include the Mary McAleese Bridge and the Platin Cement Factory. It is possible to see the two farm buildings located on the subject lands from here. These features sit within a landscape which is predominantly agricultural or wooded and is characterised by the gentle and elongated undulations of the fields and the criss-crossing of hedgerows that in some places contains some maturing hedgerow trees. The subject lands occupy a small proportion of the view in the middle distance. Some disruption to the view towards the development site is provided by motorway lighting and planting in the foreground.

Visual Effects and Magnitude of Change:

During construction: It may be possible to identify site works and plant during construction. The most noticeable change will be the replacement of the green fields for a working site. The change will accommodate a part of the view in the middle distance and will introduce a new element into a moderate proportion of the backdrop to this view. This will happen in 5 phases. As such the effect has been assessed as adverse to a medium extent.

At operation: The development will be visible accommodating a moderate proportion of this view. It would extend existing multi-home residential land-uses west to the edge of the motorway. The change will not affect the character of the wider landscape and is located well beneath the horizon. It responds to the existing scale and pattern of existing field patterns and landscape elements. However, it will diminish the sense of rurality experienced here, which has already been significantly affected by the M1 motorway. As such, the magnitude of change has been assessed as medium with a qualitative assessment of neutral.

At maturity: The extent of the development visible from this viewpoint will be softened by the significant tree planting located to the north and the west of the subject lands and within the development itself. It is also likely that the residential development with approval to the west of the subject lands would have also been built up and therefore this site would be perceived as the western

extent of Drogheda town. As such, the magnitude of change has been assessed as being low with a qualitative assessment of neutral.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint M	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Medium*	*Medium*	*Low*
Significance of Effects	*Slight*	*Slight*	*Not significant*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.15 Visual impact assessment for Viewpoint M

***View N:* View south from the Mary McAleese Bridge**

Location of the view: 515m north of the site boundary

Rationale for selection: Elevated public road close to Mary McAleese Bridge providing a gateway experience for users

Description of viewpoint: The Mary McAleese Bridge was completed in 2003 to cross the Boyne Valley. It is a cable-stayed bridge and emphasises the transition between Counties Meath and Louth. The bridge takes people at elevation across the Boyne valley, the experience of which encourages users to look around them and take in their surroundings. The design of the bridge, with its low-level safety barriers and angular cables further invites this. This is a unique bridge over a unique landscape. However, there are several detractors present in the view such as the existing wall of housing along the Rathmullan Ridge and the motorway infrastructure. The users of the bridge experience this landscape at high speeds and many will be focussed on the act of driving as a principle activity.

NB. Due to the bridge not being accessible to pedestrians, this assessment was informed by travelling by car across the bridge and CGIs prepared by Chris Shackleton Consulting.

Visual Receptor Sensitivity Rating: Medium

The existing view

Description of the existing view: This view is seen fleetingly, but by many people throughout the day. In the foreground can be seen the bridge deck/road and then the safety barriers which allow only partial glimpses of the landscape beyond, from most vehicles. Beyond the barrier where there are gaps the eye is drawn south east across the Boyne River as it widens around Yellow Island, the wooded valley sides to the south and the urban fringe of Drogheda which comprises housing, fields, woodlands, and hedgerows. The subject lands, including the woodland along the northern boundary accommodate a stretch of the view in the middle to far distance of the view just shy of the horizon. The view towards the lands is at a low angle. However, the view is highly constrained by the safety barriers on the motorway itself and the speed of vehicles making it difficult to appreciate.

Visual Effects and Magnitude of Change:

During construction: Partial views of the construction works will be visible from this viewpoint although these will be phased. Some of the construction works will be screened by existing infrastructure and vegetation. It is expected to see urban extension on the edges of towns and will not affect the principle elements of the view which is Boyne River and its valley-sides. However, the construction works will draw attention to the changes described. Therefore, the visual effects have been assessed as adverse to a low extent.

At operation: The north-western edge of the development will be partly visible from this viewpoint. It will accommodate a moderate section of the view and will be perceived as part of the urban edge of

Drogheda. The angle of the view from this viewpoint is very low and therefore development on the NW section of the site screens what lies to the south of it. The addition of housing into this view towards Drogheda's western edge is characteristic of the setting. The proposed character and structure of the development has been designed to complement the landform and create a strong urban character – that in future will be much softened by proposed vegetation – however, immediately at operation where visible, there will be a change from green field to developed lands, however this will only be partly perceivable from the bridge and present an interesting addition to the extended urban landscape. As such, the visual effects are impacts to be neutral and to a low extent.

At maturity: The planted bund and woodland planting in the northern parklands will soften and screen parts of the buildings visible at operation. Rooftops, upper storeys of apartments and occasional glimpses through and over the trees will still be possible. The development will look to be well connected to the wider landscape through the strong green infrastructure proposed. The mature development may screen some views towards existing visual detractors further east. As such, the landscape effects are impacts to be neutral and to a low extent.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint N	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Low*	*Low*	*Low*
Significance of Effects	*Slight*	*Slight*	*Slight*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.16 Visual impact assessment for Viewpoint N

***View P:* View south from The Square (south)**

Location of the view: 119m east of the site boundary

Rationale for selection: Close proximity view from a residential receptor

Description of viewpoint: View west along The Square, a cul-de-sac within the Riverbank Estate, Drogheda. The Square has three-storey duplexes on its northern side which is not mirrored by development on the south side at the cul-de-sac end.

Visual Receptor Sensitivity Rating: Medium from the street (P1) and High from overlooking homes (P2)

Existing Views

Description of the existing view: This view is aligned with the proposed development which would be visible at the end of the street. Almost all houses look directly onto others on the street. Towards the end of the street, there is an elevated view over a local green which takes in the wooded verges of the Rathmullan Road and the rising NE slope of the site towards the plateau of northernmost field and the existing farm buildings on the Rathmullan Road. The hedgerow between the middle and northern-most field within the site boundary forms part of the horizon.

Visual Effects and Magnitude of Change:

During construction: The view would change to include the removal of trees along the Rathmullan Road and the construction of housing in Phase 1 and the apartments in phase 5. The change would be a partial intrusion of the view and would include the site works, movement and plant associated with this stage of the build. The effect on the view as shown would therefore be adverse to a medium extent.

The houses directly overlooking the site would have more extensive views over the building of the new crossroads at Rathmullan Road / Sheephouse Road, the housing in the northeast of the site and the works to Boyne Valley Park. The works would be a partial intrusion into the view and would change the visual amenity and the character of this outlook adversely in the short-term to a medium extent. Once these stages are complete, the buildings will screen much of the works associated with the later phases of construction although some tall site plant may be visible above rooftops. The effect on the view directly overlooking the development would be adverse to a medium extent.

At operation: The proposed development accommodates a moderate proportion of the existing view. The development would be visible at close proximity / urban distance at the end of the street – extending the existing character of the street, in its broadest sense, as urban form. Although in keeping with the character of the viewpoint itself, the existing view towards countryside would be lost. The proposed development is well-designed so although it is materially different, compliments the existing characteristics of street – and so has been assessed qualitatively as neutral to a medium extent.

Where the houses directly overlook the site, the development would be visible in the right-hand side of the view where there are currently green fields. A wide strip of landscape comprising the NE slope of the subject lands and the fields to the south of the Riverbank Estate would be retained. The proposed development would be prominent but partial intrusion into the view. As such, the development would have an adverse impact to a medium extent.

At maturity: The vegetation within Boyne Valley Park and along the proposed street will have grown to screen and soften some of the views towards the new development. The visual effect has been assessed as neutral to a medium extent.

Where houses directly overlook the site, the partial but prominent views towards the development would be softened and screened by the proposed new tree planting within the NE parklands and the further maturing of existing vegetation on and off the subject lands resulting in a neutral impact of a medium extent.

The visual impact assessment for this viewpoint is presented in the table below. For ease of reference two assessments have been provided or this viewpoint to cover off the expected effect on the street in general, and then from the houses at the western end of the street that directly overlook the site.

Viewpoint P (1) - as shown	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Medium*	*Medium*	*Medium*
Significance of Effects	*Moderate*	*Moderate*	*Moderate*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.17 Visual impact assessment for Viewpoint P as shown

Viewpoint P (2) – houses overlooking the site	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Medium*	*Medium*	*Medium*
Significance of Effects	*Significant*	*Significant*	*Significant*
Qualitative Assessment	*Adverse*	*Adverse*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.18 Visual impact assessment for Viewpoint P houses overlooking the site

Existing View R: **View west from Rathmullan Road**

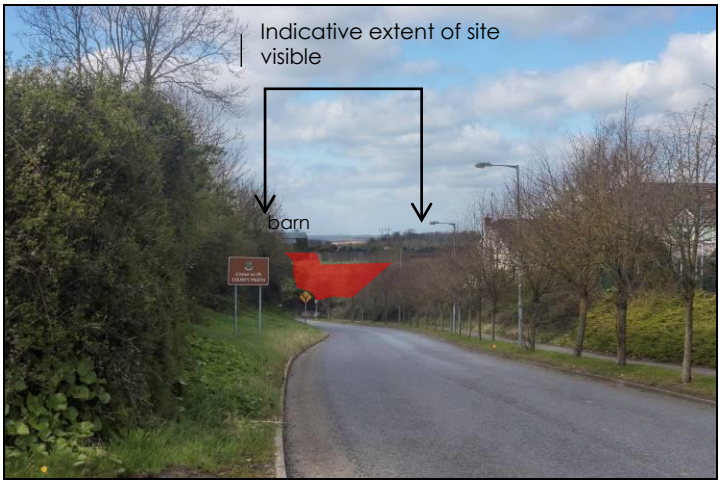
Location of the view: 95m west of the site boundary

Rationale for selection: View experienced when approaching the site from Drogheda

Description of viewpoint: Link road with off-road pedestrian path on its northern side. View offered towards the site is moderately scenic although most people using the route would be using the route for other purposes than to look at the view.

