ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME II

PROPOSED RESIDENTIAL DEVELOPMENT

AT

Newcastle South, Newcastle, Co. Kildare

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LIST OF ABBREVIATIONS

AA Appropriate Assessment

ABP An Bord Pleanála

CDP County Development Plan

CEMP Construction Environmental Management Plan

CA Competent Authority (An Bord Pleanála)

CSO Central Statistics Office

DAHG Department of Arts, Heritage and the Gealtacht

DCENR Department of Communications, Energy and Natural Resources

DEHLG Department of Housing, Planning and Local Government

EIA Environmental Impact Assessment

EIAR Environmental Impact Assessment Report

EMP Environmental Management Plan

EPA Environmental Protection Agency

ESRI Economic and Social Research Institute

GDP Gross Domestic Product

GSI Geology Survey Ireland

IAA Irish Aviation Association

IEEM Institute of Ecology and Environmental Management

IFI Inland Fisheries Ireland

LAP Local Area Plan

NHA/pNHA Natural Heritage Area / proposed Natural Heritage Area

NIAH National Archive of Architectural Heritage

NPWS National Parks and Wildlife Service

NRA National Roads Authority

NPF National Planning Framework

OPW Office of Public Works

PBSA Purpose-Built Student Accommodation

RMP Record of Monuments and Places

RPG Regional Planning Guidelines

RPS Record of Protected Structures

SAC Special Area of Conservation

SDCC South Dublin County Council

SMR Sites and Monuments Record

SPA Special Protection Area

SHD Strategic Housing Development

SUDS Sustainable Drainage System

TMP Traffic Management Plan

WFD Water Framework Directive

GLOSSARY OF TERMS[1]

Alternatives *A description of other options that may have been considered during the conception of a project; these include alternative locations, alternative designs and alternative processes.*

Baseline Scenario *The current state of environmental characteristics – including any evident trends in its status.*

Competent Authority (CA) *The term 'competent authority' means the Minister or public authority to which an EIAR is required to be submitted, i.e. the authority charged with examining an EIAR with a view to issuing a consent to develop or operate.*

Development *A project involving new works [including alteration and/or demolition] or altered patterns of activity.*

'Do-nothing' Scenario *The situation or environment which would exist if a proposed, development, project or process were not carried out. This scenario needs to take account of the continuation or change of current management regimes, as well as the continuation or change of trends currently evident in the environment.*

Effect / Impact *A change resulting from the implementation of a project.*

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

Environmental Impact Assessment Report *– EIAR A report or statement of the effects, if any, that the proposed project, if carried out, would have on the environment. EPA The Environmental Protection Agency.*

Impact / Effect *A change resulting from the implementation of a project*

Impact Avoidance *The modification of project decisions (about site location or design, for example) having regard to predictions about potentially significant environmental effects.*

Infrastructure *The basic structure, framework or system which supports the operation of a project, for example roads and sewers, which are necessary to support development projects.*

Land Use *The human activities which take place within a given area of space.*

Likely Effects (or Likely Impacts) *The effects that are specifically predicted to take place – based on an understanding of the interaction of the proposed project and the receiving environment. (See also Potential Effects and Residual Effects.)*

Methodology *The specific approach or techniques used to analyse impacts or describe environments.*

Mitigation Measures *Measures designed to avoid, prevent or reduce impacts. These measures can mitigate impacts: \ by Avoidance When no impact is caused (often through consideration of alternatives). \ by Prevention When a potential impact is prevented by a measure to avoid the possibility of the impact occurring. \ by Reduction When an impact is lessened.*

Monitoring *The observation, measurement and evaluation of environmental data to follow changes over a period of time, to assess the efficiency of control measures and to record any unforseen effects in order to be able to undertake appropriate remedial action. This is typically a repetitive and continued process carried out during construction, operation or decommissioning of a project.*

Pathway *The route by which an effect is conveyed between a source and a receptor.*

[1] Selected – From Guidelines on the information to be contained in Environmental Impact Assessment Reports – EPA, May 2022

Planning Application Report *Documentation that accompanies the planning application which describes the conformity of the proposal with relevant legislation and planning matters – such as the County, City or Local Area Plans – and sectoral policies, as well as social and economic activity.*

Pollution *Any release to the environment which has a subsequent adverse effect on the environment or man.*

Potential Effect/ Impact *The effect / impact that would occur without mitigation.*

Processes *The activities which take place within a project.*

Project *For the purposes of the Guidelines, the term project is used to encompass all of the various forms of development, works and activity which are subject to EIA requirements, as set out in the relevant legislation and as understood by the Directive.*

Sensitivity *The potential of a receptor to be significantly affected. Significance (of impact) The importance of the outcome of the impact (or the consequence of change) for the receiving environment. Source The activity or place from which an effect originates.*

DOCUMENT CONTROL SHEET

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1.0 INTRODUCTION AND METHODOLOGY

John Spain Associates, Planning & Development Consultants, have been commissioned by Cairn Homes Properties Ltd., to prepare an Environmental Impact Assessment Report (EIAR) for the construction of 280 no. dwellings and associated ancillary infrastructure on lands of c. 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche on a site of c. 0.07 ha. Located in 'Graydon' to the east. This chapter of the EIAR was prepared by Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates.

Rory Kunz has a Masters in Environmental Resource Management and a Diploma in Environmental Impact Assessment (EIA) Management (both from UCD) as well as a Masters in Town and Country Planning. In addition, Rory is a corporate member of the of the Irish Planning Institute and has 19 years of experience of Environmental Impact Assessment and urban development.

Rory has acted as lead planning consultant on a range of high-quality complex planning applications across the country over an extended period. Rory has wide-ranging experience in the management and review of Environmental Impact Assessment Reports (EIAR) for major residential and mixed-use development and redevelopment projects.

The subject site is located to the west of Graydon, a residential development under construction by Cairn, and to the west by the Athgoe Road, to the north by St. Finian's Way and to the south by undeveloped and agricultural lands.

The central purpose of the Environmental Impact Assessment Report (EIAR) is to undertake an appraisal of the likely and significant impacts on the environment of the proposed development in parallel with the project design process, and to document this process in the EIAR. This is then submitted to the competent/ consent authority to enable it assess the likely significant effects of the project on the environment.

A full description of the proposed development lands together with a description of the proposed development is provided in Chapter 2 of this EIAR document.

The Strategic Housing Development (SHD) proposal comprises the development of 280 no. dwellings comprising 128 no. houses, 116 no. apartments 36 no. duplex apartments, a creche c. 778 sq. m along with open space, new signalised junction and upgrades on the Athgoe Road and all ancillary works.

This EIAR document has been prepared in accordance with the codified European Union Directive 2011/92/EU as amended by Directive 2014/52/EU (EIA Directive), as well as implementing legislation, i.e. Part X of the Planning and Development Act 2000, as amended ('***the 2000 Act***'), the Planning and Development (Housing) and Residential Tenancies Act 2016 ("***the 2016 Act***") and Parts 10 and 23 of the Planning and Development Regulations 2001, as amended, in particular as amended by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 ("***the 2001 Regulations***"). A description of the methodological approach to the preparation of this EIAR is provided in the following sections of this chapter.

1.1 EIA LEGISLATION, DEFINITION OF EIA AND EIAR

Certain public and private projects that are likely to have significant effects on the environment are subject to EIA requirements derived from the codified European Union Directive 2011/92/EU as amended by Directive 2014/52/EU (EIA Directive). The purpose of these Directives to ensure that projects likely to have significant effects on the environment are subject to a comprehensive and systematic assessment of environmental effects prior to development consent being given.

Directive 2014/52/EU defines '*environmental impact assessment'* as a process, which includes the responsibility of the developer to prepare an Environmental Impact Assessment Report (EIAR), and the responsibility of the competent authority to provide reasoned conclusions following the examination of the EIAR and other relevant information.

Article 1(2)(g) of Directive 2011/92/EU, as amended by the 2014 Directive states that "*environmental impact assessment*" means a process consisting of:

> *"(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);*
>
> *(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;*

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

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

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

A definition of "*environmental impact assessment*" is also contained under Section 171A of the 2000 Act, as amended as follows:

'environmental impact assessment' means a process—

(a) consisting of—

(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,
(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,
(iii) the examination by the planning authority or the Board, as the case may be, of—
(I) the information contained in the environmental impact assessment report,
(II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and
(III) any relevant information received through the consultations carried out pursuant to subparagraph (ii),
(iv) the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and
(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and

(b) which includes—
(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:

(I) population and human health;
(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive;
(III) land, soil, water, air and climate;
(IV) material assets, cultural heritage and the landscape;
(V) the interaction between the factors mentioned in clauses (I) to (IV),

and
(ii) as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development;

The amended Directive (Directive 2014/52/EU) uses the term environmental impact assessment report (EIAR) rather than environmental impact statement (EIS). Where current national guidelines and regulations refer to an environmental impact statement or an EIS, this can be taken to be the same as an environmental impact assessment report (EIAR).

A definition of Environmental Impact Assessment Report (EIAR) has not been included in the revised directive. However the EPA Guidelines (2022)2 (and the Planning and Development Act 2000 as amended) provide the following definition:

> *"A report or statement of the effects, if any, that the proposed project, if carried out, would have on the environment."*

The EIAR is prepared by the developer and is submitted to a Competent Authority (CA) as part of a consent process.

The CA uses the information provided to assess the environmental effects of the project and, in the context of other considerations, to inform its decision as to whether consent should be granted. The information in the EIAR is also used by other parties to evaluate the acceptability of the project and its effects and to inform their submissions to the CA.

The EIAR provides a systematic analysis and evaluation of the potentially significant effects of a proposed project on the receiving environment. The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and these factors must be addressed in the EIAR.

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

Where significant and likely environmental effects are identified that are unacceptable, the EIA process aims to quantify and minimise the impact specified development projects have on the environment through appropriate mitigation measures. The preparation of an EIAR requires site-specific considerations and the preparation of baseline assessment against which the likely impacts of a proposed development can be assessed by way of a concise, standardised and systematic methodology.

1.2 EIA GUIDELINES

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

We would also note that the pre-application discussions with the Planning Authority and An Bord Pleanála, including the Board's opinion informed the content of the EIAR.

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

Irish
• Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, EPA, May 2022 • Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018 • Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems - Key Issues Consultation Paper, Department of Housing, Planning, Community and Local Government, 2017. • Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017). • Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoECLG, March 2013). • Development Management Guidelines (DoEHLG, 2007).

[2] *Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency, 2022*

- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).

European Union (in addition to Directives referenced above)

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, European Commission, 2017
- Environmental Impact Assessment of Projects Guidance on Screening (2017).
- Environmental Impact Assessment of Projects Guidance on Scoping (2017).
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (2021)).
- EU Commission Notice on changes and extensions to projects (2021)
- Study on the Assessment of Indirect & Cumulative Impacts as well as Impact Interaction (DG Environment 2002).

The content of this Environmental Impact Assessment Report has been prepared in accordance with the provisions of Article 5(1) and Annex IV of Directive 2014/52/EU and Article 94 and Schedule 6 the 2001 Regulations as amended, in particular by European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

1.3 EIA PROCESS OVERVIEW

The main purpose of the EIA process is to identify the likely significant impacts on the human environment, the natural environment and on cultural heritage associated with the proposed development, and to determine how to eliminate or minimise these impacts. The EIAR summarises the environmental information collected during the impact assessment of the proposed development.

Several interacting steps typify the early stages of the EIA process and include:

- Screening;
- Scoping;
- Assessing Alternatives; and
- Assessing and Evaluating.

Screening: Screening is the term used to describe the process for determining whether a proposed development requires an EIA.

Scoping: This stage firstly identifies the extent of the proposed development and associated site, which will be assessed as part of the EIA process, and secondly, it identifies the environmental issues likely to be important during the course of completing the EIA process through consultation with statutory and non-statutory stakeholders. Scoping request letters were issued to a range of stakeholders at the commencement of this EIA process and the responses received have been considered as part of the compilation of the EIAR.

Assessing Alternatives: This stage outlines the possible alternative approaches to the proposed development. Consideration of alternative sites and layouts within the final chosen site are set out in Chapter 2 of this EIAR.

Assessing and Evaluating: The central steps of the EIA process include baseline assessment (desk study and field surveys) to determine the status of the existing environment, impact prediction and evaluation, and determining appropriate mitigation measures where necessary. This stage of the EIAR is presented in Chapters 3 to 15.

1.4 SCREENING – REQUIREMENT FOR EIA

Screening is the term used to describe the process for determining whether a proposed development requires an EIA by reference to mandatory legislative threshold requirements or 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.

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.

Projects needing environmental impact assessment are listed in Schedule 5 of the Planning and Development Regulations 2001 (as amended). Schedule 5 (Part 2) of the Planning & Development Regulations 2001 (as amended) set mandatory thresholds for each project class.

Paragraph 10((b)(i) refers to Infrastructure projects comprising the construction of more than 500 dwelling units. The proposed development which comprises 280 no. dwellings is below the threshold.

Paragraph 10(b)(iv) refers to 'Urban development which would involve an area greater than 2 hectares in the case of business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.' The proposed site is c. 8.47 hectares and is sub-threshold in respect of Category 10(b)(iv).

Paragraph 15 relates to sub-threshold development and states:

Any project listed in this Part which does not exceed a quantity, area or other limit specified in this Part in respect of the relevant class of development but which would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7

The EPA Guidelines note that "*where a project is of a specified type but does not meet, or exceed the applicable threshold then the likelihood of the project having significant effects on the environment needs to be considered….this is done by reference to the criteria specified in Annex III of the amended Directive*."

Having regard to the location of the project in Newcastle, within the historic Burgage Field Plots, location of protected structures in proximity (including Tower House) and also within the Newcastle Architectural Conservation Area, it was considered appropriate to undertake a sub-threshold EIA.

The EIAR provides information on the receiving environment and assesses the likely significant effects of the project and proposes mitigation measures to avoid or reduce these effects. The function of the EIAR is to provide information to allow the competent authority to conduct the Environmental Impact Assessment (EIA) of the proposed development.

1.5 SCOPING

The EPA Guidelines state that '*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[3] as:

"'The process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process."

The EIAR team has extensive professional experience on undertaking similar EIAR projects on similar sites (e.g. Graydon SHD to the east by Cairn) and elsewhere over an extended period.

[3] Environmental Impact Assessment of Projects Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU)

Section 7(1)(b) of the 2016 Act, as amended, provides that a request for scoping may be submitted to the Board, however this is not mandatory and was not undertaken. The second paragraph of Article 5(2) of Directive 2014/92/EU provides that Member States can choose to make it mandatory that competent authorities have to give a scoping opinion irrespective of whether the developer so requests. The transposition of this provision is optional and has not been introduced in Ireland. The consultation paper from the Department indicates that it is not intended to introduce mandatory scoping.

The provisions included in the revised EIA Directive and all of the issues listed in Schedule 6, Sections 1, 2 and 3 of the Planning and Development Regulations 2001 (as amended) and in recent guidance documents have been addressed in the EIAR.

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

- Introduction and Methodology,
- Project Description and Alternatives Examined,
- Population and Human Health,
- Biodiversity,
- Land and Soils,
- Water,
- Air Quality and Climate,
- Noise and Vibration,
- Landscape and Visual Impact,
- Material Assets - Traffic,
- Material Assets - Waste
- Material Assets - Utilities,
- Cultural Heritage - Archaeology, ,
- Cultural Heritage Architectural Heritage,
- Risk Management for Major Accidents and or Disasters,
- Interactions of the Foregoing,
- Summary of EIA Mitigation and Monitoring Measures,
- Non-Technical Summary.

In addition to the above a series of standalone reports have been prepared to accompany the application and which have helped inform the above chapters of the EIAR where relevant. Chapter 2 provides details of the envisaged phased delivery of development on the lands.