Visual Receptor Sensitivity Rating: Medium

Existing View



Description of the existing view: From the road, a small proportion of the eastern slopes of the site, the existing farm buildings located on the Rathmullan Road and existing boundary vegetation is visible over and through the semi-mature trees planted either side of this section of road. Views towards the site transition into views of the broader, predominantly rural landscape west. It is likely that existing vegetation would further screen views towards the site and beyond from the adjacent pedestrian footway.

Visual Effects and Magnitude of Change:

During construction: The construction of the proposed entrance crossroads and phase 1 of the development would be visible in the middle distance breaking the horizon where it is visible through the trees. This intrusion, while very discernible, accommodates a small proportion of the view. Urban extension is expected on the edge of towns in the current climate and therefore is not uncharacteristic of the area. The works would create a partial intrusion into the view which would change the visual amenity and the character of this outlook adversely in the short-term to a low extent. Once these stages are complete, the existing trees and proposed buildings will screen much of the works associated with the later phases of construction.

At operation: This view would include limited numbers of new houses and associated landscape works and boundary treatments located along the eastern edge of the site and along the proposed entrance road. The junction of the proposed entrance road is lifted in elevation in comparison to the existing road levels. The character of the view would become more urban in character (as per the zoning of the lands). The proposed street has been skilfully considered to create a sense of continuation in the view which draws upon the borrowed landscape to create character in the same way that currently exists although to a lesser extent. As such the visual effect is assessed as adverse and to a neutral extent.
At maturity: Proposed vegetation and tree planting along the proposed access road and within the parks to the east and within the site will have matured to soften this view and diminish the impact of the buildings, better mimicking the vegetated edges and roadsides currently experienced locally (than at operation). As such the visual effect is assessed as neutral and to a low extent.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint R	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Low*	*Low*	*Low*
Significance of Effects	*Slight*	*Slight*	*Slight*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.19 Visual impact assessment for Viewpoint R

***View W:* View SW from Tullybrook**

Location of the view: 550m NNE of the site boundary

Rationale for selection: Representative of direct views from front elevations from residential receptors.

Description of viewpoint: The viewpoint is located on publicly accessible land on the access roads

Visual Receptor Sensitivity Rating: High

Existing View

Description of the existing view: The view south is far-reaching and has panoramic views over the Boyne Valley and the generally rural landscape beyond. The subject lands are visible in the middle distance, sloping towards the receptor at an oblique and low angle and visible from the street and residential frontages over the street and through the temporary fencing (which is planned for removal – given the nature of the approved residential site immediately south). Views towards the site are softened and partly screened by the mature woodland along the Boyne Valley, which is part of the site. The rising land towards Donore and beyond forms the horizon of this view.

Visual Effects and Magnitude of Change:

During construction: It will be possible to identify the site works, plant and buildings under construction. The site, in its totality accommodates a moderate proportion of the view, however, the construction works will happen in phases, at distance of over half a kilometre away. Phases built early on will screen works to the south and site works will not occur across the whole of the subject lands at any one time. As such, the impact of the changes occurring in this view during construction are expected to be adverse and to a low extent.

At operation: The northern and north-western sections of the development will be the most visible part of the development from this viewpoint over the canopies of the existing trees. The proposed development will alter a moderate proportion of the view but the horizon formed of the rising lands towards Donore remains generally intact. This is important because it allows the landscape to swallow up the development to a greater extent and creates the sense that it complements the existing landscape scale and pattern. The development will introduce a new residential element into the view, which although is characteristic of the wider landscape and townscape, is not currently evident in existing views from this viewpoint, which are predominantly rural. However, these lands are zoned for housing and the proposal put forward has a strong urban structure and has been designed to reduce visual impact. Generally, it is in keeping with new developments locally although the scale, massing and materiality of the proposed apartments introduces variance. Generally, the change will not affect the overall visual amenity from this viewpoint – in that extensive views will still be available, but the composition of the view will change in parts. Until the proposed woodland becomes established, this change will contrast with the existing landscape qualities more starkly than expected at maturity. As such, the development would have an adverse impact to a medium extent.

At maturity: The proposed woodland along the northern edges of the site will have a significant positive impact on this development and the extent to which it compliments and knits into the surrounding landscape character. The result will be perceived a well-designed extension to Drogheda's urban edge that allows overall visual amenity to be retained from this viewpoint. As such, the development would have a neutral impact to a medium extent.

The visual impact assessment for this viewpoint is presented in the table below.

Viewpoint W	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Medium*	*Medium*	*Medium*
Significance of Effects	*Significant*	*Significant*	*Significant*
Qualitative Assessment	*Adverse*	*Adverse*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.20 Visual impact assessment for Viewpoint W

***View X:* View south from N51 at Mell**

Location of the view: 1227m N NE of the site boundary

Rationale for selection: Protected Viewpoint 29 (LCC)

Description of viewpoint: This viewpoint is located in a layby on the N51 between the Mell runabout at junction 10 of the M1 and the M1 retail park. The viewpoint has no public paths leading to it.

Visual Receptor Sensitivity Rating: High

Existing View

Description of the existing view: The existing view looks out over the Boyne valley and the rising land to the south. The key feature of the view noted in Policy is the ravine which was the route of the Williamite army from their camp at Tullyallen Hill to cross the Boyne river. This historical feature is visible in the fore to middle ground. The wider landscape forms a backdrop to this view within which it is possible to see the Riverside Estate in Drogheda. The Platin Cement Works, the Mary McAleese Bridge and the M1 motorway lighting are visible and all break the horizon of this view. The subject lands are visible over the tree canopies of the mature woodland of the Boyne Valley accommodating a small proportion of the existing view immediately to the left of the Mary McAleese Bridge. Approximately a third of the subject lands visible includes the existing woodland located on the site.

Visual Effects and Magnitude of Change:

During construction: it will be possible to see the changes to the subject lands, the construction of the proposed neighbourhoods and site plant over the top of and through existing vegetation. The works will extend over the 3 fields in the backdrop of this view and will occur over 5 phases. The construction of phase one of the development will screen much of the later phases of construction – except for phase 5 and other tall site plant. The changes in the view relate to a minor intrusion of an element that is to be expected on the edge of town and is not uncharacteristic of the wider landscape. Changes will not detract from the key focus of the protected viewpoint and will not change the overall character or level of visual amenity afforded from this viewpoint. As such, the impact of the changes occurring in this view during construction are expected to be adverse and to a low extent.

At operation: the developed lands will be visible in the backdrop of the view over and through existing vegetation. The development will not break the horizon and will be perceived as an extension to Drogheda's urban edge – continuing – albeit at a different angle, the line of buildings already created by the Riverside Estate. Changes will not detract from the key focus of the protected viewpoint and will not change the overall character or level of visual amenity afforded from this viewpoint. As such, the impact of the changes occurring in this view during the operational phase is expected to be neutral and to a low extent.

At maturity, the view described above will be much softened and screened by proposed woodland planting to the north of the building line. It may still be possible to see homes through the proposed trees, but views will be fragmented and broken by the proposed landscape features. As such, the impact of the changes occurring in this view at maturity are expected to be neutral and to a low extent.

The visual impact assessment for this viewpoint is presented in the table overleaf.