In addition, consultation has taken place with the technical staff of South Dublin County Council and a consultation meeting has taken place between the Applicant and An Bord Pleanála under the strategic housing development process which assisted in the preparation of this EIAR and the SHD planning application.

1.6 INFORMATION TO BE CONTAINED IN AN EIAR

The content of this Environmental Impact Assessment Report has been prepared in accordance with the provisions of Article 5(1) and Annex IV of Directive 2014/52/EU. Article 5(1) states:

> *"The information to be provided by the developer shall include at least:*
> *(a) a description of the project comprising information on the site, design, size and 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 relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."*

Annex IV states:

"1. A Description of the project, including in particular:

(a) a description of the location of the project;

(a) (b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;

(b) (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;

(c) (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.

2. 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.

3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.

4. A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

5. A description of the likely significant effects of the project on the environment resulting from, inter alia:

(a) the construction and existence of the project, including, where relevant, demolition works;

(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;

(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);

(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;

(g) the technologies and the substances used.

The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.

6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.

7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

8. A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. W here appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

9. A non-technical summary of the information provided under points 1 to 8.

10. A reference list detailing the sources used for the descriptions and assessments included in the report."

Article 94 and Schedule 6 of the Planning and Development Regulations 2001, as amended, transpose into Irish law the EIA Directive requirements in relation to information to be contained in an EIAR.

Article 94 states:

"An EIAR shall take into account the available results of other relevant assessments under European Union or national legislation with a view to avoiding duplication of assessments and shall contain——

(a) the information specified in paragraph 1 of Schedule 6,

(b) any additional information specified in paragraph 2 of Schedule 6 relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, and methods of assessment,
(c) a summary in non-technical language of the information required under paragraphs (a) and (b),

(d) a reference list detailing the sources used for the descriptions and assessments included in the report, and

(e) a list of the experts who contributed to the preparation of the report, identifying for each such expert— (i) the part or parts of the report which he or she is responsible for or to which he or she contributed, (ii) his or her competence and experience, including relevant qualifications, if any, in relation to such parts, and (iii) such additional information in relation to his or her expertise that the person or persons preparing the EIAR consider demonstrates the expert's competence in the preparation of the report and ensures its completeness and quality."

Schedule 6 provides for the following information to be furnished:

1. (a) A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development.
(b) A description of the likely significant effects on the environment of the proposed development.
(c) A description of the features, if any, of the proposed development and the measures, if any, envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment of the development.
(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.

2. Additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters, by way of explanation or amplification of the information referred to in paragraph 1:

(a) a description of the proposed development, including, in particular—

(i) a description of the location of the proposed development,

(ii) a description of the physical characteristics of the whole proposed development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases,

(iii) a description of the main characteristics of the operational phase of the proposed development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used, and

(iv) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases;

(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) 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 selecting the chosen option, including a comparison of the environmental effects;

(c) a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge;

(d) a description of the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act likely to be significantly affected by the proposed development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape;

(e) (i) a description of the likely significant effects on the environment of the proposed development resulting from, among other things—

(I) the construction and existence of the proposed development, including, where relevant, demolition works,

(II) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources,

(III) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste,

(IV) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters),

(V) the cumulation of effects with other existing or approved developments, or both, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources,

(VI) the impact of the proposed development on climate (for example

the nature and magnitude of greenhouse gas emissions) and the vulnerability of the proposed development to climate change, and

(VII) the technologies and the substances used, and

(ii) the description of the likely significant effects on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act should cover the direct effects and any indirect, secondary, cumulative, transboundary, short term, medium-term and long-term, permanent and temporary, positive and negative effects of the proposed development, taking into account the environmental protection objectives established at European Union level or by a Member State of the European Union which are relevant to the proposed development;

(f) a description of the forecasting methods or evidence used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved;

(g) a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of an analysis after completion of the development), explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset during both the construction and operational phases of the development;

(h) a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events.

Article 5(1) of the EIA Directive and Article 94 of the 2001 regulations, also require that the EIAR shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under Union or national legislation. The available result of other such assessments, where relevant, have been considered in each of the chapters.

The likely significant effects in this EIAR are, unless otherwise indicated in a particular Chapter, described using the terminology in Table 3.4 in the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, EPA, May 2022 (the EPA Guidelines 2022), which are presented in the Table below. The use of these terms for the classification of impacts ensures that the EIA employs a systematic approach, which can be replicated across most disciplines covered in the EIAR. The consistent application of terminology throughout the EIAR facilitates the assessment of the proposed development on the receiving environment.

Table 1.2 – Description of Effects

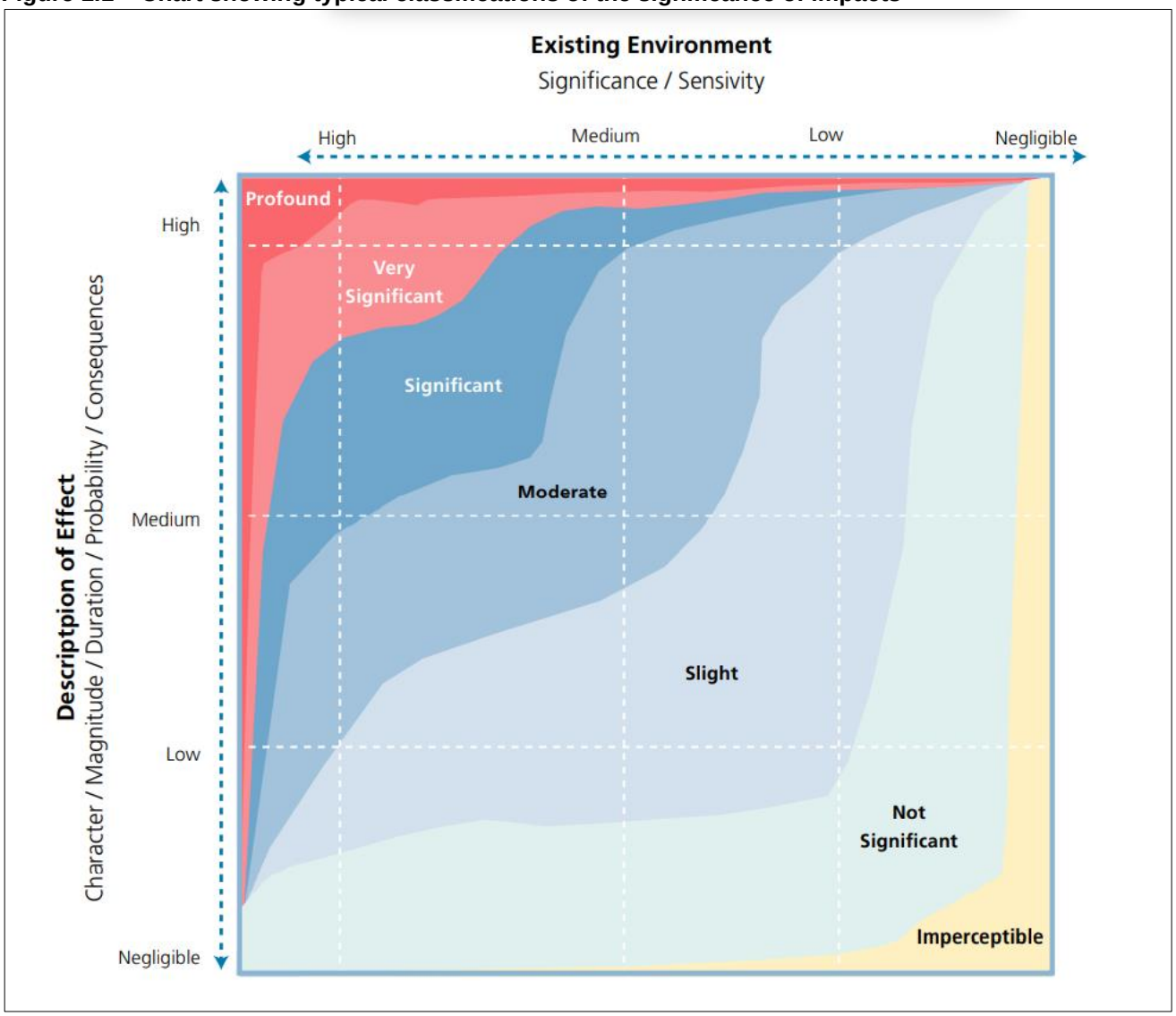
Quality of Effects	**Definition**
Negative /Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Positive	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Significance of Effects on the Receiving Environment	**Description of Potential Effects**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Extent and Context of Effects	**Describing the Extent and Context of Effects**

Extent	Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Probability of Effects	**Describing the Probability of Effects**
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration of Impact	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration
Frequency of Effects	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Types of Effect	**Describing the Types of Effects**
Indirect Effects (a.k.a. Secondary Effects)	Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative Effects	The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects
'Do-Nothing Effects'	The environment as it would be in the future should the subject project not be carried out.
`Worst case' Effects	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

Source: Table 3.4 EPA Guidelines 2022

The diagram below shows how comparison of the character of the predicted impact to the sensitivity of the receiving environment can determine the significance of the impact.

Figure 1.1 – Chart showing typical classifications of the significance of impacts



Source: Figure 3.4 of EPA Guidelines 2022

1.7 PURPOSE OF THIS EIAR

The EPA Guidelines 2022 state that the main purpose of an EIAR '*is to identify, describe and present an assessment of the likely significant effects of a project on the environment*'. This informs the competent authority's assessment process, its decision on whether to grant consent for a project and, if granting consent, what conditions to attach. The EIAR focuses on:

- *effects that are both likely and significant; and;*
- *description of effects that are accurate and credible.*

In addition to identifying and predicting the likely predicted significant environmental impacts resulting from the proposed development, the EIAR should describe the means and extent by which they can be reduced or ameliorated, to interpret and communicate information about the likely impacts and to provide an input into the decision making and planning process.

The EIAR documents the consideration of environmental effects that influenced the evaluation of alternatives. It also documents how the selected project design incorporates mitigation measures; including impact avoidance, reduction or amelioration; to explain how significant adverse effects will be avoided.

It is intended that this EIAR will assist An Bord Pleanála, statutory consultees and the public in assessing all aspects of the application proposals.

1.8 OBJECTIVES OF THIS EIAR

The EPA guidelines (2022) list the following fundamental principles to be followed when preparing an EIAR:

- Anticipating, avoiding and reducing significant effects;
- Assessing and mitigating effects;
- Maintaining objectivity;
- Ensuring clarity and quality;
- Providing relevant information to decision makers; and
- Facilitating better consultation.

The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and the environmental impact assessment should identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the prescribed environmental factors which are:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

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

This EIAR documents the assessment process of the prescribed environmental factors in relation to the proposed strategic housing development at Newcastle South.

Pursuing preventative action is the most effective means by which potential negative environmental impacts can be avoided. Avoidance of impacts has been principally achieved through the consideration of alternatives and through the review of the project design in light of identified key environmental constraints. This is outlined in greater detail in Chapter 2.

The EIAR document enables the Board, as competent authority, to reach a decision on the acceptability of the proposed development in the full knowledge of the project's likely significant impacts on the environment, if any.

Decisions are taken by competent/consent authorities through the statutory planning process which allows for public participation and consultation while receiving advice from other key stakeholders and statutory authorities with specific environmental responsibilities.

Public participation and consultation are an integral part of the Strategic Housing Development process as outlined in the Planning and Development (Housing) and Residential Tenancies Act 2016 and the Planning and Development (Strategic Housing Development) Regulations 2017, which amend the 2001 Regulations to include provisions relating to SHD.

The structure, presentation and the non-technical summary of the EIAR document as well as the arrangements for public access all facilitate the dissemination of the information contained in the EIAR. The core objective is to ensure that the public and local community are aware of any likely environmental impacts of projects prior to the granting of consent.

Informal scoping of potential environmental impacts was undertaken with the Planning Authority (South Dublin County Council) through pre-application meeting held on the 23rd August 2021 with the Planning Department, Transportation Department and Water Services Department.

1.9 FORMAT AND STRUCTURE OF THIS EIAR

1.9.1 EIAR Structure

The structure of the EIAR is laid out in the preface of each volume for clarity. It consists of three volumes as follows:

- **Volume I: Non-Technical Summary**

This is a non-technical summary of the information contained within Volume II.

- **Volume II: Environmental Impact Assessment Report.**

This is the main volume of the EIAR. It provides information on the location and scale of the proposed development, details on design and impacts on the environment (both positive and negative) as a result of the proposed development.

Each of the environmental aspects as listed below are examined in terms of the existing or baseline environment, identification of potential construction and operational stage impacts and where necessary proposed mitigation measures are identified. The interaction of the environmental aspects with each other is also examined. Each chapter below includes an assessment of potential cumulative impacts with other existing and planned developments, where relevant. Environmental aspects considered include:

Chapter 3 Population and Human Health;
Chapter 4 Biodiversity;
Chapter 5 Land and Soils;
Chapter 6 Water;
Chapter 7 Air Quality and Climate;
Chapter 8 Noise and Vibration;
Chapter 9 Landscape & Visual;
Chapter 10 Material Assets – Traffic;
Chapter 11 Material Assets - Waste Management;
Chapter 12 Material Assets – Utilities;
Chapter 13 Cultural Heritage – Local History, Archaeology;
Chapter 14 Cultural Heritage – Architectural Heritage;
Chapter 15 Risk Management for Major Accidents and or Disasters;
Chapter 16 Interactions of the Foregoing;
Chapter 17 Summary of EIA Mitigation and Monitoring Measures;

- **Volume III: Technical Appendices**

Volume III contains specialists' technical data and other related reports.

1.9.2 EIAR Volume II Structure

The preparation of an EIAR document requires the assimilation, co-ordination, and presentation of a wide range of relevant information in order to allow for the overall assessment of a proposed development. For clarity and to allow for ease of presentation and consistency when considering the various elements of the proposed development, a systematic structure is used for the main body of this EIAR document.

The structure used in this EIAR document is a Grouped Format structure. This structure examines each environmental topic[4] in a separate chapter of this EIAR document. The structure of the EIAR document is set out in Table 1.3 below.

[4] In some instances similar environmental topics are grouped.

Table 1.3 – Structure of this EIAR

Chapter	Title	Content
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	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.
4	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 and includes mitigation measures.
5	Land and Soils	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 includes mitigation measures.
6	Water	Provides an overview of the baseline position, the potential impact of the proposed development on water quality and quantity and includes mitigation measures.
7	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 includes mitigation measures.
8	Noise and Vibration	Provides an overview of the baseline noise environment, the potential impact of the proposed development and includes mitigation measures.
9	Landscape & 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 includes mitigation measures.
10-12	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 and includes mitigation measures.
13-14	Archaeology and 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 includes mitigation measures.

Chapter	Title	Content
15	Risk Management	Provides a review of the potential vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned
16	Interactions of the Foregoing	Describes the potential interactions and interrelationships between the various environmental factors.
17	Summary of Mitigation and Monitoring Measures	Sets out the key mitigation and monitoring measures included in the EIAR Document for ease of reference.

This systematic approach described above employs standard descriptive methods, replicable assessment techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration. An outline of the methodology employed consistently in each chapter to examine each environmental topic is provided below:

Table 1.4 – Methodology Employed to Evaluate Environmental Topic

- Introduction:
- Study Methodology:
- The Existing Receiving Environment (Baseline Situation):
- Do Nothing Scenario:
- Characteristics of the Proposed Development:
- Potential Impact of the Proposed Development:
- Avoidance, Remedial and Mitigation Measures: Avoidance:
- Predicted Impacts of the Proposed Development (Assessing the significance of residual effects, taking account of any mitigation measures):
- Monitoring:
- Reinstatement:
- Interactions and Cumulative Impacts:
- Difficulties Encountered in Compiling:
- References.

1.10 EIAR PROJECT TEAM

1.10.1 EIAR Project Management

The preparation of this EIAR was project managed, co-ordinated and produced by John Spain Associates. John Spain Associates role was to liaise between the design team and various environmental specialist consultants. John Spain Associates were also responsible for editing the EIAR document to ensure that it is cohesive and not a disjointed collection of disparate reports by various environmental specialists. John Spain Associates does not accept responsibility for the input of the competent specialist consultants or the design team.

1.10.2 EIAR Competent Experts/Environmental Specialists

Environmental specialist consultants were also commissioned for the various technical chapters of the EIAR. 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'.

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. Each environmental specialist was commissioned having regard to their previous experience in EIA; their knowledge of relevant environmental legislation relevant to their topic; familiarity with the relevant standards and criteria for evaluation relevant to their topic; ability to interpret the specialised documentation of the construction sector and to understand and anticipate how their topic will be affected during construction and operation phases of development; ability to arrive at practicable and reliable measure to mitigate or avoid adverse environmental impacts; and to clearly and comprehensively present their findings.

Each environmental specialist was required to characterise the receiving baseline environment; evaluate its significance and sensitivity; predict how the receiving environment will interact with the proposed development and to work with the EIA project design team to devise measures to mitigate any adverse environmental impacts identified.

The relevant specialist consultants who contributed to the EIAR and their inputs are set out in Table 1.5 below.

Table 1.5 – EIAR List of Competent Experts

Organisation	EIAR Specialist Topics / Inputs
John Spain Associates, Planning & Development Consultants, 39 Fitzwilliam Place, Dublin 2, D02 ND61 T: 01 662 5803 Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt	Introduction and Methodology Project Description and Alternatives Examined Population and Human Health Interactions of the Foregoing Principal Mitigation and Monitoring Measures Non-Technical Summary
Altemar Bryan Deegan – MCIEEM, M.Sc. Environmental Science, BSc (Hons.) in Applied Marine Biology; National Diploma in Applied Aquatic Science CMK Tree Survey and Report Charles McCorkell – BSc. (Hons) Agriculture, MICF, LANTRA	Biodiversity
Altemar Bryan Deegan – MCIEEM, M.Sc. Environmental Science, BSc (Hons.) in Applied Marine Biology; National Diploma in Applied Aquatic Science	Biodiversity (Bats)
Mr. Noel Gorman DBFL Consulting Engineers BEng, CEng, MIEI Chartered Civil Engineer	Land and Soils/ Population and Human Health
Mr. Noel Gorman DBFL Consulting Engineers BEng, CEng, MIEI Chartered Civil Engineer	Water and Hydrogeology
Mr. Mark McKenna DBFL Consulting Engineers, BEng (Hons), MSc, MIEI	Material Assets-Traffic
David Doran MSc in Environmental and Energy Management. Chonaill Bradley of AWN Consulting BSc in Environmental Science.	Material Assets (Waste Management)

Organisation	EIAR Specialist Topics / Inputs
Associate Member of the Institute of Waste Management (CIWM)	
Margaret Dolan, Tech Cert, BSc (Hons), CEng, MIEI, Chartered Engineer of Waterman Moylan Consulting Engineers	Material Assets (Utilities)
Dr. Avril Challoner AWN CSci BEng (Hons) (Environmental) HDip in Statistics PhD in Environmental Engineering (Air Quality)	Air Quality and Climate (Population and Human Health)
AWN Leo Williams BAI MAI PgDip AMIOA, Acoustic Consultant	Noise and Vibration (Population and Human Health)
Jim Bloxam (MLArch, MILI), a Senior Associate Landscape Architect	Landscape and Visual Impacts
Mr. Noel Gorman DBFL Consulting Engineers BEng, CEng, MIEI Chartered Civil Engineer	Risk Management
Faith Bailey MA, BA (Hons), MCIfA Associate Director. Rob Goodbody (BA (MOD), DIP ENV P, DIPABRC, MUBC, MA)	Archaeology, Architectural and Cultural Heritage
John Spain, BBS, MRUP, MRTPI, MIPI, Managing Director, John Spain Associates	Review of EIAR

1.11 NON-TECHNICAL SUMMARY

The EIA Directive requires that one of the objectives of the EIA process is to ensure that the public are fully aware of the environmental implications of any decisions.

The EPA guidelines 2022 note that the non-technical summary of the EIAR should facilitate the dissemination of the information contained in the EIAR and that the core objective is to ensure that the public is made as fully aware as possible of the likely environmental impacts of projects prior to a decision being made by the Competent Authority. The 2018 EIA Guidelines (paragraph 4.6) prepared by the DHPLG state that the Non-Technical Summary *"should be concise and comprehensive and should be written in language easily understood by a lay member of the public not having a background in environmental matters or an in-depth knowledge of the proposed project."*

A Non-Technical Summary of the EIAR has therefore been prepared which summarises the key environmental impacts and is provided as a separately bound document in Volume I.

1.12 LINKS BETWEEN EIA AND APPROPRIATE ASSESSMENT/NIS

Article 6(3) of the Habitats Directive (92/43/EEC) provides that any project not directly connected with or necessary to the management of a Natura 2000 site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to an Appropriate Assessment of its likely implications for the site in view of the site's conservation objectives.

In January 2010 the DoEHLG issued a guidance document entitled '*Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities'*. This guidance document enshrines the '*Source-Pathway-Receptor'* into the assessment of plans and projects which may have an impact on Natura 2000 sites.

An Appropriate Assessment screening by Altemar was carried out in accordance with '*Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance on the Provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC)'* - Brussels, 28.9.2021 C(2021) 6913 final. The AA Screening is included with the SHD application.

In accordance with these Guidelines, the Appropriate Assessment may be a separate document or form part of the EIAR. In the case of the proposed development a separate Appropriate Assessment Screening Report is submitted with this application as a standalone report and referenced in the Biodiversity Chapter.

Article 5(1) of the Directive also states that the EIAR shall include the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment. The developer shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under Union or national legislation, in preparing the environmental impact assessment report.

In this regard, while not required under Part 23 of the Planning and Development Regulations 2001-2021, a brief account of how the results of other relevant assessments considered in the preparation of this EIAR is included as Appendix B Volume III of the EIAR.

1.13 AVAILABILITY OF EIAR DOC

A copy of this EIAR document and Non-Technical Summary of the EIAR document is available for purchase at the offices of An Bord Pleanála and South Dublin County Council (Planning Authority) at a fee not exceeding the reasonable cost of reproducing the document. It can also be viewed on the SHD website: www.newcastlesouthplanning.com set up by the applicant.

1.14 IMPARTIALITY

This EIAR document has been prepared with reference to a standardised methodology which is universally accepted and acknowledged. Recognised and experienced environmental specialists have been used throughout the EIA process to ensure the EIAR document produced is robust, impartial and objective.

1.15 STATEMENT OF DIFFICULTIES ENCOUNTERED

No particular difficulties, such as technical deficiencies or lack of knowledge, were encountered in compiling any of the specified information contained in this statement, such that that the prediction of impacts has not been possible. Where any specific difficulties were encountered these are outlined in the relevant chapter of the EIAR.

1.16 EIAR QUALITY CONTROL AND REVIEW

John Spain Associates is committed to consistently monitoring the quality of EIAR documents prepared both in draft form and before they are finalised, published and submitted to the appropriate competent authority taking into account latest best-practice procedure, legislation and policy. The EPA published draft guidelines on information to be contained in Environmental Impact Assessment Report[5] and the Department of Housing, Planning, Community and Local Government have published a consultation paper[6], which have been consulted in the preparation of this EIAR. This document includes a detailed EIAR Review Checklist which has been used to undertake a review of this EIAR document.

1.17 ERRORS

While every effort has been made to ensure that the content of this EIAR document is error free and consistent there may be instances in this document where typographical errors and/or minor inconsistencies do occur. These typographical errors and/or minor inconsistencies are unlikely to have any material impact on the overall findings and assessment contained in this EIAR.

[5] *Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency, 2022*

6 *Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems - Key Issues Consultation Paper, Department of Environment, Community and Local Government, 2017.*

2.0 DESCRIPTION OF THE PROJECT AND ALTERNATIVES EXAMINED

2.1 INTRODUCTION AND TERMS OF REFERENCE

This section of the EIAR has been prepared by John Spain Associates, Planning & Development Consultants, and provides a description of the proposed development and also explains the evolution of the scheme design through the reasonable alternatives examined. This chapter of the EIAR was prepared by Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates, and approved by John Spain, Managing Director.

Rory Kunz has a Masters in Environmental Resource Management and a Diploma in EIA Management (both from UCD) as well as a Masters in Town and Country Planning. In addition, Rory is a corporate member of the of the Irish Planning Institute and has 19 years of experience of Environmental Impact Assessment and urban development.

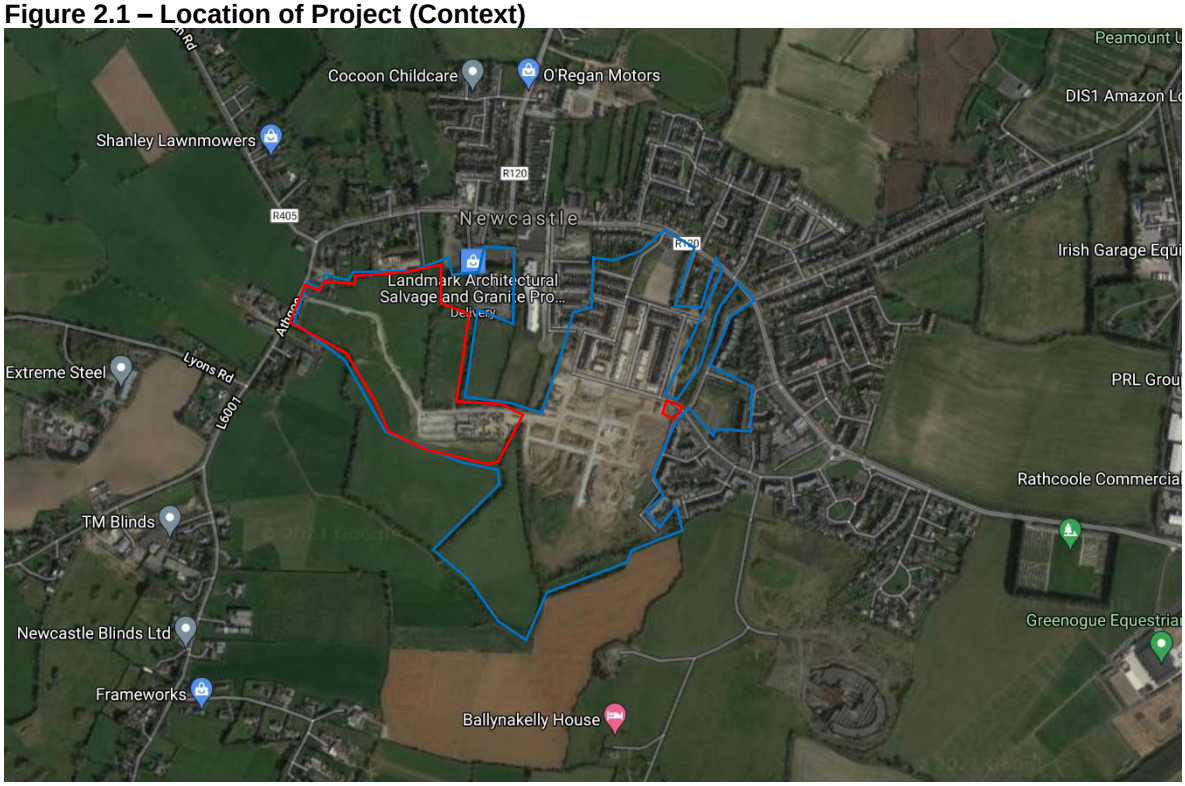
Rory has acted as lead planning consultant on a range of high-quality complex planning applications across the country over an extended period. Rory has wide-ranging experience in the management and review of Environmental Impact Assessment Reports (EIAR) for major residential and mixed-use development and redevelopment projects. Inputs to this chapter have also been provided by MOLA Architects, DBFL Consulting Engineers, AWN Consulting and Moylan Consulting Engineers.

The description of the proposed development is one of the two foundations upon which an EIAR is based (the other being the description of the existing environment described in this chapter and by each of the specialist consultants in the subsequent chapters). It is also a requirement of the EIA Directive (as amended) to present "*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*."

2.2 DESCRIPTION OF THE LOCATION OF THE PROJECT

The location of the project is within the administrative area of South Dublin County Council. The lands are situated within the development boundary of Newcastle as identified in the Newcastle Local Area Plan 2012 extended to 2022 (LAP). The proposed development site is situated in the townland of Newcastle South.

Figure 2.1 – Location of Project (Context)



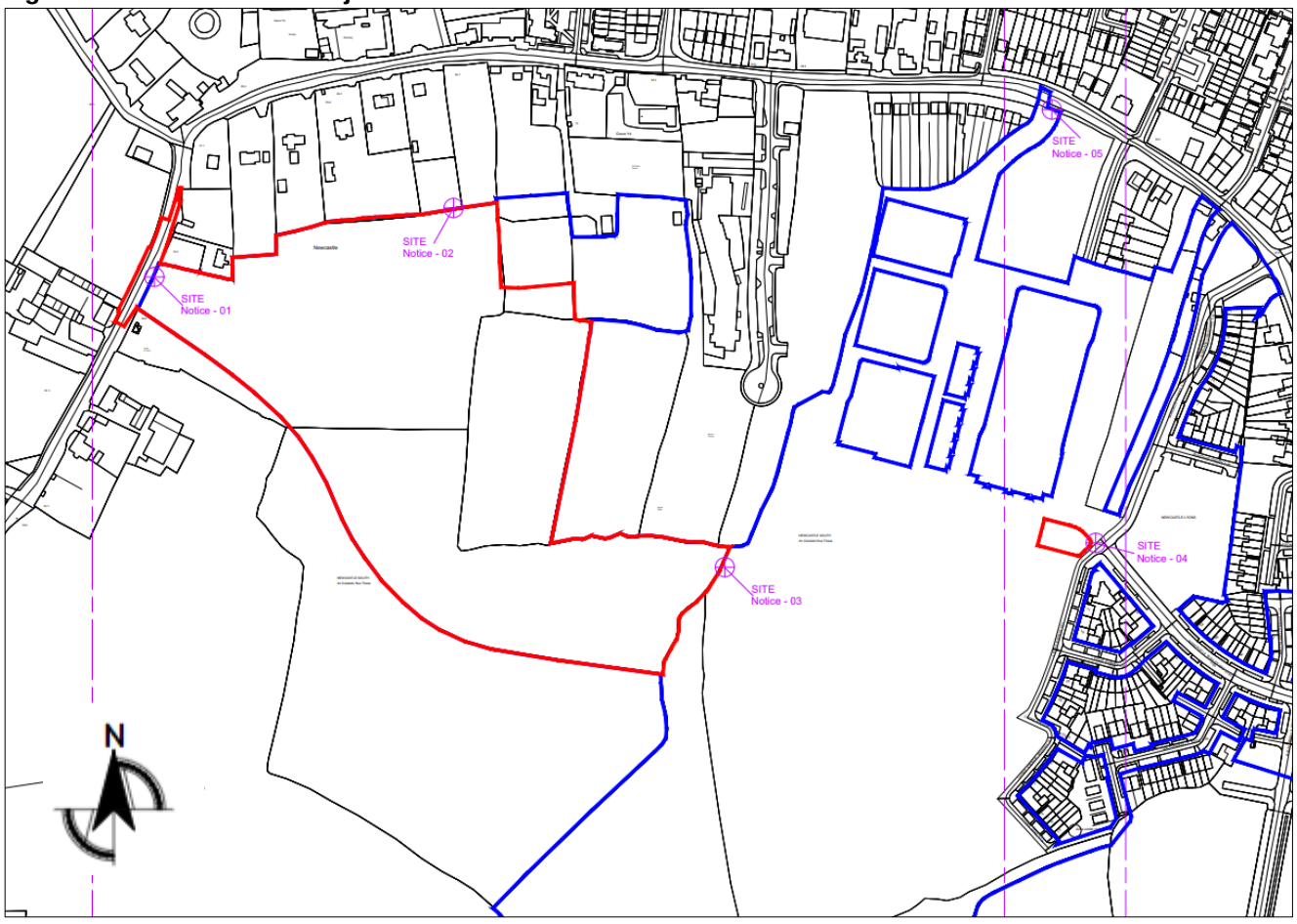
The proposed development site is situated to the south of Main Street, Newcastle. Main Street is formed by the R120 which links the M4 Motorway at Lucan with the N7 National Primary Route at Rathcoole Interchange. The R405 joins the R120 on the Main Street. The R405 links the M4 Motorway via Celbridge and Hazelhatch Rail Station to the N7 at Rathcoole.