Viewpoint X	**PROJECT STAGE**		
ASSESSMENT	During Construction	At Operation	At Maturity
Magnitude of Change	*Low*	*Low*	*Low*
Significance of Effects	*Moderate-Slight*	*Moderate-Slight*	*Moderate-Slight*
Qualitative Assessment	*Adverse*	*Neutral*	*Neutral*
Longevity Assessment	*Short-term*	*Medium*	*Permanent*

Table 12.21 Visual impact assessment for Viewpoint X

12.7.5 Summary of Visual Impacts

Viewpoint details	Project Stage	Magnitude of Change	Significance of Effects	Qualitative Assessment	Longevity Assessment
A *– from Sheephouse Road 30m SW Medium sensitivity*	**During Construction**	Low	Slight	Adverse	Short-term
	At Operation	Low	Slight	Neutral	Medium-term
	At Maturity	Low	Slight	Beneficial	Permanent
B *– from Sheephouse Road 335m SW Medium sensitivity*	**During Construction**	Low	Slight	Adverse	Short-term
	At Operation	Low	Slight	Neutral	Medium-term
	At Maturity	Low	Slight	Neutral	Permanent
D *– from Donore Cemetery 800m SW High sensitivity*	**During Construction**	Low	Moderate-Slight	Adverse	Short-term
	At Operation	Low	Moderate-Slight	Neutral	Medium-term
	At Maturity	Low	Moderate-Slight	Neutral	Permanent
E *- from Battle of the Boyne viewpoint, Oldbridge 835m SW High sensitivity*	**During Construction**	Low	Moderate-Slight	Adverse	Short-term
	At Operation	Low	Moderate-Slight	Neutral	Medium-term
	At Maturity	Negligible	Slight-Not Significant	Neutral	Permanent
I *- from Oldbridge House 1890m NW High sensitivity*	**During Construction**	Negligible	Slight-Not Significant	Neutral	Short-term
	At Operation	Negligible	Slight-Not Significant	Neutral	Medium-term
	At Maturity	Negligible	Slight-Not Significant	Neutral	Permanent
K *- from Drybridge House 730m NW High sensitivity*	**During Construction**	Low	Moderate-Slight	Adverse	Short-term
	At Operation	Low	Moderate-Slight	Adverse	Medium-term
	At Maturity	Low	Moderate-Slight	Adverse	Permanent
L *– south From the Rathmullan Rd / Boyne River walkway 15m N High sensitivity*	**During Construction**	Medium	**Significant**	Adverse	Short-term
	At Operation	Low	Moderate-Slight	Adverse	Medium-term
	At Maturity	Low	Slight	Neutral	Permanent
M *- from road bridge on Hill of*	**During Construction**	Medium	Slight	Adverse	Short-term

Rath Road 1917m N Low sensitivity	**At Operation**	Medium	Slight	Neutral	Medium-term
	At Maturity	Low	Not significant	Neutral	Permanent
***N** – south from the M1 motorway 515m N Medium sensitivity*	**During Construction**	Low	Slight	Adverse	Short-term
	At Operation	Low	Slight	Adverse	Medium-term
	At Maturity	Low	Slight	Neutral	Permanent
***P1** - from The Square (south) 119m E Medium sensitivity*	**During Construction**	Medium	Moderate	Adverse	Short-term
	At Operation	Medium	Moderate	Neutral	Medium-term
	At Maturity	Medium	Moderate	Neutral	Permanent
***P2** - from The Square (south) 35m NE High sensitivity*	**During Construction**	Medium	**Significant**	Adverse	Short-term
	At Operation	Medium	**Significant**	Adverse	Medium-term
	At Maturity	Medium	Significant	Neutral	Permanent
***R** - from Rathmullan Road 95m E Medium sensitivity*	**During Construction**	Low	Slight	Adverse	Short-term
	At Operation	Low	Slight	Neutral	Medium-term
	At Maturity	Medium	Slight	Neutral	Permanent
***W** - from Tullybrook 550m NE High sensitivity*	**During Construction**	Medium	Significant	Adverse	Short-term
	At Operation	Medium	Significant	Adverse	Medium-term
	At Maturity	Medium	Significant	Neutral	Permanent
***X** - from N51 at Mell 1227m N High sensitivity*	**During Construction**	Low	Moderate-Slight	Adverse	Short-term
	At Operation	Low	Moderate-Slight	Neutral	Medium-term
	At Maturity	Low	Moderate-Slight	Neutral	Permanent

12.8 Potential Cumulative Impacts

The proposed development is part of the wider expansion of Drogheda town in this area. For some views this will mean further development occurring adjacent to the proposed development expanding the urban area further towards the M1. Cumulatively this is transformative of the local high quality rural landscape but is also in accordance with local policy. New development needs to seek to maintain Green Infrastructure networks, landscape structure – trees and woods – and a consistent materiality, particularly to ensure landscape capacity and the protection of views from designated locations/routes.

12.9 'Do Nothing' Impact

The land is zoned for development. In the absence of development, agricultural uses will continue however given the proximity to the town centre, anti-social issues such as fly-tipping will be exacerbated, buildings will become increasingly derelict and the lands become increasingly unkempt.

12.10 Avoidance, Remedial & Mitigation Measures

12.10.1 Construction Phase

The remedial measures proposed revolve around the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is

kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

Existing trees and woodlands to be retained and are shown in the CSR Design Statement and Arboricultural Reports. Existing trees to be retained are particularly sensitive to negative impacts during the construction phase if proper protection measures are not adhered to. With regard to the protection of the retained trees on site during proposed construction works, reference should be made to BS5837: Trees in relation Design, Demolition and Construction – Recommendations (BSI, 2012). Tree protection details will be included with the application to the Board.

Adverse impacts both during construction and at operation phases could be mitigated through undertaking the following site works early on in the construction process in order to soften and screen views as early on as possible.

- Constructing (using fill) and planting up the 4m high bund along the western edge of the site.
- In areas not subject to construction works – the Boyne River Park, along the Rathmullan Road and the western edge of the site, advance planting can take place to build landscape capacity and establish and mature during development and ahead of occupation.
- Construction the proposed mounding and planting the woodlands and trees in the Boyne Valley parkland.
- Where feasible and sensible, planting larger sized specimen trees (c 18-20 girth) around the perimeter of the site.

Reducing the footprint of all construction works wherever feasible and ensuring the remainder of the land is retained as green field will also limit any adverse effects during the construction phase

12.10.2 Operational Phase

The mitigation measures that have been adopted in the proposed scheme are as follows:-

- The retention of much of the existing woodland to the north, north-east and west of the site.
- The architectural layout aims to address visual impacts by proposing variety in scale and massing of buildings and by their design and materiality. The layout adopted early advice to stagger building lines particularly along the northern and western edges of the site and to design in green fingers, planted with woodland, that would knit the development into the surrounding landscape.
- The design process has involved detailed exploration of the placement, height and materiality of the apartment blocks to the NW of the development to achieve a visual effect that recedes.
- The extensive planting of additional trees and shrubs throughout the site where possible will reduce the visual mass of the buildings, soften and partially screen the development over time from various viewpoints, as identified in the assessment, thereby minimising the visual impacts.
- Native and appropriate planting for biodiversity and the provision of woodland to be naturally regenerated from the existing woodland stock has been incorporated into the scheme following the advice of the Project Ecologist.
- Public open spaces have been designed as part of an overall design strategy that focuses on creating a ‘sense of place’ and individual character for the development area.
- The introduction of a ‘Green Streets’ approach includes for a sufficient quantum of street trees, swales and planting that form a sufficient barrier between pedestrians and traffic. This approach will also focus the creation of vegetative buffers for privacy and shading to adjoining residences, and for more distant viewers the creation of a green landscape structure within which the development nestles.
- The project has facilitated the creation of meaningful public open spaces that adheres to the criteria outlined in The Meath County Development Plan 2013-2019.

- Public open spaces form part of a network of spaces that includes areas for passive and active recreation, social / community interaction and play facilities catering for all ages.
- Application of best practice horticultural methods to ensure that mitigation measures establish and grow appropriately.

During construction there will be a change to the landscape and there will be negative visual impacts for residents and visitors to the areas adjacent to the site associated with construction activity.

The scheme design incorporates significant consideration and mitigation in respect of potential impacts. The quality of the public realm scheme is of a high standard and the quality of materials proposed is similarly high and robust.

Landscape works are proposed to reduce and offset any impacts generated due to the proposed development, where possible. The planting of substantial numbers of new trees and other planting in the open spaces the site boundaries and internal roads, both native and ornamental varieties, will enhance the overall appearance of the new development and compensate for the removal of hedgerows and trees where needed for the construction works and increase the overall landscape capacity of the site to accommodate development.

12.11 Monitoring

12.11.1 Construction Phase

Landscape tender drawings and specifications will be produced to ensure that the landscape work is implemented in accordance with best practice. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect.

The planting works will be undertaken in the next available planting season after completion of the main civil engineering and building work.

12.11.2 Operational Phase

This will consist of weed control, replacement planting, pruning etc. All landscape works will be in an establishment phase for the initial three years from planting. The company responsible for site management of the scheme will be responsible for the ongoing maintenance of the site after this three-year period is complete.

12.12 Reinstatement

The proposed landscape development works in the form of tree and shrub planting will be used to re-instate the site, post-construction. These works will be carried out by an appointed landscape contractor and will be supervised by a suitably qualified landscape architect or manager.

12.13 Difficulties Encountered in Compiling

Representing view N from the M1 motorway was not possible using traditional access for health and safety reasons. The view was represented using digital modelling instead.

12.14 Conclusion

This LVIA has assessed the impact of the proposed residential development at the application site on the Rathmullan Road, Drogheda, County Meath. The subject lands are zoned for housing and the proposed application meets that need. A high-quality proposal has been submitted that adheres to local planning policy and has been developed with the aim of the provision of an excellent place to live. The design process has incorporated into it a number of mitigative measures (see section 12.10) that have contributed towards the positive conclusions reached within the assessments included in Sections 12.6 and 12.7.