The indicative location of the subject site is outlined in red below, with the neighbouring SHD lands (Graydon - under construction) and other lands under the control of the applicant in blue.

Newcastle is a small village situated 20km south of Dublin City Centre. The village supports a range of commercial and social facilities including a church; a national school; a range of local village shops; a pharmacy, and a medical centre along the Main Street. Located opposite Newcastle Manor is a Texaco Service Station which accommodates a post office and convenience store. The Greenogue Industrial Estate and Aerodrome Business Park are located just beyond the village to the east.

The Site Layout Plan (figure 2.3) prepared by MOLA Architects shows the overall layout in context.

Figure 2.2 – Location of Project



Source: Mola Architects

2.3 DESCRIPTION OF THE PHYSICAL CHARACTERISTICS OF THE WHOLE PROPOSED DEVELOPMENT

2.3.1 Demolition

There is no demolition of habitable or any other structures relating to the proposed development.

2.3.2 Main Characteristics of the Operational phase of the project

In summary, the proposed development comprises 280 no. residential units consisting of 128 no. 2-storey semi-detached and terraced houses providing 2, 3 4 and 5 bed units, 18 no. 3-bed duplex units over 18 no. ground floor 2-bed apartments in 3 separate no. 3-storey blocks and 116 no. apartments (1, 2 and 3 bed units) provided within 2 no. 5-storey buildings, all associated site work, access, infrastructure, car parking, open space and boundary treatments.

Table 2.1 – Summary of Key Site Statistics

Site Area	8.47 ha. Gross (including road works and creche site c. 0.07 ha) 7.3 ha. net (residential development)
Land Use Zoning	Objective RES-N' - *'To provide for new residential communities in accordance with approved area plans'* 'Objective RU' *'To protect and improve rural amenity and to provide for the development of agriculture.*
No. of Dwellings	280 dwellings (128 no. houses & 152 no. duplex apartments/apartments) 8 no. 2 bedroom houses 94 no. 3 bedroom houses 25 no. 4 bedroom houses and 1 no. 5 bedroom house 116 no. apartments 54 no. 1 bedroom apartments & 62 no. 2 bedroom apartments 36 no. apartments/duplex apartments (18 no. 2 bedroom apartments and 18 no. 3 bedroom duplex apartments)
Density	33.1 units per hectare Gross (37.1 units per hectare net)
Creche	778 sq. m
Open Space	1.98 ha. of open space comprising: 1.71 ha. public open space 0.27 ha communal open space
Building Heights	2, 3 and 5 storeys
Dual Aspect	50%
Plot Ratio	1:0.34 (Gross) 1:0.38 (Net)
Car Parking	423 (251 no. for houses, 172 no. for apartments/duplexes & 13 no. permitted from Graydon SHD for the creche)
Bicycle Parking	370 no. cycle spaces (252 no. long stay secured & 112 no. short stay & 6 no. for creche).
EV spaces & Car Share	38 no. EV and 5 no. car share
Vehicular Access	Athgoe Road, Graydon to the East and to the northern boundary (St. Finian's Way)
Part V	28 units

2.4 DEMOLITION

There is no demolition of habitable or any other structures relating to the proposed development.

2.5 RESIDENTIAL DEVELOPMENT

The development will consist of the construction of 280 no. dwellings, a creche, and open space at this site within the townland of Newcastle South, Newcastle, Co. Dublin, on lands of c. 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche c. 0.07 ha. in 'Graydon' as follows:

A) 128 no. 2 storey houses (8 no. 2 bedroom houses, 94 no. 3 bedroom houses, 25 no. 4 bedroom houses and 1 no. 5 bedroom house;
B) 116 no. apartments in 2 no. 5 storey buildings comprising (54 no. 1 bedroom apartments & 62 no. 2 bedroom apartments, all with terrace or balcony along with solar panels and green roofs at roof level as well as telecommunications infrastructure comprising 9 no. support poles on ballast mounts (to accommodate 1No. 2m 2G/3G/4G antenna & 1No. 5G antenna each) & 3 no. poles on lift overrun (to accommodate 2No. Ø0.3m Microwave links each at roof level of Apartment building B, together with associated equipment and cabinets/shrouds);
C) 36 no. apartments/duplex apartments in 3 no. 3 storey buildings – (18 no. 2 bedroom apartments and 18 no. 3 bedroom duplex apartments) all with terrace;
D) Amendment to permitted Creche (c. 518sqm) in *'Graydon'* (ABP References: TA06S.305343 & ABP-305343-19) to now provide a Creche of c. 778 sq. m of 2 no. storeys;
E) Open space, hard and soft landscaping (including public lighting & boundary treatment), communal open space for duplex apartments and apartments; along with single storey bicycle/bin stores and ESB substations;
F) Vehicular access from the Athgoe Road from a new signalised junction along with upgrades to footpath and pedestrian crossing as well as provision of vehicular/pedestrian/cycle link to permitted 'Graydon' (TA06S.305343) 'Newcastle Boulevard' to the east, as well as 423 no. car parking spaces and 370 no. bicycle spaces and all internal roads, cycleways, green routes and paths;
G) Provision of Surface water attenuation measures and underground attenuation systems, connection to water supply, and provision of foul drainage infrastructure as well as underground local pumping station to Irish Water specifications and all ancillary site development/construction/landscaping works.

Figure 2.3 – Site Layout

Source: Mola Architects

The houses are located in the western portion of the lands, while the 2 no. apartment buildings are located centrally within the site. The duplex units are located in the southern part of the site.

The overall mix of apartments within the proposed scheme is noted as follows:

Table 2.2 – Overall Mix of Units

	1 bed	2 bed	3 bed	4 bed	5 bed	Overall
Houses		8	94	25	1	128
Apartments	54	62				116
Duplex Apartments		18	18			36
Total	54	88	112	25	1	280
Overall Mix %	19.2%	31.4%	40%	8.9%	0.3%	

Source: Mola Architects

The proposal will include significant areas of open space and landscaping which will include a combination of pocket parks, neighbourhood park and interlinked shared surfaces which will enhance pedestrian movement and permeability. The primary point of access is proposed from the 'Athgoe' roadway, which connects the R405 and L6001, at the site's western perimeter. A secondary access is also proposed to connect with the permitted development to the adjoining lands of Graydon to the east and south-east boundaries.

2.6 HOUSES

The 128 no. houses are designed as two storey family dwellings, in a wide mix of units comprising 8 no. 2 bedroom houses, 94 no. 3 bedroom houses, 25 no. 4 bedroom houses and 1 no. 5 bedroom unit in semi-detached or terraced configurations. Individual plot layouts provide good separation to ensure privacy and minimise overlooking. The end-row and end terrace house types have been used to turn corners, with front doors and windows giving activity and passive supervision to the sides and avoiding large blank gables. All houses are 2 no. storeys with private amenity space in the form of a rear garden. Dwellings are provided as a combined of semi-detached and terraced units. Individual plot layouts provide good separation to ensure privacy and minimise overlooking both within the proposed development and to the north at St. Finian's Way.

The variety of house types provides for a wide choice to suit all potential occupiers and many household types, as well as permitting a very efficient site layout. The mix of house type in the street frontage creates visual interest and contribute to the specific character of the development, both overall and in each street. The overall provision of 10 no. house types adds positively to the variety for potential occupiers and contributes to a development which provides high quality family homes in a legible and efficient layout which is easily navigable.

2.7 APARTMENT BUILDINGS

The apartments will be located in 2 no. centrally located apartment buildings of 5 storeys in height and are located within the Burgage Plot.

Figure 2.4 – Greenway

2.7.1 Block A

Block A is 5 storeys and comprises 58 no. apartments consisting of 27 no. 1 bedroom apartments & 31 no. 2 bedroom apartments and is located within the southern portion of the Burgage Plot.

Figure 2.5 – Apartment Building A within Burgage Plot

Extensive areas of open space are provided within the Burgage Plot area comprising c. 0.5 hectares along with additional communal open space of c. 1,627 sq. m

2.7.2 Block B

Block B is 5 storeys and comprises 58 no. apartments consisting of 27 no. 1 bedroom apartments & 31 no. 2 bedroom apartments.

Figure 2.6 – Apartment Building B within Burgage Plot

Figure 2.7 – Apartment Buildings within Burgage Plot

2.8 DUPLEX UNITS

It is proposed to provide 36 no. duplex units (18 no. 2 bed and 18 no. 3 bed ground floor duplex apartments) contained in 3 no. separate 3 storey duplex buildings located within the south east portion of the scheme. Communal open space with a southerly aspect of c. 1,063 sq. m is provided.

Figure 2.8 – Duplex Units

The three storey duplex blocks provide a focal point at the eastern entrance point to the scheme from the adjacent Graydon development. They also continue the transition between the adjacent Graydon development and the subject lands. The Duplex Blocks will be a combination of Brick and self-coloured render.

Figure 2.9 – Duplex Units Layout

2.9 CRECHE

The Creche that forms part of this application is an amendment to the permitted Creche (c. 518sqm) in 'Graydon' (ABP References: TA06S.305343 & ABP305343-19) to now provide a 2 no. storey Creche of c. 778 sq. m. The parking is as per previously permitted, with some additional cycle spaces (6 no.) provided.

Figure 2.10 – Creche

Figure 2.11 – Creche Layout

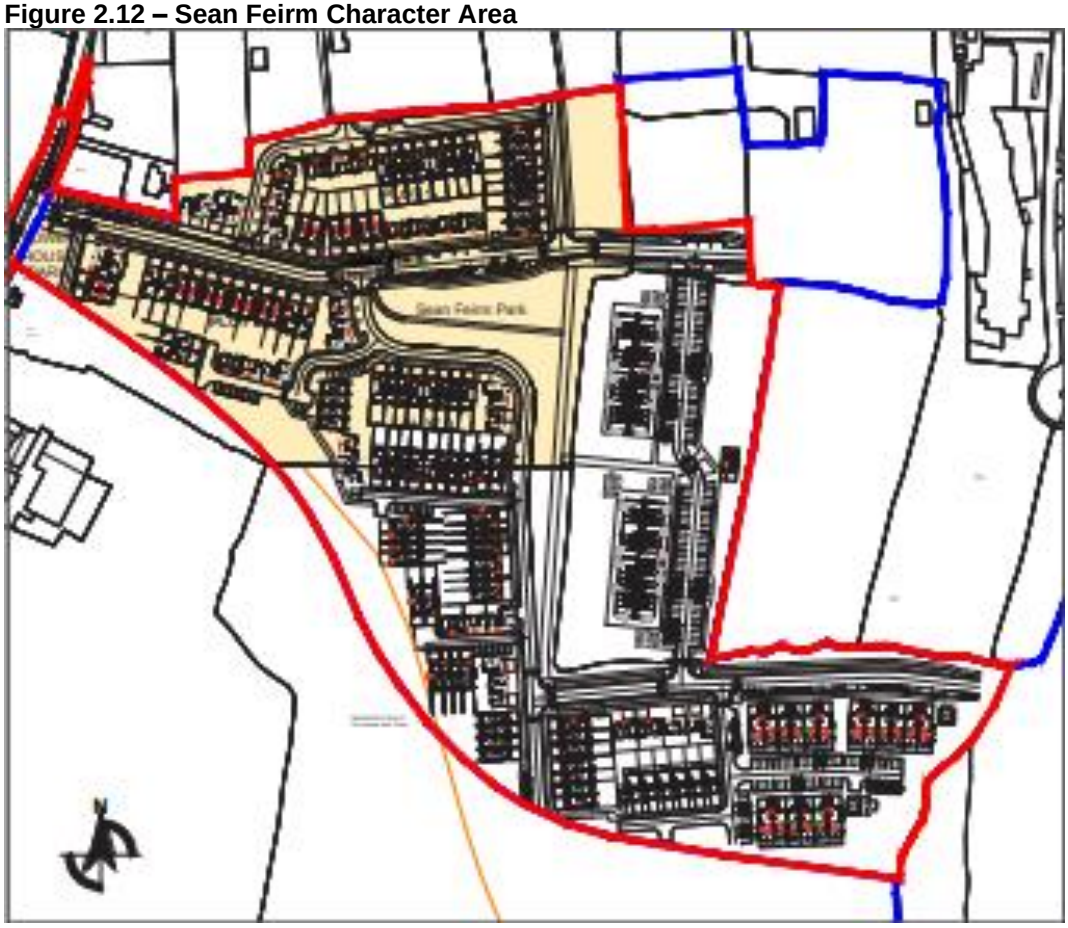
2.10 CHARACTER AREAS

2.10.1 Character Area - Neighbourhood 1 - Sean Feirm

The Sean Feirm Neighbouhood is a mix of 2 storey Detached, Semi detached and some terraced housing providing 73 units on a site of C.3.4Ha.

The area of this Neighbourhood has a gentle east to west cross fall of approximately 1 to 2m and so is generally flat to gently sloping. The northern boundary of this neighbourhood backs onto the existing large detached houses that front onto the Main street and also the recently completed 2 storey terraced development, at St. Finian's Way. The Sean Feirm neighbourhood forms the main access off the Athgoe road and connects the main boulevard that runs through the development to the eastern boundary connection with Graydon and Ballynakelly.

Figure 2.12 – Sean Feirm Character Area



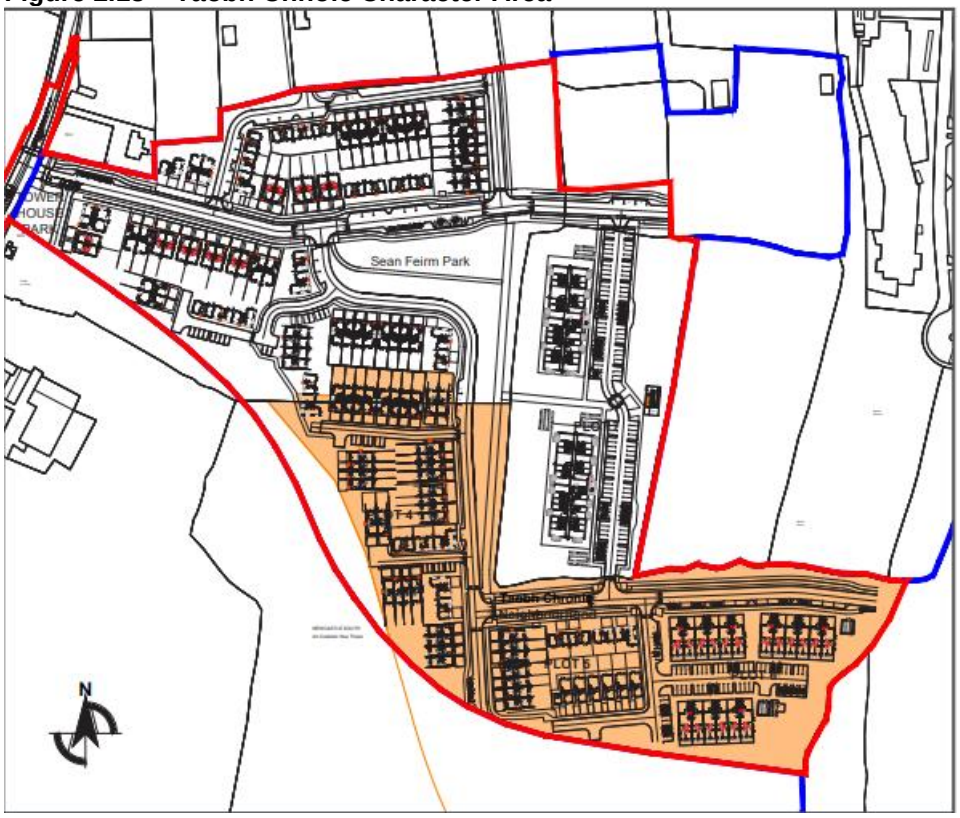
Two parks have been provided, Towerhouse park, a small pocket park acting as a gateway feature at the Athgoe entrance, while also providing an appropriate setting and green buffer to the upstanding Towerhouse located further south along Athgoe road. This also facilitates any future walking and cycling trails that would incorporate Towerhouse. As well as the pocket park a more formal park (Sean Feirm Park) has been provided as set out in the LAP.