The predicted landscape effects on both Meath County Council's Landscape Character Area 7 ("Coastal Plain") and the subject lands themselves have been assessed as 'Neutral' both at Operation and Maturity. See Section 12.6.5 for a summary table of the predicted landscape effects.

Visual effects on the 13 no. views identified for assessment led to the following conclusions:

- The development will not be visible from inside the World Heritage Site Boundary.
- 5 no. viewpoints assessed were located within the World Heritage Site Buffer Zone. All of these five viewpoints are expected to receive a predicted Neutral effect at maturity.
- No significant adverse effects are predicted when the proposal is at maturity.

The proposed development is in keeping with its zoning status and the emerging trends of development proposed in the vicinity.

See Section 12.7.5 for a summary table of the predicted landscape effects.

CHAPTER 13.0 INTERACTIONS BETWEEN ENVIRONMENTAL FACTORS

13.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants in association with the various EIAR consultants. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, and Ms. Margaret Commane, Senior Planner, with Hughes Planning and Development Consultants.

Mr. Kevin Hughes of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Regional and Urban Planning (MRUP) in 2002, having previously completed a Bachelor of Arts Degree in Sociology from National University of Ireland in 1999. Kevin has over 18 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Kevin is currently the Director of Hughes Planning and Development Consultants.

Ms. Margaret Commane of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2012, having previously completed a Bachelor of Arts Degree in Geography and Legal Science from National University of Ireland in 2010. Margaret has over 7 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Margaret is currently a Senior Planner in the Practice of Hughes Planning and Development Consultants.

The preceding Chapters 4.0 to 12.0 of this EIAR identify the potential environmental impacts that may have occur as a result of the proposed development in terms of Population and Human Health; Biodiversity; Soils, Geology and Hydrogeology; Water; Noise and Vibration; Air Quality and Climate; Material Assets; Archaeology, Architectural and Cultural Heritage; Landscape and Visual Amenity. All of the potential significant effects of the proposed development and the measures proposed to mitigate them have been outlined in the preceding chapters of this report. However, for any development with the potential for significant environmental effects there is also the potential for interaction amongst these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them, or have a neutral effect. The purpose of this chapter is to identify and draw attention to interactions and interdependencies between the various chapters of this EIAR and associated topic specific assessments.

As previously stated, the scoping process of this EIAR occurred concurrently with the masterplanning process. As members of the design team contributed to this EIAR, detailed elements of the scheme evolved. The relevant consultants liaised with each other and the project architects, engineers and landscape architects where necessary to review the proposed scheme and incorporate suitable mitigation measures where necessary. For example, the archaeological assessment informed the open space provision and the landscaping type in the north-western corner of the site, the noise assessment resulted in the inclusion of bunds in the landscaping area adjacent to the western boundary, while following a road safety audit alterations were made to the road layout. Most of the interactions informed the design approach undertaken by the project architect in the first instance and were considered to be design considerations and site constraints.

13.2 Impact Definitions

Section 3.7.7 of the *Draft Guidelines on the Information to be Contained in Environmental Impact Statements* published by the EPA provides guidance on how to measure and define potential impacts on the environment. The following assessment criteria have been used to assess significant interactions:

Impact Definition	**Impact Definition**
Neutral	An interaction which does not affect the environment
Positive	An interaction which improves the quality of the environment
Negative	An interaction which reduces the quality of the environment
Significance	**Definition**
Imperceptible	*Capable of measurement but without noticeable consequences*
Not Significant	*Causes noticeable changes in the character of the environment but without noticeable consequence*
Slight	*Causes noticeable changes in the character of the environment without affecting sensitivity*
Moderate	*Alters character of environment consistent with existing and emerging trends*
Significant	*By its character, magnitude and duration or intensity alters a sensitive aspect of the environments*
Profound	*Obliterates sensitive characteristics*

Table 13.1 Assessment criteria utilised in assessing the significance of interactions

13.3 Summary of Principal Interactions

The following tables highlight the interactions that occur between topics addressed by this EIAR and rate the outcome of those interactions employing the above criteria.

Subject Interaction	**Interaction With**	**Interactions/Inter-Relationships**	**Impact *Significance***
Population & Human Health	Air Quality & Climate	Construction vehicles, generators etc., may give rise to some CO2 and N2O emissions. However, due to the short-term and temporary nature of these works the impact on climate will not be significant.	Neutral *Slight*
Population & Human Health	Biodiversity	There is potential for disturbance to breeding birds to occur during initial construction stages. Site clearance will take place outside of the breeding season (March 31st to September 1st) to avoid direct injury and disturbance to breeding birds.	Neutral *Not Significant*
Air Quality & Climate	Population & Human Health	An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The dust mitigation measures that will be put in place will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and neutral with respect to human beings.	Neutral *Not Significant*

Population & Human Health	Biodiversity	There is potential for disturbance to breeding birds to occur during initial construction stages. Site clearance will take place outside of the breeding season (March 31st to September 1st) to avoid direct injury and disturbance to breeding birds.	Neutral *Not Significant*
Air Quality & Climate	Population & Human Health	An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The dust mitigation measures that will be put in place will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and neutral with respect to human beings.	Neutral *Not Significant*
Air Quality & Climate	Soils, Geology & Hydrogeology	Exposed soil during the construction phase of the proposed development may give rise to increased dust emissions. However, the implementation of the dust management and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust.	Neutral *Not Significant*
Air Quality & Climate	Material Assets – Traffic & Transport	Traffic volumes have been provided by the traffic consultant to allow the air quality and climate impact of additional traffic on the local road network to be assessed. It has been concluded that the increased vehicular traffic as a result of the development will result in an imperceptible air quality and climate impact.	Neutral *Slight*
Air Quality	Biodiversity	The construction and operation of the proposed development will lead to emissions to the atmosphere which have the potential to impact on sensitive flora and fauna, in particular with respect to the Boyne River Islands pNHA, River Boyne and River Blackwater SPA and River Boyne and River Blackwater SAC. However, the effect of these emissions is predicted to be imperceptible for both the construction and operational phases. The implementation of the dust management plan will minimise dust emissions which could impact on flora and fauna. In the operational phase, impacts meet the criteria set down for ecologically sensitive sites and therefore the interactions between air quality flora and fauna are imperceptible and not significant for both the construction and operational phases.	Neutral *Not Significant*
Noise & Vibration	Material Assets – Traffic & Transport	Traffic volumes have been provided by the traffic consultant to allow the noise impact of additional traffic on the local road network to be assessed. It has been concluded that the increased vehicular traffic as a result of the development will result in an imperceptible noise impact.	Neutral *Slight*
Noise & Vibration	Population & Health	The site layout, floor plan and elevation drawings have been used in the assessment of inward noise impact on the development. It has been concluded that some of the development buildings require enhanced sound insulation of the building envelope	Neutral *Not Significant*

		in order to ensure good internal noise levels are achieved. Mitigation measures are presented in Chapter 8.0 to minimise the risk of any such issues	
Noise & Vibration	Population & Human Health	The proposed development has the potential to create noise and some vibration, which could give rise to nuisance for occupants of nearby dwellings. Mitigation measures are presented in Chapter 8.0 to minimise the risk of any such issues.	Neutral *Not Significant*
Noise & Vibration	Biodiversity	Site activity during the construction of the proposed development has the potential to give rise to noise and some vibration that could disturb fauna. This will occur only during the construction phases which will be temporary.	Neutral *Not Significant*
Material Assets – Waste Management	Soils, Geology & Hydrogeology	During the construction phase excavated soil and stone will be generated from the excavations required to facilitate construction of new building foundations, roads, the installation of underground services and attenuation tank. It is envisaged that all excavated material will remain onsite. If any excavated material has to be removed from site it will be taken for reuse or recovery, where practical, with disposal as last resort. Adherence to the mitigation measures in Chapter 14.0 and the requirements of the Construction & Demolition Waste Management Plan (included as Appendix 10.1), will ensure the effect is long-term, imperceptible and neutral.	Neutral *Not Significant*
Material Assets – Waste Management	Material Assets - Traffic & Transportation	Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the development. The increase in vehicle movements as a result of waste generated during the construction phase will be temporary in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase and has been addressed in the Traffic and Transportation Section of Chapter 10.0. Provided the mitigation measures detailed in Chapter 14 and 10.0 and the requirements of the Operational Waste Management Plan (included as Appendix 10.2) are adhered to, the effects should be short to long-term, imperceptible and neutral.	Neutral *Not Significant*
Material Assets – Waste Management	Population and Health	The potential impacts on human beings in relation to the generation of waste during the construction and operational phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific Construction & Demolition Waste Management Plan and Operational Waste Management Plan, will ensure appropriate management of waste and	Neutral *Not Significant*

		avoid any negative impacts on the local population.	
Water	Soil, Geology and Hydrogeology	During construction stage, the connection of wastewater services has the potential to impact the local surface water from a hydrology and hydrogeology perspective. During the operation stage, the water supply and foul drainage services have the potential to pollute natural water bodies.	Neutral *Not Significant*
Water	Population and Health	There are potential implications for the local populations if there are disruption to utility services during the connection of the new services to the proposed development. disrupt the existing services. During the operation stage, the water supply and foul drainage services have a potential interaction with the available water supply.	Neutral *Not Significant*
Water	Material Assets -Traffic & Transportation	The construction of the various services will also interact with construction traffic as outlined in the Traffic and Transport Chapter.	Neutral *Not Significant*
Water	Biodiversity	Site activities have the potential to give rise to some water pollution (although this is limited), and consequential impacts on flora and fauna that rely on or use that water within the same catchment. These potential impacts have been assessed, and the relevant measures will be in place to avoid any water pollution and subsequent effect on flora and fauna.	Neutral *Not Significant*
Material Assets -Traffic & Transportation	Population & Health	There may be temporary negative impacts to Human Health during the Construction Phase caused by noise, dust, air quality and visual impacts which are covered in other chapters of this EIAR. The effects of these will be mitigated through the implementation of the measures outlined within the Preliminary Construction Management Plan.	Neutral *Not Significant*
Material Assets -Traffic & Transportation	Water	There may also be interaction with the surrounding water bodies through surface water runoff during topsoil stripping and earthworks which will be required to construct the roads. The effects of these will be mitigated through the implementation of the measures outlined within the Preliminary Construction Management Plan.	Neutral *Not Significant*
Soil, Geology & Hydrogeology	Air and Noise	Rock breaking will generate noise and excavations on site will give rise to dust.	Neutral *Not Significant*
Soils, Geology & Hydrogeology	Biodiversity	The disturbance of soils and potentially bedrock within the proposed development area will result in habitat loss and some disturbance of fauna in the areas surrounding the works area. Where possible, the excavated soil will be used for reinstatement and landscaping works around the site.	Neutral *Slight*

Landscape and Visual Impact	Archaeology	Changes to the landscape may impact site archaeology however there a strategy has been proposed to integrate archaeological features within the landscape masterplan.The visual impact of the site has been assessed from places of cultural value as noted in the archaeological section of the EIAR.	Neutral *Not Significant*
Landscape and Visual Impact	Biodiversity	Changes to the site may have ecological impacts. These are addressed in detail in the ecology chapter. General impacts to landscape character are presented in the LVIA chapter. Landscaping proposals have been adapted to provide as much natural habitat as possible to replace habitat removed by the proposed development.	Neutral/Positive *Slight*
Water	Biodiversity	Site activities have the potential to give rise to some water pollution (although this is limited), and consequential impacts on flora and fauna that rely on or use that water within the same catchment. These potential impacts have been assessed, and the relevant measures will be in place to avoid any water pollution and subsequent effect on flora and fauna.	Neutral *Not Significant*
Material Assets -Traffic & Transportation	Population & Health	There may be temporary negative impacts to Human Health during the Construction Phase caused by noise, dust, air quality and visual impacts which are covered in other chapters of this EIAR. The effects of these will be mitigated through the implementation of the measures outlined within the Preliminary Construction Management Plan.	Neutral *Not Significant*
Material Assets -Traffic & Transportation	Water	There may also be interaction with the surrounding water bodies through surface water runoff during topsoil stripping and earthworks which will be required to construct the roads. The effects of these will be mitigated through the implementation of the measures outlined within the Preliminary Construction Management Plan.	Neutral *Not Significant*

Table 13.2 Summary Table of Principal Interactions between topics addressed by this EIAR.

13.4 Cumulative Impacts

The cumulate effects with other existing and/or approved projects in the area have also been considered to determine whether these could be sufficient to generate impacts of significance on the environment. Any predicted specific cumulative impacts are outlined in the various EIAR chapters, and tend to be temporary; related to the construction period; and manageable by way of mitigation. No significant interactions are envisaged in terms of interactions arising from cumulative impacts.

Within the urban block of this development, there is one development with a planning approval (Reg. Ref. LB170675 immediately east of the subject site, on the opposite side of Rathmullan Road). This development has been considered in the preparing of this EIAR. Future or alternative developments adjacent or near the site will further affect the area, potential through the altering of the skyline from distant viewpoints.

13.5 'Do Nothing' Scenario

If the proposed project does not proceed, there will be no cumulative impacts arising.

13.6 Mitigation and Monitoring Measures

It is not proposed that any mitigation or monitoring will be undertaken specifically for cumulative impacts.

CHAPTER 14.0 EIAR MITIGATION AND MONITORING MEASURES

14.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants in association with the various EIAR consultants. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, and Ms. Margaret Commane, Senior Planner, with Hughes Planning and Development Consultants.

Mr. Kevin Hughes of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Regional and Urban Planning (MRUP) in 2002, having previously completed a Bachelor of Arts Degree in Sociology from National University of Ireland in 1999. Kevin has over 18 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Kevin is currently the Director of Hughes Planning and Development Consultants.

Ms. Margaret Commane of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2012, having previously completed a Bachelor of Arts Degree in Geography and Legal Science from National University of Ireland in 2010. Margaret has over 7 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Margaret is currently a Senior Planner in the Practice of Hughes Planning and Development Consultants.

The central purpose of EIA is to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR document sets out a summary, for ease of reference, of the measures outlined within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring during the construction and operational phases of the proposed development. All measures included below form part of the proposed development and will be implemented in full.

It is intended that this chapter of the EIAR document will provide a useful and convenient summary to the competent/consent authority of the range of mitigation and monitoring measures proposed.

14.2 Mitigation and Monitoring Measures

The following provides a list, for ease of reference, of the mitigation and monitoring measures recommended in each chapter of the EIAR.

14.2.1 Population and Human Health

Construction Phase

All standard Safety and Health procedures will be implemented at every stage of this project. The Main Contractor for the project is responsible for the method in which the demolition and construction works are carried out and to ensure that best practices and all legal obligations including Local Authority requirements and Health and Safety legislation are complied with. Further to this, Building Regulations will also be adhered to during the construction phase.

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics discussed under each. These measures seek to ensure that any likely significant adverse environmental impact on humans during the construction phases are either ameliorated to have an acceptable level of impact or avoided altogether. Included in these measures is the requirement that a detailed construction traffic management plan be prepared by the Contractor and agreed with Meath County Council as the Road Authority prior to

commencing works on the public road. This Construction Traffic Management Plan will include restrictions on deliveries and access to the construction site, typically both will be via Rathmullan Road to avoid use of the River Road to the north of the site or the local Road to the south of the site. Further, measures with regards to noise and dust abatement covered elsewhere within this EIAR will be implemented during construction and will limit impacts on population and human health.

Further to the above, working hours on site will be as such that the residential amenity of adjacent residences is not unreasonably impacted upon. They will be agreed with the Council in full as part of the required construction management plan.

As a result of the implementation of the abovementioned measures, the impacts of the construction phase of the development on population and human health are not anticipated to be significant. Furthermore, all impacts will be temporary in nature.

Operational Phase

The mitigation measures relating to the operation phase of the development concerning traffic, transport, noise, vibration, water, air and dust quality and landscaping as set out in this EIAR (and listed hereafter) will be carried out in full to minimise impacts on residents of the development, adjacent residents and human health.

Monitoring

There is no other ongoing monitoring required in relation to the effect of the proposed development on the population and human health.

14.2.2 Biodiversity

Construction Phase

Designated Sites

Specific mitigation measures for the construction and operation phases are outlined in full within the Construction Environmental Management Plan (CEMP), prepared by Waterman Moylan Consulting Engineers. that accompanies this report. In summary, during construction the River Boyne will be protected from surface water run off by a series of cut off trenches which follow existing contours, fitted with check dams and/ or straw bales and a final settlement pond. A suitably qualified person will inspect this system during construction works to ensure it is functioning properly and that excessive silt does not reach the River Boyne. Construction will involve a range of appropriate mitigation measures such as the use of drip trays, bunding and emergency response measures for spills. No permanent works are proposed north of the development plan set back line i.e. within ~140m of the SAC boundary (as illustrated on the architect's site plan). Temporary works during the construction phase are required to capture, attenuate and filter surface water run-off from the construction site. The existing culvert running along the southern site boundary will be replaced by a larger one at the start of construction works to reduce the possibility of flooding on the subject lands.

Habitats

The following measures will be undertaken to reduce and avoid potential damage to habitats within the lands during construction:

- All hedgerows and immature woodland marked for retention will be fenced off at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree (National Roads Authority, 2005-2011). In general, the RPA

covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees);
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it. It will still be necessary to ensure that the area within the RPA is not used for vehicle parking or the storage of materials (including oils and chemicals);
- Soil will not be placed within the Root Protection Area of trees or within 5m of hedgerows;
- The woodland will not be lit during the construction or operational phases of the development; and
- The construction compound will be located a minimum of 50m from watercourses.

Measures to prevent pollution of watercourses is outlined within Section 5.5.1 and in detail within the Construction Environmental Management Plan.