Frontages of houses are to be of a Brick finish to the ground floor with a soldier course detail and self rendered finish to the first floor. The colour of brick used will further differentiate this neighbourhood from the other areas. The ground floor windows to the front facades will also have a selected reconstituted stone surround detail providing a more historical feature. Rear and gable walls where they do not font onto the street and form the entrance to the house will be a self coloured render finish.

2.10.2 Character Area - Neighbourhood 5 - Taobh Chnoic

The Taobh Chnoic Neighbouhood is a mix of 2 storey Detached, Semi detached and terraced housing along with 3No three storey Duplex blocks, providing a total of 91 units on a site of C.3.1Ha.

Figure 2.13 – Taobh Chnoic Character Area



The detached, semi detached and terraced houses of this neighbour hood continue the transition between the village and rural hinterlands along the southern boundary.

2.10.3 Character Area - Neighbourhood 4 - Burgage South

2.10.4 Character Area - Neighbourhood 4 - Burgage South

The area within our proposed development is in the Burgage South Neighbourhood and forms part of the Village expansion area. The Burgage South Neighbourhood is located on lands that are permeated by the historic burgage plot hedgerows. It is a requirement of the LAP that this neighbourhood should be developed around and within the burgage plot patterns. The effect of reducing the footprint of development in this part of the site has allowed for larger areas of landscaping and public open spaces that incorporate and protect the historic burgage hedgerows. This landscaped approach enhances the public realm within the plot and surrounding areas

This design rational has allowed for the future protection of these Burgage hedgerows by keeping them within in public and managed areas and reducing the need to remove sections of the hedgerow. Pedestrian and cycle paths form part of the proposal for this neighbourhood providing accessible links to other parts of the scheme. The Hedgerows will also be incorporated in to the SUDS network and form the boundaries to the parks and open spaces

Figure 2.14 – Character Area Burgage South

2.11 LANDSCAPING STRATEGY

2.11.1 Design Approach & Open Space Planning Context

The design intent is to create a high quality and appropriate landscape for future residents, which will meet their recreational needs and provide an attractive visual setting and associated social amenity spaces. The principles of inclusivity for all age groups, universal accessibility and sustainable development are applied to ensure an inclusive and environmentally responsible design solution. The objective of the landscape strategy for the proposed development is not simply to apply greenery to open areas but to place the new residential and community facilities within a cohesive landscape that responds to and integrates the proposed development within the site. The landscape developments that are proposed are in accordance with the relevant Green Infrastructure policies of the South Dublin County Council Development Plan 2016 – 2022, Draft South Dublin County Development Plan 2022-2028 and the Newcastle Local Area Plan 2012.

POS (A) - Tower Park	472	
POS (B) - Sean Feirm Park	3427	
POS (C) - North South Green Link	2884	
POS (D) - Northern Space	1460	
POS (E) - adjacent to Apts (total)	5110	
POS (F) - To western boundary with LAP	3744	
Total	***17097***	22.2%
Amenity Area - Apartments	1627	
Amenity Area - Duplex Blocks	1063	
Total	***2690***	

The Local Area Plan seeks to create a permeable network of green infrastructure and open spaces across the LAP lands. This allows for the creation of a series of local parks within easy walking distance of future residents, along with a larger village park area (Taobh Chnoic Park) a significant portion of which is to be delivered as part of the Graydon development, to the south of the lands. Each of the smaller open spaces will cater for active and passive needs while the Taobh Chnoic Park will cater for more formal play activities, with the inclusion of a senior size playing pitch, a multi-use games area and a playground catering for a large range of age groups.

These open spaces are linked with a Greenway pedestrian/ cycle network. This network links existing developed areas to the east to the centre of Newcastle to the north through the new development and continues out to the existing roadway on the western side of Newcastle. The proposed greenway incorporates existing hedgerows where feasible and is separated from the proposed roadway system as much as possible.

2.11.2 Burgage Plots

As set out in the Murray Associates Landscape Report, overarching this permeable pedestrian-focused network is the existing burgage plot and hedgerow system. The LAP sets out to retain, incorporate and reinstate the existing burgage plot boundaries associated with Newcastle. Within the proposed development the creation of successful streets and urban configurations has been carefully balanced with the need to retain the burgage character of the landscape. A study of existing and proposed hedge typology has been undertaken, which, along with recommendations from the LAP, and has formed the basis of a system of retention and reinstatement of plot boundaries and hedgerows.

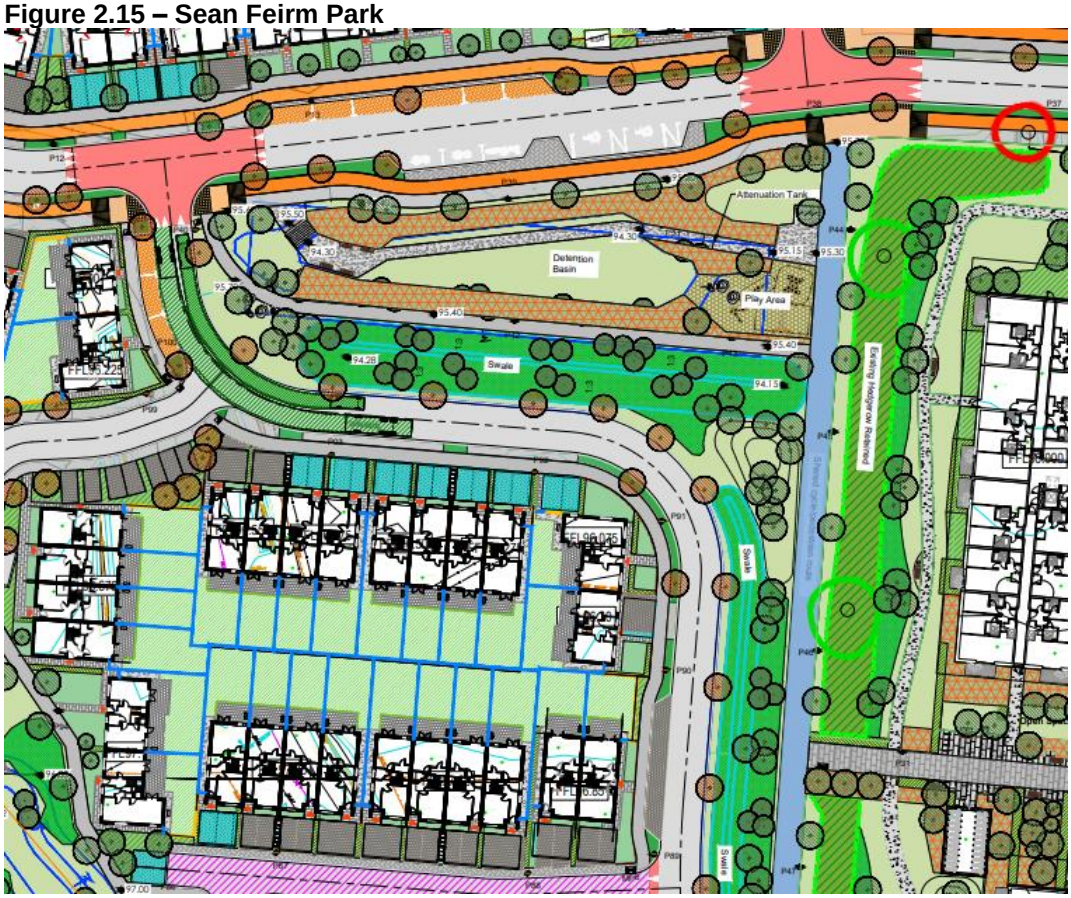
The proposed development will also provide for a connected series of public open spaces and amenity Green Infrastructure areas measuring c 1.71 hectares is provided.

The proposed open space for the overall site is c 22.2% therefore meets and exceeds the open space requirements as set out in the 2016 Development Plan (14%) and the draft 2022 Development Plan (15%). Furthermore, it is proposed to provide additional open space comprising Communal Open Space of 1,627sq. m for the apartments and 1,063 sq. m for the duplex units. (c. 0.27 hectares)

2.11.3 Landscape Layout and Design

The site layout proposal aims to create a unifying streetscape which is rich in detail and diverse in textural and spatial qualities, with open spaces and boundary planting lending a verdant and visually attractive atmosphere. The open spaces are directly over-looked by dwellings, providing passive surveillance for safety. Within the open spaces there are areas for informal play, casual recreation and passive leisure. The quality of these spaces is enhanced by the inclusion of features such as, seating, paths, native planting and landform, and the utilisation of environmentally appropriate materials. Natural Play elements will be incorporated within the spaces. Natural Play incorporates designed elements that enable play spaces to blend in with their surroundings and encouraging interaction with the natural landscape. A restrained palette of materials will also be used to integrate the proposed architectural forms and materials within the landscape.

Figure 2.15 – Sean Feirm Park



2.12 ACCESS

The proposed development will be accessed from the L6001 Athgoe Road to the west of the site. The access point from the L6001 Athgoe Road to the west of the site is proposed to be updated to a signalised junction. The proposed signalised junction aims to improve pedestrian accessibility to the existing footpath on Athgoe Road and improve connectivity to Newcastle Main street. There will be a link street providing access from Newcastle Phase 1 (Graydon Development) provided under planning reference ABP 305343-19.

The proposed link street carriageway is 6.5m to 6.0m wide with a raised adjacent cycle track on each side in the western and eastern area of the site. The cycle facilities deviate from the link street onto a 4m wide greenlink in the centre section of the site. Intermittent parallel parking bays are provided as per the Newcastle LAP, 2012.

The permeability of the site will ensure ease of access for future residents (through a number of modes of travel) to facilities such as Newcastle town centre, its associated retail and commercial services, and public transport facilities such as Dublin Bus stops served by the 68 route.

The proposed development site is proposed to be accessible from 3 no. vehicular access points. The first will be located to the east where the subject lands connecting with the emerging Graydon development lands. The second is via a proposed new signal controlled junction located on Athgoe Road. The third vehicular access is proposed to the north with the R120 Main Street corridor via the emerging 3rd party development currently under construction at this location. The figure below presents the aforementioned site access locations.

The proposed new site access junction on Athgoe Road will take the form of a three-arm signal-controlled junction comprising the following key characteristics:

- Right turn lane on the southern approach so that right turning vehicles do not delay ahead moving traffic;
- Pedestrian crossings across all arms to ensure convenient access / egress for non-vehicular modes; and
- Right turn set back to facilitate any left turning HGV's exiting the site. This set back allows for the provision of 'tight' corner radii (6m) compliant with DMURS to minimise crossing widths for pedestrians and control vehicle speeds.

Figure 2.16 – Proposed Site Access Locations

Source: DBFL

2.12.1 Green Link Cycle Infrastructure

Green-link cycle infrastructure has been provided throughout the development to link parks, existing roads and local amenities in accordance with the Newcastle LAP 2012. Cycle infrastructure on the east/west link street has been

provided as raised adjacent cycle tracks to align with the Newcastle LAP, 2012 and ties into existing cycle infrastructure in the Graydon Development to the east. The cycle facilities deviate from the link street onto a 4m wide greenlink in the centre section of the site. The proposed north/south green link is provided as a 4m wide shared surface for pedestrians and cyclists migrating between the various amenities and runs through predominantly green open space.

The green-link has been designed with no proposed vehicular crossings. The green link ties into the east/west link street at the south of the proposed site and ties into the east/west link street to the north. The green link has been designed in accordance with TII TD300 (Rural Cycleway Design Guide) and the National Cycle Manual.

2.13 PARKING

2.13.1 Car Parking

The proposed development layout design provides a total of 423 no. car parking spaces comprising 251 no. for the houses and 172 no. for the apartment / duplex units (13 no. car parking assigned to the creche as permitted within the Graydon development and outside of the subject application site boundary).

Disabled car parking spaces are required at a rate of 5% of total car parking provision for the apartment / duplex units which equates to a total of 8 no. dedicated mobility impaired car parking spaces. 13 no. mobility impaired parking spaces are proposed, with 10 to serve the residential units and 1 for the creche (5% required as per SDCC development plan 2016-2022 which equated 2 1 no. bay), and 2 no. universal access drop off bays. Accordingly, this level of provision complies fully with the local development management requirements.

A total of 38 no. electrical vehicle car parking spaces are proposed which equates to 21% of the apartment / duplex car parking provision. It is assumed that residents of the housing units can utilise their private power supply to charge electric vehicles parked in-curtilage and infrastructure in place to allow for future installation of charging points. This provision is higher than both the current SDCC development plan 2016-2022 which requires 10% of parking spaces and draft development plan 2022-2028 which requires 15-20% of parking spaces.

5 no. car share spaces for car club members (e.g. GoCar) are proposed within the development site boundary including 2no. located in close proximity to the houses, 1 no. located at the apartment blocks, 1 no. located at the duplex units and 1 no. located at the creche. Residents / visitors of the subject development can book cars online or via the app for as little as an hour, then unlock with their phone; the keys are in the car, with fuel, insurance and city parking all included.

The benefits of such car sharing services include, (i) the reduction of the number of cars on the road and therefore traffic congestion, noise and air pollution; (ii) frees up land traditionally used for private parking spaces but which may not be used, (iii) increases use of public transport, walking and cycling as the need for car ownership is reduced and (iv) Car sharing allows those who cannot afford a car the opportunity to drive, encouraging social inclusivity.

Table 2.3 – Proposed Car Parking provision

Land Use	General	Visitor	Disabled	Electric Vehicles	Car Share	Total
Apartments	84	6	5*	16	1	**112**
Duplexes	36	8	5*	10	1	**60**
Houses	227	10	2	10	2	**251**
Creche**	9	-	1	2	1	**13**
Subtotal	356	24	13	38	5	**436**
Total	**436**					

* Includes 1 no. drop off space – **Note Creche parking permitted in Graydon development – no additional parking proposed for creche

2.13.2 Cycle Parking

A total of 364 number residential bicycle parking spaces are proposed as part of the development scheme comprising 252 no. long stay secured / sheltered spaces for the residential units and 112 no. short stay parking spaces for the residential units. 6 no. long stay cycle parking spaces are proposed for the creche comprising in addition to the short stay provision (22 no.) permitted as part of the Graydon development located outside the subject application site boundary.