Fauna

The following measures will be undertaken to reduce the potential impacts on fauna and to ensure compliance with legislation protecting bats and their roosts and birds, their nests, eggs, and unfledged young: A derogation licence application has been submitted to the NPWS in order to permit removal of bats from the farm buildings onsite and mitigate for the loss of any roosts; The mitigation measures for bats as outlined in the derogation licence application are as follows:

- It is proposed that demolition works of these sheds be undertaken during the shoulder seasons for bat activity between maternity roosting and hibernation roosting. This corresponds to the periods September to early November and March until mid-May. This corresponds to periods when bats are likely to be active, but when potential impacts from disturbance are lowest;
- An emergence/re-entry survey will be undertaken at each shed the night preceding demolition works by a suitably experienced ecologist. The timing of the survey will depend on the suitability of weather for bat activity, i.e. it will only take place if weather conditions are considered to be suitable for bat activity. In general, this corresponds to dusk temperatures above 8°C, with relatively light winds and dry weather;
- Where no bats are recorded emerging from/returning to the buildings, demolition works will proceed unhindered. Where bats are noted returning to or emerging from the buildings, the ecologist will note the location of the roost. Bats will be retrieved by hand from the roost and transferred to a bat box prior to demolition of the buildings. The bat box will be deployed on a tree in woodland to the north of the lands;
- Clearance of tall vegetation (woody or herbaceous) to facilitate construction works will be undertaken outside of the breeding bird season (1st March to 31st August, inclusive), or where this seasonal constraint cannot be adhered to, the area of proposed clearance will be checked for nesting birds by a suitably qualified ecologist. If birds are encountered, clearance works will be suspended in the relevant area until nesting has finished; and
- A pre-construction check must be carried out to confirm whether nesting buzzards are present within the woodland. If nesting is confirmed, appropriate mitigation to minimise disturbance will be agreed with the local NPWS ranger and subsequently implemented.

Operational Phase

Designated Sites

During operation, SUDS measures are proposed for the treatment of all surface waters arising from the subject lands. These include a series of underground storm tech and hydobrake facilities which will attenuate run-off to greenfield rates and will provide first flush settlement of silts and hydrocarbons and some level of percolation to ground. A hydrocarbon interceptor will be provided at the last stage prior to exiting the development site. Treated and attenuated surface waters will be routed off the proposed development site at the north eastern site boundary into an existing surface water pipe. These waters will flow into an open ditch and ultimately discharge into the River Boyne.

Monitoring

A suitably qualified and experienced ecologist will be appointed to undertake an Ecological Clerk of Works role during the construction phase of the project. The ecologist will be responsible for the supervision, monitoring and reporting of compliance with mitigation set out within this chapter and will report to the competent authority on these matters.

Item	Schedule	Aims & Objectives	Outputs
Undertakes pre-construction checks for protected species, reviews method statement of contractor to ensure that it incorporates all aspects of CEMP. Provides tool box talks and other training, and ensures understanding by all involved of all mitigation measures. Assesses effectiveness of mitigation, checks weather forecast and site conditions where trigger levels are required, checks for adequacy of infiltration where water is being pumped, undertakes weekly water-quality monitoring.	During Construction Weekly visits during the construction phase of the proposed development	Prevent construction phase impacts	N/A
Tree inspection surveys will be undertaken by a licenced bat worker to assess whether the trees marked for felling have any suitability to support roosting bats. If the trees are confirmed to have potential roosting features, these trees must be inspected at height for roosting bats the day prior to felling works. Once surveyor is satisfied that bats are not present within potential roosting features, the tree will be felled. If bats are encountered during any works at the site the relevant works will be suspended until the advice of a suitably qualified and licenced bat ecologist is sought. A derogation licence may need to be sought from NPWS in order to permit removal of bats and mitigate for the loss of any roosts on the site.	Prior to Construction One visit to assess suitability for roosting bats. If trees are found to be suitable for bats, follow up surveys are required	Prevent disturbance to and mortality of bats	N/A
All tall woody and herbaceous vegetation in worked areas should be removed outside of the breeding bird season (1st March to 31st August, inclusive) to avoid the destruction of nests or disturbance of breeding birds If this is not possible, trees will be inspected by a qualified ecologist immediately prior to removal. If it is found that breeding birds are present, felling works must be suspended immediately and cannot recommence until chicks have fledged and the nest has been abandoned.	Prior to Felling	Prevent disturbance to and mortality of birds	N/A
All hedgerows and woodland marked for retention will be fenced off at the outset of works and for the duration of construction to avoid damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree (National Roads Authority, 2005-2011). In general, the RPA covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees); Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around	Prior to and during Construction	Protection of hedgerows and trees marked for retention	N/A

the trunk of the tree and strapping stout buffer timbers around it. It will still be necessary to ensure that the area within the RPA is not used for vehicle parking or the storage of materials (including oils and chemicals) Soil will not be placed within the Root Protection Area of trees or within 5m of hedgerows; The woodland will not be lit during the construction or operational phases of the development; and, The construction compound will be located a minimum of 50m from watercourses.			
Bat boxes	Post-Construction: 1, 3, 5 years after completion	Checks of the bat boxes to assess success of the mitigation	Production of a short report outlining the success of the bat boxes
Landscape plan Success of their mitigation measures i.e. wildflower meadow, woodland planting etc	Post-Construction: 1, 3, 5 years after completion	Record diversity along fixed transects using standard methodology. Record success of tree establishment.	Production of a short report outlining the success of the planting.

14.2.3 Soils, Geology and Hydrogeology

Construction Phase

In order to preserve the topsoil on the site, topsoil will be removed to stockpiles and protected during the construction period for reuse on completion of the works. Topsoil will be stored in mounds and suitably protected to prevent water logging during wet weather. The stripping of topsoil will be undertaken on a phased basis so that no area is stripped until such time as works are imminent in that area.

Levels of the proposed roads will be established to minimise the quantity of fill material to be imported to the site. Surplus subsoil will be used for landscaping where possible.

The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soils deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.

Cut off trenches along the northern boundary of the development boundary will be constructed prior to stripping topsoil. These cut off trenches will have a settlement pond / silt trap at the end of each trench with an overflow. Straw bales will be placed within the cut off trenches at strategic locations and at the

outfall of the settlement ponds to the overflow. These measures will be implemented and maintained during the construction phase to prevent silt runoff into the existing ditches / watercourses during the drainage works.

Dampening down measures with water sprays will be implemented during periods of dry weather to reduce dust levels arising from the development works.

After implementation of the above measures the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will be short term only in duration.

Operational Phase

On completion of the construction works, it is proposed to re-soil and re-plant any fill embankments and cut slopes. Within the development, landscape areas will be topsoiled and planted in accordance with the proposed landscaping plan. Following completion of these reinstatement works, no significant adverse impacts on the soils and geology of the subject lands are envisaged.

A comprehensive drainage network will be constructed to ensure that the lands drain effectively following their reshaping / re-profiling. The drainage system shall incorporate sustainable urban drainage methods to clean flows prior to discharge.

Monitoring

Monitoring during the construction phase will be undertaken particularly in relation to the following: -

- Adequate protection of the topsoil stockpiled for reuse;
- Monitoring of surface water discharged to existing ditches / watercourses;
- Monitoring cleanliness of the adjoining road network;
- Monitoring measures for prevention of oil and petrol spillages; and
- Dampening down measures close to the boundaries of the site in dry weather.

14.2.4 Water

Construction Phase

Surface Water

The following measures will be adopted during construction:

- The contractor will appoint a suitably qualified person to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
- Cut off trenches along the northern boundary of the development boundary will be constructed prior to stripping topsoil (illustrated in Appendix 7.1). These cut off trenches will have a settlement pond / silt trap at the end of each trench with an overflow. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall of the settlement ponds to the overflow. These measures will be implemented and maintained during the construction phase to prevent surface water runoff from discharging directly into the local water course. An indicative layout for the proposed cut off trenches is set out in Appendix 7.1 of this EIAR.
- Settlement ponds / silt traps as outlined above will be provided to prevent silt runoff into the existing ditches / watercourses during the drainage works
- Regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on

those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.

- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The project ecologist will review and agree alternative pollution control measures, such as deepening or redirecting trenches as appropriate, before works may recommence.
- All fuels and chemicals will be bunded, and where applicable, stored within double skinned tanks / containers with the capacity to hold 110% of the volume of chemicals and fuels contents. Bunds will be located on flat ground a minimum distance of 50 m from any watercourse or other water conducting features, including the cut off trenches.
- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- Temporary traffic management will be implemented as appropriate during the construction of the outfalls on Rathmullan / River Road.

Water Supply

The following measures will be adopted during construction:

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- A pressure reducing valve will be installed at the connection point.
- All water mains will be cleaned, sterilised and tested to the satisfaction of the Irish Water/Local Authority prior to connection to the public water main.
- All connections to the public water main will be carried out under the supervision of the Irish Water/Local Authority.

Foul Water

All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.

- Foul water pipes to be laid with sufficient falls to ensure self-cleansing velocity.
- Foul and surface water pipes will be carefully laid so as to minimise the potential for cross connections.