Table 2.4 – Proposed Cycle Parking provision

Land Use	Long Stay	Short Stay	Total
Houses[1]	16	18	**34**
Apartment Blocks	172	66	**238**
Duplexes / GF Apts	64	28	**92**
Creche	6	-[2]	**6[2]**
Total	**258**	**112**	**370**

1 Houses with external side access to rear gardens can utilise rear gardens for long stay cycle parking
2 Additional 22 no. Short stay parking are permitted Graydon Residential Development – not included in subject application

2.14 SURFACE WATER DRAINAGE

An overall surface water drainage strategy was developed by DBFL Consulting Engineers for the overall development site including Phase 1 under planning reference ABP 305343-19 and future zoned lands. This strategy is shown on drawing number 210026-DBFL-CS-SP-DR-C-1202 which outlines each catchment and its corresponding attenuation facility. Surface water runoff from the development will be attenuated to greenfield runoff rates in accordance with the Greater Dublin Strategic Drainage Study (GDSDS).

Where possible, attenuation facilities have been designed as above ground storage in order to maximize the use of SuDs and limit the requirement of underground tanks to promote biodiversity. This approach was adopted in line with SDCCs Sustainable Drainage Explanatory Design Guide 2022. The open ponds have been designed to cater for the 1:5 year storm in a low flow channel which will be predominantly wet the 1:100 year storm will be stored at the next level which will be predominantly dry and lend itself to a usable amenity space. Where design constraints did not allow for open ponds, attenuation facilities will store up to the 30-year critical storm in underground stormtech attenuation systems and shallow detention basins will be used to store surface water for storms between the 30 year and the 100 year critical storms.

Surface water run-off from the subject site (subject site, future phases and zoned lands as outlined on drawing number 210026-DBFL-CS-SP-DR-C-1202) will be attenuated to greenfield runoff rates (Qbar). The overall catchment and a catchment plan strategy is shown on drawing number 210026-DBFL-CS-SP-DR-C-1202.

Detention basins will be incorporated into the landscape plan with gently sloping side slopes. The maximum open water depth in the detention basins will be 600mm in the 100 year critical storm. An example of a useable detention basin is shown below (from Graydon)

Source: DBFL IDR

2.15 FOUL SEWER

The existing site is predominantly greenfield and therefore has no foul loading at present. There is an existing 225mm diameter foul sewer on Main Street (R120) to the north of the site. According to records, this foul sewer connects to a 525mm foul sewer on Aylmer Road which ultimately outfalls to Newcastle Pump Station.

Following receipt of the confirmation of feasibility, DBFL and Cairn Homes met with Irish Water regarding the Newcastle Local Network Reinforcement Project and Newcastle Pumping Station. It was agreed that a pumping station within the subject site to pump back to Phase 1 was the optimum solution as the foul outflow would then avoid the network constraints in Newcastle Village. It was also agreed that Cairn Homes would enter into a Project Works Services Agreement (PWSA) on Newcastle Pumping Station to establish if any constraints exist at the pumping station. Cairn Homes entered into this PWSA in April 2021 and agreed to fund the study of the pumping station for Irish Water. As indicated by Irish Water, in the Confirmation of Feasibility, this SHD is not reliant on the Irish Water Newcastle pumping station project by reason of the installation of the on-site pumping station proposed.

The proposed foul drainage system for the subject site will connect to the existing 225mm diameter foul sewer in Newcastle phase 1 provided under planning reference ABP 305343-19. A Wastewater Pumping Station is proposed to serve the majority of the subject site and forms part of this planning application. Foul drainage from the proposed development will drain to a proposed pumping station at the north of the site by gravity before being pumped back to a stand-off manhole at the south of the site and discharging to Newcastle Phase 1 infrastructure. The capacity of the foul infrastructure in phase 1 was reviewed and found to have to have sufficient capacity to accommodate the subject site.

A section to the south of the subject site will not make use of the pumping station and will flow by gravity and discharge to the Newcastle phase 1 where it will be connected. Individual houses will connect to the 225mm diameter foul drains via individual 100mm diameter house connections, as per Irish Water Code of Practice for Wastewater Infrastructure. The proposed foul sewer network is shown on DBFL drawing 210026-DBFL-CS-SPDR-C-1200.

2.16 WATER SUPPLY AND DISTRIBUTION

The existing site is predominantly greenfield and therefore has no water supply at present. Water supply infrastructure has been constructed as part of Newcastle Phase 1 to the east of the subject site (under planning reference ABP 305343-19) in accordance with the Irish water code of practice. There is a 100mm and 150mm watermain along the L6001 to the west of the subject site. The existing watermains are shown on drawing 210026-DBFL-WM-SP-DR-C-1300.

It is proposed to connect to the existing 250mm watermain provided in the Newcastle Phase 1 development at Newcastle boulevard to the south east of the site through the link street of the proposed site. A closed valve connection is also proposed to the existing watermain in Athgoe road. The proposed 250mm trunk watermain will serve a number of 150mm diameter watermain loops throughout the development. A number of 100mm watermain loops will be fed from the 150mm watermains along the Local Streets.

2.17 UTILITIES

2.17.1 ESB Power

The existing overhead services on the site will be undergrounded and diverted as required. A new Medium Voltage below ground network will be provided in the proposed development which will connect to the existing ESB Networks infrastructure in the area. Up to 2 new “unit sub-stations” will be provided throughout the site to meet the electrical demands associated with the new houses and duplex units while a further 1no “in-building” sub-station will be provided to serve the apartments.

2.17.2 Gas Infrastructure

Gas Networks Ireland (GNI) have been contacted and an existing gas network map for the area surrounding the proposed development has been obtained, refer to Appendix F Volume III of this EIAR No Gas will be brought to the new development.

2.17.3 Telecommunications – Eir

There is an extensive Eir Network in the roads surrounding the site in Graydon located to the east.

New connections will be made to the existing Eir networks at the boundary of the site and services will be distributed throughout the site as required. The exact extent and location of these connections will be agreed with Eir during the design stage of the project.

2.17.4 Telecommunications – Virgin Media

There is an extensive Virgin Media Network in the roads surrounding the site in in Graydon located to the east.

New connections will be made to the existing Virgin Media networks at the boundary of the site and services will be distributed throughout the site as required. The exact extent and location of these connections will be agreed with Virgin Media during the design stage of the project.

2.17.5 Telecommunications – Mobile

ISM have prepared a report in relation to Telecommunications. It is noted the existing mobile reception in Newcastle is poor. The assessment identified Radio Frequency coverage for the local geographic area is served by a distinct lack of cells at a range of long distances to the Development on less than a 360° basis, which is not a typical cell pattern for urban/semi-rural Radio Frequency coverage.

The average indoor coverage signal recorded was -115db across all 3 mobile phone networks. With -85db being the benchmark optimal coverage signal, and anything over -100db being poor too bad, -115db denotes extremely poor coverage for the local area.

In this regard, it is proposed to include some GPS Antennae and associated cabinets at roof level of the apartment Building, which will improve the existing mobile reception. This is set out in the ISM Report included with the application.

The proposal includes the following at roof level telecommunications infrastructure comprising 9 no. support poles on ballast mounts (to accommodate 1No. 2m 2G/3G/4G antenna & 1No. 5G antenna each) & 3 no. poles on lift overrun (to accommodate 2No. Ø0.3m Microwave links each at roof level of Apartment building B, together with associated equipment and cabinets/shrouds)

2.18 DESCRIPTION OF THE MAIN CHARACTERISTICS OF THE CONSTRUCTION PHASE

2.18.1 Introduction

The development of the lands will occur for up to 7 years having regard to the nature of the project and the need for flexibility to respond to market demand. The anticipated duration of construction within the 7 years is envisaged at between 36-48 months. A Preliminary Construction Environmental Management Plan has been prepared by DBFL and is included with the SHD application. The PCEMP will be developed and submitted to South Dublin County Council prior to commencement of development and will include the mitigation measures set out in this EIAR.

This EIAR presents proposed mitigation measures to ensure that the planned development of the lands does not generate significant adverse impacts for residential and working communities in the vicinity of the site.

The proposed development, as described, is detailed on the planning application drawings and particulars which accompany the application.

Construction of the development involves the following principal elements:

- Site strip. Earthworks associated with the construction of the houses and roads in the development.
- Construction of new buildings - houses, duplex units & creche.
- Construction of roads, footpaths & hard/soft landscaping.
- Buried site services installation. New foul pumping station. Connection to public services.
- Works to the Cookstown Road along the site boundary, and a new footpath along the southside of the road as far as the existing school crossing.

2.18.2 Liaison with Neighbouring Properties

A monitoring regime will be put in place to protect neighbours & neighbouring properties with a full and detailed vibration, noise, dust and groundwater monitoring regime put in place for the duration of the works.

The Contractor will appoint a competent person to be referred to as the Surveying, Instrumentation and Monitoring Subcontractor (MSC) who will implement the monitoring measures during the construction phase described in this EIAR.

The MSC will be responsible for preparing or organising the preparation of condition surveys of surrounding buildings, walls, hardstanding area etc. prior to the carrying out of any works on site. Extent of surveys to be agreed. The condition surveys will be carried out to a level of detail, suitable to the nature and extent of conditions encountered in order to obtain an understanding of the general structural condition of the property/structure and/or external environments.

It is proposed that vibration monitoring will be conducted at properties adjacent to or within 50m of the site as required using calibrated vibration monitors and geophones capable of transmitting live text and email alerts to ensure that if vibration levels approach or exceed specified warning and limit values.

2.18.3 Existing Ground Conditions

As set out in the DBFL Infrastructure Design Report, the ground conditions of the site were summarized as follows:

The ground conditions generally consist of topsoil to a maximum depth of 400mm over sandy gravelly clays with occasional cobbles and boulders over gravel deposits. No bedrock was discovered in the boreholes undertaken on the subject site. A copy of the Ground Investigation Report is provided with the planning application.

2.18.4 Demolition

There are no demolition works required on the subject lands.

2.18.5 Main Stages/phases of Construction

In summary the construction of the development will involve the following:

- Site strip. Earthworks associated with the construction of the houses, duplex units, creche and roads in the development.
- Construction of new buildings - houses, duplex units & creche, including ancillary buildings such as bike stores, bins stores and an ESB substation.
- Construction of roads, footpaths & hard/soft landscaping.
- Buried site services installation.

Section 5.5 of the EIAR provides more detail on the construction phase.

2.18.5.1 Site Accommodation & Site Parking

On site accommodation will consist of:

- Staff welfare facilities (toilets, canteen, offices/meeting rooms,)
- Materials storage areas and drop off Temporary water supply, electricity supply and foul drainage will be required for the new facilities.
- Connections to electricity & water are available close to the site boundary.
- Foul drainage with need to taken to a vented holding tank for regular removal by suction tanker.
- Limited parking (c. 40-60 spaces depending on stages of construction) for construction personnel will be provided within the site for the period of construction.
- The site is within walking distance of the main street which is served by a Dublin Bus route. The contractor parking areas will be contained within the construction compound.

2.18.5.2 Hours of Working

It is proposed that standard construction working hours should apply i.e.:

- 7am to 6pm Monday to Friday (excluding Bank Holidays)
- 8am to 3pm on Saturdays.

Any works proposed outside of these periods shall be strictly by agreement with the Local Authority in advance (such as Concrete pouring, foul or water main connections). Deliveries of material to site will be planned to avoid high volume periods. There may be occasions where it is necessary to make certain deliveries outside these times, for example, where large loads are limited to road usage outside peak times. There may be occasions where it is necessary to have deliveries within these times. The Contractor will develop, agree and submit a detailed Traffic Management Plan, to SDCC, for the project prior to commencement. The TMP will implement the relevant mitigation measures contained in the EIAR.

2.18.5.3 Construction of Services

Following on from completion of site clearance, demolition, site re-profiling works construction activities will focus on the installation of underground utilities to provide the infrastructure required for storm water drainage, foul water drainage, water supply, power and building utility systems.

2.18.5.4 Temporary Construction Works

During the construction phase it will be necessary to provide contractor welfare facilities for the workers. A site office and staff welfare facilities will be installed at a suitable location centrally within the overall site as part of the construction compound. All surplus plant and materials shall be stored in this location when not in use. Welfare facilities will include a canteen, drying room, toilets and first aid. Power will be provided using a small petrol generator.

The petrol generator and fuel storage containers used for various items of plant will be located within a sealed containment bund.

Temporary portable toilet facilities will be provided on site. These units will be maintained and the waste collected therein will be disposed of using an appropriate contractor. Storage areas will be clearly identified and agreed with all relevant parties in advance of construction.

2.18.5.5 Cranes Tower

Cranes will not be required on site. Mobile cranes may be used for some activities. All materials being lifted by crane will be controlled by guide ropes and will only be carried out under the strict supervision of appropriately qualified and experienced banksmen.

2.18.5.6 Hoarding and Site Segregation

The new works will be hoarded off or fenced off from the public at all times. A 2.4m minimum high plywood painted timber hoarding will be provided along the Cookstown Road boundary after tree/hedge removal here and at any other areas around the site where the perimeter fence/hedge is not deemed sufficient for safety and security reasons. Heras type fencing will be used on short term site boundaries where appropriate to suit the works. The hoarding alignment and specification are to be confirmed by the Contractor prior to commencement. Controlled access points to the site, in the form of gates or doors/turnstiles, will be kept locked for any time that these areas are not monitored (e.g. outside working hours). During working hours, a gateman will control traffic movements and deliveries at any active site access to ensure safe access and egress to & from site onto the public roads. All personnel working on site must have a valid Safe Pass card and be inducted by the Main Contractor with regard to site specific information.

2.18.6 Noise and Dust Management

The main contractor will be required to be accredited with ISO14001 Environmental Management Systems. The main contractor will be required to mitigate the impact of the construction works and the mitigation measures set out in this EIAR.

2.18.7 Construction Traffic Management Plan

2.18.7.1 Traffic Management & Construction Access

The works associated with the new development will result in additional traffic on the road network with the vehicles for the importation of earthworks fill material and the delivery of new materials for construction – concrete, concrete blocks, pipes, timber, roof tiles, glazing, road surfacing materials etc. Construction traffic access to the site will be via the Lyreen Avenue. It is proposed that unloading bays should be provided for deliveries to the site within the hoarding perimeter. Appropriately demarcated storage zones will be used to separate and segregate materials. All deliveries to site will be scheduled to ensure their timely arrival and avoid the need for storing large quantities of materials on site. The storage area is to be located at least 50m from the site access to allow for the possibility of traffic queueing inside the site without any interference with the public road.

A Construction Traffic Management Plan (CTMP) will be developed by the main contractor and agreed with the Planning Authority and An Garda Siochana prior to commencement of development in the event of a grant of permission. The CTMP will implement the mitigation measures contained in this EIAR (including PCMP).

The mitigation will include the following matters:

- The contractor shall be responsible for and make good any damage to existing roads or footpaths caused by his own contractor's or suppliers transport to and from the site.
- The contractor shall at all times keep all public and private roads, footpaths entirely free of excavated materials, debris, rubbish, provide vehicle wheel wash and thoroughly clean all wheels and arches of all vehicles as they leave the site.
- The contractor shall confine his activities to the area of the site occupied by the works and the builders' compound, as far as practicably possible, during any particular phase of the development.
- Properly designed and designated entrance and egress points to the construction site for construction traffic will be used to minimize impact on external traffic.
- Flagmen shall be used to control the exit of construction vehicles from the site onto the public road, if required.
- Existing fire hydrants are to remain accessible as required.

Construction vehicle movements will be minimised through the implementation of the following measures contained in the PCMP, which forms part of the mitigation in this EIAR (See Appendix D2 Volume III of this EIAR):

- Consolidation of delivery loads to/from the site and scheduling of large deliveries to site to occur outside of peak periods;
- Use of precast/prefabricated materials where possible;
- 'Cut' material generated by the construction works will be re-used on site where possible, through various accommodation works.
- Adequate storage space on site will be provided;
- Construction staff vehicle movements will also be minimised by promoting the use of public transport.
- Car sharing among the construction staff following Covid-19 safety guidelines may be used to reduce traffic numbers. Public Transport: An information leaflet to all staff as part of their induction on site highlighting the location of the public transport services in the vicinity of the construction site.

2.18.8 Reinstatement / Road Cleaning

Prior to the works commencing, detailed photographic surveys (condition schedules) of adjoining walls, roads, footpaths, fences etc. is to be prepared. Copies of the relevant parts are to be made available to adjoining owners and KCC. This record will form the basis of assessing repairs to adjoining areas in the future should a dispute arise as to their cause. Roadways are to be kept clean of muck and other debris. A road sweeping truck is to be provided as necessary, to ensure that this is so.

Reinstatement at completion of the works will involve:

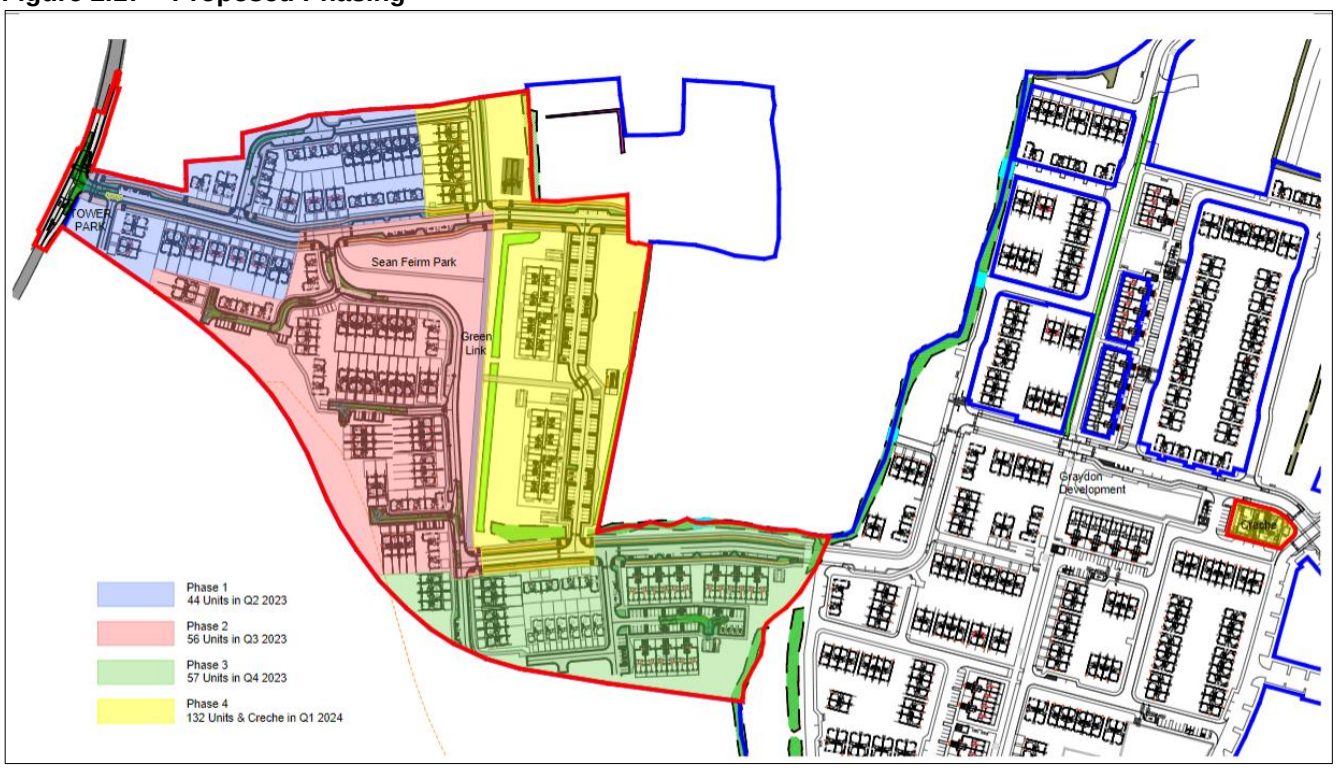
- Testing and cleaning of all watermains in the development to the requirements of the IW / KCC prior to connection to the public watermain. This will reduce the risk of contamination to the public water supply when the new network is connected to the system.
- Repair of any damage to any adjacent public roadways, kerbs, grass verges etc. in accordance with KCC requirements.
- Reinstatement of all excavations to the requirements of KCC.
- Leaving the area in a neat and clean condition, removing all deleterious materials that may have been deposited during construction works.

2.18.9 Construction Phasing

As set out in the public notices and having regard to the scale of the proposed development, the proposed phasing, the fact that the application is subject to an EIAR, a seven-year permission is sought for this development having regard to the provisions of Section 41 of the Planning and Development Act 2000, as amended.

It is envisaged that the development will be constructed in 4 phases as follows.

Figure 2.17 – Proposed Phasing



It is noted the timing and sequency of the phases may be subject to change, but it is not considered that there would be any material impact on the assessment contained in the EIAR.

2.19 ENERGY STATEMENT

The Waterman Moylan Energy Statement enclosed with the SHD application sets out to demonstrate a number of methodologies in Energy Efficiency, Conservation and Renewable Technologies that will be employed in part or in combination with each other for this development. These techniques will be employed to achieve compliance with the building regulations Part L and NZEB standards.

2.19.1 Environment / Global Issues

Increasing levels of greenhouse gases have been linked with changes in climate and predicted global warming. By far the biggest human contribution to the greenhouse gases is in emissions of carbon dioxide. The development is likely to increase carbon dioxide levels in the atmosphere by the embodied emissions in the building materials used, and in the operational energy consumed during the life of each building.

To minimise the embodied emissions impact, materials will be sourced locally where possible (reducing carbon dioxide emissions associated with transportation), and preference will be given to reusing materials, and using materials in their natural state (reducing the emissions associated with processing). Chapter 7 of the EIAR sets out the potential impacts and mitigation in respect of Air Quality and Climate.

2.20 EMISSIONS AND WASTE

2.20.1 Effluents

Effluent arising from foul drainage from the proposed development will be discharged through piped systems to the local authority sewers. Operation of the development will involve the discharge of uncontaminated surface water from the impermeable areas to a proposed network all linking into the established public system in the environs. Details of the impacts and mitigation measures for surface water and foul drainage are recorded at Chapter 6 of this Environmental Impact Assessment Report. Mitigation measures include measures designed to avoid, reduce, remedy or offset impacts.

2.20.2 Construction Waste Disposal Management

Chapter 11 of the EIAR (Material Assets – Waste Management) and the Construction and Demolition Waste and By-Product Management Plan, prepared by AWN (included with the SHD application), provides detail on the construction related waste management for the proposal.

The Objective of the Waste Management Plan is to minimise the quantity of waste generated by construction activities, to maximise the use of materials in an efficient manner and to maximise the segregation of construction waste materials on-site to produce uncontaminated waste streams for off-site recycling.

The Waste Management Plan shall be implemented throughout the construction phase of the development to ensure the following:

- That all site activities are effectively managed to minimise the generation of waste and to maximise the opportunities for on-site reuse and recycling of waste materials.
- To ensure that all waste materials are segregated into different waste fractions and stored on-site in a managed and dedicated waste storage area.
- To ensure that all waste materials generated by site activities are removed from site by appropriately permitted waste haulage contractors and that all wastes are disposed of at approved waste licensed / permitted facilities in compliance with the Waste Management Act 1996 and all associated Waste Management Regulations.

2.20.3 Contaminated Soil

Where contaminated soils/materials are discovered or occur as a result of accidental spillages of oils or fuels during the construction phase, these areas of ground will be isolated and tested in accordance with the 2002 Landfill Directive (2003/33/EC) for contamination, and pending the results of laboratory WAC testing, will be excavated and exported off-site by an appropriately Permitted Waste Contractor holding an appropriate Waste Collection permit and that this hazardous material will be sent for appropriate treatment / disposal to an appropriately Permitted / Licenced Waste Facility.

2.20.4 Domestic Municipal Waste/Waste Management

Chapter 11 of the EIAR (Material Assets – Waste Management) and the Operational Waste Management Plan, prepared by Byrne Environmental, provides detail on the domestic waste management for the proposal.

The Objective of the Waste Management Plan is to maximise the quantity of waste recycled by providing sufficient waste recycling infrastructure, waste reduction initiatives and waste collection and waste management information to the residents of the development. The Goal of the Waste Management Plan is to achieve a residential recycling rate of 50% of managed municipal waste by 2020 in accordance with The Eastern-Midlands Region Waste Management Plan 2015-2021.

The Facilities Management Company shall employ an appropriately qualified and experienced staff member who will be responsible for all aspects of waste management at the development. All accommodation units shall be provided with a Waste Management Information document, prepared by the Facilities Management Company, which shall clearly state the methods of source waste segregation, storage, and recycling initiatives that shall apply to the Management of the development. This Information document shall be issued to all residential units on an annual basis.

2.20.5 Emissions

The principal forms of air emissions relate to discharges from motor vehicles and heating appliances. With regard to heating appliances, the emission of nitrogen oxides and carbon monoxide will be minimised by the use of modern, efficient heating appliances and as a result, the potential impact is estimated to be negligible. Exhaust gases from motor vehicles will arise from car parking areas and will be discharged directly to the atmosphere. Car parking for motor vehicles is provided at surface level. Chapter 7 of the EIAR sets out the potential impacts and mitigation in respect of Air Quality and Climate.

Noise may be considered in two separate stages, during construction, and when the development is operational. Construction related noise impacts are an inevitable short term limited inconvenience feature which, in general, is accepted by members of the public, subject to the standard controls typical of planning conditions attached to urban

based development projects. These impacts can be reduced in a number of ways. It is standard practice to limit construction to normal working hours during the day. In addition, there are a number of regulations relating to noise during construction which the contractor will be expected to adhere to throughout the construction phase. Chapter 8 of the EIAR sets out the potential impacts and mitigation in respect of Noise and Vibration.

2.21 DIRECT AND INDIRECT EFFECTS RESULTING FROM USE OF NATURAL RESOURCES

Details of significant direct and indirect effects arising from the proposed development are outlined in Chapters 3-15 which deal with *'Aspects of the Environment Considered'*. No significant adverse impact is predicted to arise from the use of natural resources.

2.22 DIRECT AND INDIRECT EFFECTS RESULTING FROM EMISSION OF POLLUTANTS, CREATION OF NUISANCES AND ELIMINATION OF WASTE

Details of emissions arising from the development together with any direct and indirect effects resulting from same have been comprehensively assessed and are outlined in Chapters 3-15 which deal with '*Aspects of the Environment Considered'*. There will be no significant direct or indirect effects arising from these sources.

2.23 FORECASTING METHODS USED FOR ENVIRONMENTAL EFFECTS

The methods employed to forecast and the evidence used to identify the significant effects on the various aspects of the environment are standard techniques used by each of the particular individual disciplines. The general format followed was to identify the receiving environment, to add to that a projection of the *"loading"* placed on the various aspects of the environment by the development, to put forward amelioration measures, to lessen or remove an impact and thereby arrive at net predicted impact.

Where specific methodologies are employed for various sections they are referred to in the Receiving Environment (Baseline Scenario) sections in the EIAR. Some of the more detailed/specialised information sources and methodologies for a number of the environmental assessments are outlined hereunder.

2.24 TRANSBOUNDARY IMPACTS

Large-scale transboundary projects[7] are defined as projects which are implemented in at least two Member States or having at least two Parties of Origin, and which are likely to cause significant effects on the environment or significant adverse transboundary impact.

Having regard to the nature and extent of the proposed development, which comprises a residential development, located in Newcastle, within the administrative area of South Dublin County Council, transboundary impacts on the environment are not considered relevant, in this regard.

2.25 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."

Article 94 and Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001, as amended, requires the following information to be furnished in relation to alternatives:

"(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."

[7] The definition is based on Articles 2(1) and 4 of the EIA Directive and Article 2(3) and (5) of the Espoo Convention, respectively. http://ec.europa.eu/environment/eia/pdf/Transboundry%20EIA%20Guide.pdf

The presentation and consideration of various alternatives investigated by the project design team is an important requirement of the EIA process. This section of the EIAR document provides:

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."

This serves to indicate the main reasons for choosing the development proposed, taking into account and providing a comparison the environmental effects. Alternatives may be described at three levels:

- Alternative Locations.
- Alternative Designs.
- Alternative Processes.

The DHPLG 2018 EIA Guidelines state:

"Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. ***A 'mini- EIA' is not required for each alternative studied."*** *(Emphasis added).*

This approach above is reflected in section 3.4.1 of the EPA EIAR Guidelines 2022 which state:

"The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."[8]

Pursuant to Section 3.4.1 of the EPA EIAR Guidelines 2022, the consideration of alternatives also needs to be cognisant of the fact that *"Clearly, in some instances some of the alternatives described below will not be applicable – e.g. there may be no relevant 'alternative location' …"*

The EPA EIAR Guidelines 2022 are also instructive in stating:

"Analysis of high-level or sectoral strategic alternatives should not be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics.'".

The consideration of the main alternatives in respect of the development of the subject lands was undertaken by the Design Team and has occurred throughout an extensive and coordinated decision-making process, over a considerable period of time. The main alternatives considered are identified below.

2.25.1 Alternative Locations

The application site is zoned for residential development under the Newcastle Local Area Plan, the South Dublin County Development Plan 2016-2022 and the Draft South Dublin County Development Plan 2022-2028 within the ownership of Cairn Homes Properties Ltd., and the proposed uses are permitted in principle with the land use zoning objectives pertaining to the project site.

There are further residentially zoned lands located to the south, which are not under the control of Cairn. In terms of an alternative location, those lands would not be sequentially well located to existing development on the main street. The 2018 DHPLG Guidance on the preparation of EIARs notes specifically that the consideration of some types of alternatives, such as alternative locations, may not be appropriate in all cases. EIA is concerned with projects and the Environmental Protection Agency's guidelines (2022) state that, in some instances, neither the applicant nor the

[8] Ref CJEU Case 461/17

competent authority can be realistically be expected to examine options that have already been previously determined by a higher authority, such as a national plan or regional programme for infrastructure which are examined by means of a Strategic Environmental Assessment (SEA), the higher tier form of environmental assessment. As the subject site has been identified to accommodate the uses proposed, it is not considered appropriate to evaluate alternative locations in the EIAR.

A *"do-nothing*" scenario was considered to represent an inappropriate, unsustainable and inefficient use of these residential zoned lands; particularly having regard to the opportunity to provide much needed housing for both South Dublin and the wider Greater Dublin Area (GDA). The suitability of the lands for development, within an established development area of the County and the application site's location adjacent to existing amenities, primary school, public transport and good road infrastructure were also key considerations.

The EIAR Guidelines 2022 also note that:

"Higher level alternatives may already have been addressed during the strategic environmental assessment of relevant strategies or plans. Assessment at that level is likely to have taken account of environmental considerations associated, for example, with the cumulative impact of an area zoned for industry on a sensitive landscape."

This is of relevance to the application site at Newcastle South. The lands on which the application is made are zoned RES-N in the Newcastle Local Area Plan 2012-2022, 'to provide for new residential communities in accordance with approved area plans'. The Newcastle LAP 2012- 2022 was the subject of a Strategic Environmental Assessment (SEA).

The issue of alternatives is a critical function of the Strategic Environmental Assessment (SEA) process and is necessary to evaluate the likely environmental consequences of a range of alternative development strategies for the settlement within the constraints imposed by environmental conditions. The SEA for the Newcastle LAP 2012-2022 considered alternatives at an early stage of the process and through an iterative process with the Local Area Plan, SEA and AA teams the most appropriate scenario was selected.