Operational Phase

Surface Water

The following measures will be adopted during construction:

- Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the ditch / culvert.
- Attenuation systems will be constructed on-line to intercept the first flush during rainfall events after periods of dry weather. Furthermore, the proposed Stormtech attenuation system contains an 'Isolator Row' which provides treatment even in low flow conditions. This row is surrounded with filter fabric that provides for settling and filtration of sediments as the water passes through. This ensures that the majority of the solids are removed within the isolator row which prevents silt build-up in the remainder of the chambers, therefore minimising maintenance requirements and associated costs. The Stormtech systems have a stone base and permeable chambers which encourages water to permeate into the ground.
- Sustainable urban drainage measures such as filter drains, permeable paving, rain water harvesting, swales etc. will be provided.
- A petrol interceptor will be installed to prevent hydro carbons entering the local ditch / culvert.

- The attenuation storage systems will be constructed at a fall to maintain movement of water and thus prevent stagnation. Silt would be collected at a sump and removed periodically.
- Regular maintenance of the drainage network, including petrol interceptor.

Water Supply

It is not envisaged that any other mitigation measures will be necessary upon the completion of the development.

Foul Water

The pumping station is being provided with the following emergency equipment and procedures: -

- Standby pump in the event of a pump failure.
- Telemetry system to facilitate Irish Water monitoring of the station.
- High level alarms to warn of increases in level of effluent in the pump sump.
- Storage capacity within the sump and pipe network in excess of 24 hours.
- Over-pumping facilities on the rising main to facilitate the installation of a temporary external pump to empty the sump directly into the rising main.

The above emergency equipment and procedures provide a very high level of redundancy and backup in the event of a failure in the mechanical systems in the pumping station.

In addition to the above, the drainage network will be inspected annually and maintained.

14.2.5 Noise and Vibration

Construction Phase

The assessment of construction phase impacts has found that significant noise and vibration impacts are not expected. Notwithstanding this, best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be adopted. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening, and;
- liaison with the public.

Operational Phase

Building Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria included in Section 8.7 (i.e. 45dB(A) at a distance of 10m from any plant) is achieved, it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward Noise Impact

The proposed 4m high earth berm along the western boundary of the site is included within the noise impact assessment as a mitigation measure.

Furthermore, as is the case in most buildings, the glazed elements and ventilation paths of the building envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.e. block work or concrete and spandrel elements) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal.

In this instance the facades highlighted in Figure 8.5 will be provided with glazing that achieves the minimum sound insulation performance as set out in Table 8.12 previously, a copy which is included below.

Typical Glazing Specification	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
10/12/4	25	22	33	40	43	44	35

Table 14.1 Sound Insulation Performance Requirements for Glazing, SRI (dB), previously included at Table 8.12

The overall R_w outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 8.12 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

In addition, any background ventilators through the façade, e.g. trickle vents, will be selected to achieve an acoustic performance of at least 37dB $D_{ne,w}$ when in the open position for those facades identified in Figure 8.5 in previous Chapter 8.0.

With these measures in place the internal noise levels within those proposed buildings most exposed to environmental noise from the M1 motorway will achieve the criteria outlined in Table 8.5 when the windows are closed and the ventilators are open.

Monitoring

Construction Phase

The contractor will be required to ensure construction activities operate within the noise limits set out within this assessment. The contractor will be required to undertake regular noise monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*.

Operational Phase

Noise or vibration monitoring is not required once the development is operational.

14.2.6 Air Quality and Climate

Construction Phase

There is the potential for dust emissions from site activities to impact nearby sensitive receptors. The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust management plan.

In summary the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Operational Phase

The results of the air dispersion modelling study indicate that the impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase.

Monitoring

Construction Phase

Monitoring of construction dust deposition at nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m^2*day) during the monitoring period between 28 - 32 days.

Operational Phase

Air quality monitoring is not required once the development is operational.

14.2.7 Material Assets – Waste Management

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment

Construction Phase

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG and is included as Appendix 11.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development. Prior to commencement of construction the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to LCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

The project engineers, Waterman Moylan, have estimated that there will be no surplus soils and stones generated from the excavations required to facilitate site preparation, construction of, building foundations, access roads and the installation of underground services. If excess material is generated from the excavations it will be removed from site for offsite reuse, recovery, recycling and/or disposal. The contractor(s) will endeavor to ensure that material is reused or recovered off-site insofar as is reasonably practicable or disposed of at authorized facility.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as

detailed in the C&D WMP (Appendix 10.1). EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising 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* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources

Operational Phase

As previously stated, a project specific OWMP has been prepared and is included as Appendix 10.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021.

In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Waste electrical and electronic equipment (WEEE);
    - Batteries (non-hazardous and hazardous);
    - Cooking oil;
    - Light bulbs;
    - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and
    - Furniture (and from time to time other bulky waste).

- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from 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* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved

Monitoring

The management of waste during the construction phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

The management of waste during the operational phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste.

Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets.

The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects

Operational Phase

During the operational phase, waste generation volumes should be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contractor costs. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

14.2.8 Material Assets – Traffic and Transport

Construction Phase

It is proposed that a Construction Management Plan (CMP) would be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road. The CMP will consider the following aspects:

- routes to be used by vehicles;
- working hours of the site;
- details of construction traffic forecasts;
- times when vehicle movements and deliveries will be made to site;
- facilities for loading and unloading; and
- facilities for parking cars and other vehicles.

Operational Phase

The proposed development is situated adjacent to suitable infrastructure and transport services for travel by sustainable modes. A key barrier to modal shift towards sustainable modes of travel is often a lack of information about potential alternatives to the car. As such, it is proposed that residents will be made aware of potential alternatives including information on walking, cycle routes and public transport.

Residents will be encouraged to avail of these facilities for travel to and from work. Provision of this information would be made during the sales process and will be included in the new homeowners pack upon the sale of each unit, as this represents the best opportunity to make residents aware and to secure travel behaviour change. It is anticipated that this measure may help to reduce the level of traffic at the proposed development, thus providing mitigation against the already minimal traffic and transport effects of the development.

14.2.9 Archaeology, Architectural and Cultural Heritage

Construction Phase

The proposed developments will negatively impact on the various archaeological features and deposits uncovered in the course of the testing phase and any other surviving archaeological remains. However, the assessment revealed that the surviving archaeological remains on site have suffered from significant plough truncation and by and large survive as sub soil cut features.

It is therefore recommended that pre-development mitigation takes place in the form of archaeological excavation and preservation by record apart from the BA enclosure at the north end of the subject site, which will be the subject of a specific targeted mitigation strategy (see below section).

It is recommended that in the southern field an area of approximately 50 m by 50 m be topsoil stripped by mechanical tracked excavators fitted with toothless bucket under licensed archaeological supervision, centred over the site of the ring ditch and related field system and all features uncovered be excavated and recorded.

In addition, it is recommended that the smaller isolated features, including the cremations, uncovered in the course of the 2008 assessment also be the subject of pre-development investigations consisting of the monitored topsoil removal by mechanical tracked excavators fitted with toothless bucket under licensed archaeological supervision of a 10 m by 10 m area centred on each feature and their subsequent archaeological excavation and recording. Topsoil stripping should continue around each feature until a 5 m buffer zone of sub soil free of archaeological features has been achieved. This is to ensure that the features are in fact 'isolated' and not part of a larger archaeological complex.

All topsoil should be spread out at the side of the cutting and examined with the aid of a metal detector, under a separate metal detector licence.

An archaeologist with battlefield archaeology experience should be available for regular consultation to aid in the identification of all metal work recovered in this phase and all additional phases of archaeological works.

Further topsoil stripping should be archaeologically monitored preferably in a pre-construction phase of works, in concert with the proposed phasing of the overall development, to allow time to undertake any additional archaeological investigations which may be required.

All topsoil stripping archaeological works should be carried out by mechanical tracked backacter excavators fitted with toothless bucket under the supervision of a qualified licensed archaeologist. Despite the lack of certain artefactual evidence uncovered in the 2008 assessment works, it is recommended that, due to the location of the proposal within the wider landscape of the Battle of the Boyne, all topsoil stripping undertaken in association with any developments of the site be further surveyed by a licensed metal detector, assisted by an experienced battlefield archaeologist.

The substantially older architectural elements within the cluster of farm buildings along the eastern boundary of the subject site are undoubtedly the partial remains of the buildings recorded on Larkin and the first edition OS maps. This indicates that these remains are of at least early 19th century date. Such is the state of disrepair and later modifications that it is not considered that preservation in situ is appropriate, however, it is recommended that an historic building survey (Level 2), is undertaken in advance of their demolition (Historic England p26). This should consist of both a written and photographic record, with detailed measured survey drawings where necessary.

In addition, the area around the cluster of buildings should be the subject of targeted pre-development test trenching, to examine the possibility that the cluster extends beyond the buildings currently upstanding and to record the full extent and layout of the buildings

Operational Phase

The main concern within the operation phase is that of adverse visual impacts, from the various vantage points associated with the Battle of the Boyne and the views from the World Heritage site (see the Landscape and Visual Amenity chapter in the regard).

It is recommended that the proposed planting design for the development should establish tree and shrub-lined boundaries to the north and south and add to the existing tree lined boundary to the west utilizing an appropriate variety of native species. (See the Landscape Strategy and Design Report, prepared by Cunnane Stratton Reynolds which accompanies this application in this regard).

It is also recommended that trees and shrubs should form an important element within the boundaries of the subject site, to soften the hard lines which will result in the construction of the buildings and associated road network within the development (see the Landscape Strategy and Design Report, prepared by Cunnane Stratton Reynolds, which accompanies this application for further information).

Mitigation Measures Specific to Bronze Age Enclosure in North-west Corner of Site

The enclosure is located in the north-west corner of the subject site and was uncovered in four separate trenches in the course of the testing undertaken in 2008. It was defined by a 2 m wide and an average 550 mm deep U-shaped ditch which was filled with a series of deposits, the lowest of which produced a substantial quantity of sherds of pottery, the form and decoration on which suggests a middle Bronze Age date. Although only the southern half of the site was uncovered in the testing, the projected line would appear to describe a sub-circular enclosure some 60 m in diameter. The soil profiles in each of the four test trenches where evidence for the enclosure was found revealed some 500 mm of topsoil / ploughsoil over the enclosure. The surface of the ploughsoil varied in height from 23.1 m OD at the west end of the enclosure to 21.6 m OD on its eastern side.

In the first instance, it is proposed that the full extent of the enclosure be ascertained. This to be achieved by the opening of two targeted test trenches, excavated down to the top of archaeological deposits, revealing the northern extent of the enclosure. Once known, the full extent of the enclosure will be staked out on the ground, which will inform stage two.

It is then proposed to preserve the enclosure *in situ* and develop the area as a green space, limiting any development on the site. The first phase of the works on site will involve the laying down of geotextile matting across the footprint of the enclosure, to include a 5 m wide buffer zone around the enclosure. The matting will be laid directly down onto the top of the existing ground surface, and then covered with topsoil. The topsoil will be added to create a low embankment running around reflecting the line of the enclosure ditch. The profile of the embankment will have sides at a slope of 1:4 and the surface grassed over to allow for easy maintenance.

It is also proposed to develop a path way running around the perimeter of the newly formed enclosure, with the addition of benches and signage to inform the visitor of the buried archaeology and its significance.

General Mitigation Recommendations

All ground works will be carried out using backacter tracked machines equipped with toothless buckets which are under the constant supervision of a suitably qualified and licensed archaeologist. The archaeologist will monitor the works until either the surface of glacial subsoil, formation level or the surface of archaeological remains is uncovered, whichever is encountered first. Archaeological works should, if possible be phased in line with the overall phasing of the development programme, and if possible stay one phase, at least ahead of the construction works, in order to avoid any potential conflicts between archaeology and construction.

It is recommended that all archaeological deposits uncovered during monitoring be recorded and

investigated to best archaeological practice. They will in the first instant be cordoned off using high visibility tape and access to these areas by machinery and personnel denied until the deposits have been fully resolved.

The licensed archaeologist on site is responsible, on behalf of the developer, for the identification and appropriate treatment (e.g. excavation and recording) of all archaeological remains encountered. In order to fulfil the responsibilities of the developer therefore, the licensed archaeologist will have the authority to temporarily stop machining where potential archaeological material has been identified, in order to evaluate the character of said remains. It should be possible for work to continue (under archaeological supervision) in areas where no archaeological deposits have been encountered. Should archaeological remains be present, the licensed archaeologist will be responsible for communicating this to the client or appointed representative, as well as to the relevant Heritage Authorities.

In the event of the discovery of any archaeological remains during the monitoring, the deposits will be hand excavated to assess their nature date and extent and time will be allowed for the archaeologist to undertake the appropriate level of recording. The level of recording will depend on the complexity of the archaeological remains encountered and, in all cases, sufficient time will be allowed by the developer for this purpose.

If human remains, or any suspected grave cuts, are observed, machine excavation will cease, the statutory authorities and development sponsor will be informed immediately and a suitable methodology for dealing with the human remains or grave cuts will be agreed in writing with the heritage authorities. Work will not recommence in the area containing the human remains until such a methodology has been agreed, and all works subsequently undertaken in this area will be in accordance with this methodology.

During all archaeological works, recording will be by means of the standard methods employed during archaeological fieldwork. A day book will be maintained while all archaeological features will be recorded in writing utilising pro forma context sheets by means of scaled field illustrations and by appropriate photography.
It is recommended that the developer allow enough time in the development programme for any archaeological excavations. It should be noted that the results of all excavation including site evaluation and monitoring, must be compiled into a fully illustrated report.

In the course of the archaeological works all finds will be logged according to context, washed (if appropriate), bagged and catalogued prior to dispatching to the various specialists. A contract conservator will be on hand if necessary. All artefacts will be numbered and treated in accordance with National Museum guidelines and will be processed to a standard acceptable for deposition to the State's Cultural Resource Centre in Swords, Co. Dublin.

As with the finds, the site archive will also be processed to a standard acceptable for deposition to the State's Cultural Resource Centre in Swords, Co. Dublin.
A comprehensive final archaeological report will be compiled that will set out the results of the archaeological works in accordance with the terms of the National Monuments Acts and best professional practice. It will address the archaeological and historical background of the site. The location and levels (corrected to Ordnance Datum) of any archaeological deposits found will be clearly shown.

14.2.10 Landscape and Visual Amenity

Construction Phase

The remedial measures proposed revolve around the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

Existing trees and woodlands to be retained and are shown in the CSR Design Statement and Arboricultural Reports. Existing trees to be retained are particularly sensitive to negative impacts during the construction phase if proper protection measures are not adhered to. With regard to the protection of the retained trees on site during proposed construction works, reference should be made to BS5837: Trees in relation Design, Demolition and Construction – Recommendations (BSI, 2012). Tree protection details will be included with the application to the Board.

Adverse impacts both during construction and at operation phases could be mitigated through undertaking the following site works early on in the construction process in order to soften and screen views as early on as possible.

- Constructing (using fill) and planting up the 4m high bund along the western edge of the site;
- In areas not subject to construction works – the Boyne River Park, along the Rathmullan Road and the western edge of the site, advance planting can take place to build landscape capacity and establish and mature during development and ahead of occupation;
- Construction the proposed mounding and planting the woodlands and trees in the Boyne Valley parkland; and
- Where feasible and sensible, planting larger sized specimen trees (c. 18-20 girth) around the perimeter of the site.

Reducing the footprint of all construction works wherever feasible and ensuring the remainder of the land is retained as green field will also limit any adverse effects during the construction phase.

Operational Phase

The mitigation measures that have been adopted in the proposed scheme are as follows:-

- The retention of much of the existing woodland to the north, north-east and west of the site.
- The architectural layout aims to address visual impacts by proposing variety in scale and massing of buildings and by their design and materiality. The layout adopted early advice to stagger building lines particularly along the northern and western edges of the site and to design in green fingers, planted with woodland, that would knit the development into the surrounding landscape.
- The design process has involved detailed exploration of the placement, height and materiality of the apartment blocks to the NW of the development to achieve a visual effect that recedes.
- The extensive planting of additional trees and shrubs throughout the site where possible will reduce the visual mass of the buildings, soften and partially screen the development over time from various viewpoints, as identified in the assessment, thereby minimising the visual impacts.
- Native and appropriate planting for biodiversity and the provision of woodland to be naturally regenerated from the existing woodland stock has been incorporated into the scheme following the advice of the Project Ecologist.
- Public open spaces have been designed as part of an overall design strategy that focuses on creating a ‘sense of place’ and individual character for the development area.
- The introduction of a ‘Green Streets’ approach includes for a sufficient quantum of street trees, swales and planting that form a sufficient barrier between pedestrians and traffic. This approach will also focus the creation of vegetative buffers for privacy and shading to adjoining residences, and for more distant viewers the creation of a green landscape structure within which the development nestles.
- The project has facilitated the creation of meaningful public open spaces that adheres to the criteria outlined in The Meath County Development Plan 2013-2019.

- Public open spaces form part of a network of spaces that includes areas for passive and active recreation, social / community interaction and play facilities catering for all ages.
- Application of best practice horticultural methods to ensure that mitigation measures establish and grow appropriately.

During construction there will be a change to the landscape and there will be negative visual impacts for residents and visitors to the areas adjacent to the site associated with construction activity.

The scheme design incorporates significant consideration and mitigation in respect of potential impacts. The quality of the public realm scheme is of a high standard and the quality of materials proposed is similarly high and robust.

Landscape works are proposed to reduce and offset any impacts generated due to the proposed development, where possible. The planting of substantial numbers of new trees and other planting in the open spaces the site boundaries and internal roads, both native and ornamental varieties, will enhance the overall appearance of the new development and compensate for the removal of hedgerows and trees where needed for the construction works and increase the overall landscape capacity of the site to accommodate development.

Monitoring

Construction Phase

Landscape tender drawings and specifications will be produced to ensure that the landscape work is implemented in accordance with best practice. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect.

The planting works will be undertaken in the next available planting season after completion of the main civil engineering and building work.

Operational Phase

This will consist of weed control, replacement planting, pruning etc. All landscape works will be in an establishment phase for the initial three years from planting. The company responsible for site management of the scheme will be responsible for the ongoing maintenance of the site after this three-year period is complete.