The preferred strategy of the SEA provided for adopting the 'RES-N' zoning of the site. Section 4.2 of the SEA stated that the chosen option for the LAP 'is more likely to bring about better environmental outcomes because of its ability to protect the historical heritage of the area and integrate it into the biodiversity networks as well as the ability to provide for the SUDs network in the plan lands, as well as providing for increased connectivity and permeability thereby improving the surrounding environment.'

The site provides opportunities for the coherent integration, consolidation and sustainable development of the established town of Newcastle, as designated in the LAP, and provides opportunities for improved permeability between established neighbourhoods and the town centre. The site and proposed development provide significant opportunities to deliver a substantial quantum of housing in the form of the sustainable urban expansion of Newcastle town and thereby contribute in a sustainable manner to meet strategic planning objectives at a local and regional level. On the basis of the foregoing, no alternative sites were considered or assessed for the purposes of preparing this EIAR, nor is it considered necessary to do so.

2.25.2 Alternative Sequential Development

The Applicant controls approximately 34ha to the south of Main Street that are zoned for a mix of residential uses (RES-N and RES) and open space (OS) in the South Dublin County Development Plan 2016-2022. Early alternatives for the proposed development were developed for the overall landholding. As part of the early consideration of the construction phase of the proposed development, alternatives were considered as to the appropriate progression of construction of the lands. In this regard, the main alternatives considered comprise of developing the western portion of the lands initially with access provided from the Athgoe Road (L6001) or construction of the eastern portion of the lands initially with access via Main Street/the adjoining Ballynakelly development. It was considered that the development of the eastern portion of the landholding as the first phase would result in the development of lands previous disturbed as part of ground works associated with Reg. Ref. SD05A/0344 (ABP Ref. PL06S.217096). In this regard, the commencement of development on the eastern portion of the lands would not result in the loss of agricultural lands and would provide an opportunity to reinstate and enhance some of the burgage plots and hedgerows lost due to previous works on site. Furthermore, it is sequentially preferential to commence development on the eastern portion of the overall landholding, facilitating infill development and consolidation of the established urban area. This approach would assist in enhancing permeability for existing residents of the Ballynakelly development to the east providing new connections to Main Street and amenity spaces forming part of the proposed development. Accordingly, it was considered that the construction of the eastern portion of the overall landholding

would be preferable having regard to the environmental effects assessed. This SHD application comprises the western portion of the overall Carin landholding, which is shown on the Alternative 1 figure below.

2.25.3 Alternative Uses

The subject site is zoned for residential and supporting uses as referenced above. The subject site is well served by existing social and community infrastructure with a wide mix and variety of uses in the surrounding area. In addition to residential use, there are other land uses which are permitted in principle on these lands such as garden centre, industry-light, shop local, shop neighbourhood. Furthermore, it is noted there is a supermarket (SuperValu) currently under construction to the east as well as a substantial business park located at Greenouge. Including a supermarket on the subject lands would not be in compliance with the sequential test contained in the Retail Planning Guidelines 2012, as there are available, viable sites closer located to the town centre.

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 generally acknowledged need of the population for housing. The environs of the subject site are largely residential in nature, interspersed with some commercial uses on the main street. 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. 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.

In light of these nearby uses, the sites zoning, and current demand for high quality residential units, it is put forward that other land uses on site would not be considered viable alternatives or would not be in accordance with the planning policy context pertaining to the lands.

2.25.4 Description of Alternative Processes

The relevance of alternative processes and technologies is limited in the case of this EIAR having regard to the nature of the proposed development, which is primarily for a residential development. The Energy Report prepared by Waterman Moylan Consulting Engineers confirms that the proposed development will incorporate energy efficiency measures to achieve low levels of thermal bridging high levels of insulation, and will utilise low energy heating equipment, such as air source heat pumps and/or an alternative heating system (such as gas boilers with PV panels for renewable energy) for the houses and individual plant in each unit, either exhaust air heat pumps or electric heaters and hot water heat pumps for the apartments.

The building fabric has been selected to meet the requirements of Part L building Regulations. The incorporation of these elements and technologies into the scheme will ensure higher performance and improved building sustainability when compared to alternative out-dated, less energy efficient materials and technologies.

It is noted the proposed construction works comprise relatively standard building construction processes, which comprise some timber frame elements which are more sustainable compared to 100% block work.. With reference to the operational phase, no new, unusual or technically challenging operational techniques are required, as such no alternative operational processes have been considered.

2.25.5 Alternative Designs and Layouts

The proposed residential development has been prepared in accordance with the requirements of the National Planning Framework, the Regional Spatial and Economic Strategy for the Mid-East area as well as the relevant Section 28 Guidelines including those relating to Urban Development and Building Height Guidelines (2018), Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities December 2020 and the Sustainable Residential Development in Urban Areas (2009) as well as, where relevant, the South Dublin County Development Plan 2016-2022, the Draft South Dublin County Development Plan 2022-2028 and the Newcastle Local Area Plan 2012 and has been the subject of a pre-application meeting with the Planning Authority and An Bord Pleanála, prior to lodgement of the SHD application with An Bord Pleanála.

A number of alternative layouts for the proposed development were considered over the design process. In addition, the proposals for the development were subject to detailed discussion with the Planning Authority prior to the principles of the proposed layout being finalised. The significant environmental issues and potential effects which informed the proposed layout included population and human health, biodiversity, cultural heritage, transportation

and visual impact. Other factors which were fundamental to informing and directing detailed design included the land use zoning objectives under the South Dublin Development Plan 2016-2022, the Draft South Dublin Development Plan 2022-2028 and the detailed design brief established in Chapter 6 of the Newcastle Local Area Plan 2012-2022 which sets out specific framework objectives for designated neighbourhoods in Newcastle.

In this respect, the design team considered a number of options in terms of overall layout as follows:

2.25.5.1 Alternative no. 1 – Layout as per the Newcastle Local Area Plan 2012-2022.

Alternative no. 1 adopted the indicative layout as provided for in the Newcastle Local Area Plan 2012-2022. The initial scheme reflected the open space and street network as per the overall framework for the plan lands and Development Areas. While detailed layouts were not developed, it was estimated that this iteration would yield in the order of 310- 380 no. units for the overall lands (including Graydon SHD under construction to the east) within the Applicants ownership (approximately 25 ha within the LAP boundary). The gross density that would accrue is just 15.2 per hectare (380/25 ha.), which is considered unsustainable for serviced zoned residential land.

Figure 2.18 – Alternative no. 1 Layout as per the Newcastle Local Area Plan 2012-2022

2.25.5.2 Comparison of Environmental Effects

The LAP indicative layout didn't respond appropriately to the site's natural features including the network of hedgerows, historic burgage plots and topography of the site. This iteration resulted in an overprovision of streets which created an imbalance between the overall area reserved for housing, green spaces and the area reserved for vehicular traffic. It was considered that Alternative no. 1 resulted in significant environmental impacts, particularly in respect to biodiversity, cultural heritage and visual impact due to the removal of substantial lengths of existing and established burgage hedgerows. It is considered that the extent of hedgerow removal would impact on local biodiversity, potentially resulting in mortality to fauna during construction.

Furthermore, the burgage hedgerows are identified as an important cultural heritage feature which should be protected where possible. Similarly, Alternative no. 1 gave rise to potential impacts in terms of traffic and transport due to the overprovision of streets, resulting in a street dominated scheme, leading to potential traffic hazard and

safety concerns. The layout failed to provide a clear hierarchy of roads and streets in accordance with the requirements of DMURS1. Furthermore, the over provision of streets resulted in the inefficient use of zoned land proximate to the town centre and public transport links. Based on the foregoing a number of alternative iterations were explored, which deviated from the indicative LAP layout based on the environmental impacts identified.

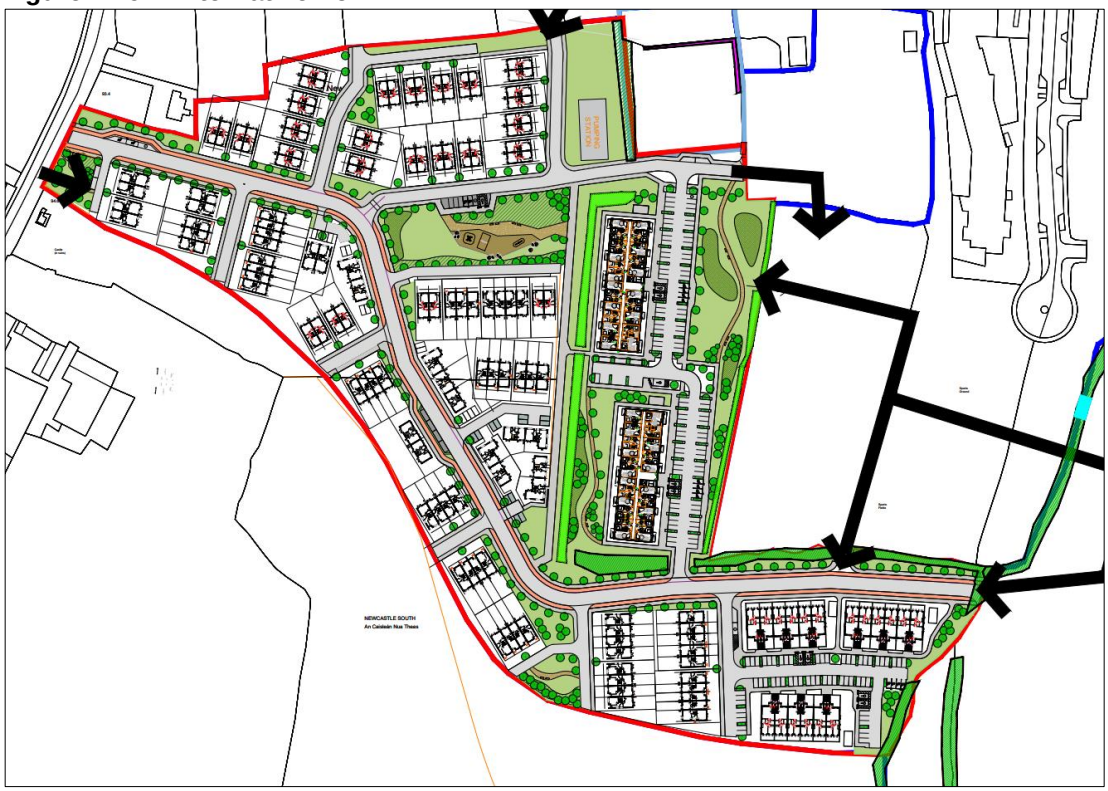
The key environmental and practical considerations which have influenced the design of the proposed development and the alternative layouts on the subject lands have been influenced by the following:

- The need to achieve an appropriate density in the context of the Sustainable Residential Development in Urban Areas Guidelines for Planning Authorities (2009).
- The need to ensure any residential development provides a good mix of housing typologies which meet current market demand and which are deliverable in the short to medium term.
- The need to provide a sustainable level of housing provision on zoned serviced land.
- The need to deliver good quality open space in appropriate locations with a clear hierarchy
- To have regard to the site's topography and to ensure the design the residential development and associated infrastructure respects the existing features and limits the impacts on the land.
- Protection of existing trees and hedgerows where possible.

2.25.5.3 Alternative no. 2

Alternative no. 2 provided layout which progressed the design to allow for re-alignment of the internal east-west link street away from the Tower (a protected structure) while also providing an additional area of open space to provide for a more appropriate transition. The no. of units was broadly similar at 279 no. units compared to Alternative no. 3 and no. 4.

Figure 2.19 – Alternative no. 2



2.25.5.4 Alternative 2 – Comparison of Environmental Effects

With regard to archaeology and biodiversity the environmental effects are considered to be broadly neutral as are the impacts on Material Assets – Traffic, whereby the relative increase in traffic generated is slight due to the sustainable levels of car parking proposed. Similarly, the environmental effects relating to air quality are similar, as is noise. With regard to the Landscape and Visual impact, the perceived comparison is anticipated to be slight negative, while also noting that the subject site is to be developed and subject to change (as a residential zoned site), and that the setbacks to the lands to the east and west, along with the high-quality design including landscaping will ensure that the proposed development will sit comfortably into its immediate and wider context.

With reference to the Burgage Plot/hedgerows, the proposal was positive in that it would have retained more hedgerows compared to the LAP layout (Alternative no. 1). Notwithstanding this further refinements of the layout were pursued to increase the retention of as much of the Burgage hedgerows as possible.

2.25.5.5 Alternative no. 3 – Scheme Submitted for Pre-application Consultation with An Bord Pleanála

Alternative no. 3 revised further the internal east west link street so as to improve the layout to a more DMURs compliant scheme as well as moving the apartment block from the Burgage hedgerow, located centrally within the scheme, which was positive from both a Biodiversity and Cultural Heritage perspective.

The proposal also included an expanded green space adjacent to the north south green link, which was positive from a Biodiversity perspective.

Figure 2.20 – Layout Alternative no. 3 Scheme Submitted for Pre-application Consultation with An Bord Pleanála

Source: MOLA

A request to enter into pre-application consultations was submitted to the Board in October 2021. The scheme as submitted to the Board for consultation comprised the construction of 283 no. dwellings and associated ancillary infrastructure on a site of c. 7.83 hectares as follows:

- 123 no. 2 storey houses (6 no. 2 bedroom houses, 104 no. 3 bedroom houses, 13 no. 4 bedroom houses;
- 124 no. apartments in 2 no. 5 storey buildings (38 no. 1 bedroom apartments, 76 no. 2 bedroom apartments and 10 no. 3 bedroom apartments, all with terrace or balcony)
- 36 no. apartments/duplex apartments in 3 no. 3 storey buildings – (18 no. 2 bedroom apartments and 18 no. 3 bedroom duplex apartments) all with terrace;
- Creche of c. 300 sq. m at ground floor of apartment block B;
- Open space (c. 1.55 hectares), hard and soft landscaping (including public lighting & boundary treatment), communal open space for duplex apartments and apartments; along with single storey bicycle/bin stores and ESB substation;
- Vehicular access from the Athgoe Road from a new junction to link to permitted Phase 1 (TA06S.305343) 'Newcastle Boulevard' to the east, as well as 398 no. car parking spaces;
- Attenuation, connection to water supply, and provision of foul drainage infrastructure as well as underground local pumping station to Irish Water specifications and all ancillary site development/construction/landscaping works.

With reference to archaeology the environmental effects are considered to be broadly neutral as are the impacts on Material Assets – Traffic. Similarly, the environmental effects relating to air quality are similar, as is noise.

In relation to the Landscape and Visual impact, the perceived comparison is anticipated to be slight negative, while also noting that the subject site is to be developed and subject to change (as a residential zoned site), and that the setbacks to the lands to the east and west, along with the high-quality design including landscaping will ensure that the proposed development will sit comfortably into its immediate and wider context.

With respect to archaeology and biodiversity the environmental effects are considered to be broadly neutral as are the impacts on Material Assets – Traffic, whereby the traffic generated is similar due to the number of units proposed. Similarly, the environmental effects relating to Air Quality (Climate) are similar, as is noise/vibration.

With reference to the Burgage Plot/hedgerows, the proposal was positive in that it would have retained more hedgerows compared to the LAP layout (Alternative no. 1). Notwithstanding this further refinements of the layout were pursued to increase the retention of as much of the Burgage hedgerows as possible.

This alternative was reviewed following the pre-application discussions with An Bord Pleanála and the subsequent opinion from the Board. Responses to each of the listed items requiring further consideration within the An Bord Pleanála Opinion have been provided as part of this SHD Planning Application. The scheme has been updated and improved as a result from an environmental perspective (such as additional SUDs measures).

2.25.6 Proposed Preferred Alternative - Main reasons for the option chosen, including a comparison of the environmental effects

With reference to the final layout, the iterative process outlined above, which included alternative site layouts were considered with the objective of producing a new high quality residential development, which has undergone a robust consideration of relevant alternatives having regard to the comparison of environmental effects and meets the requirements of the EIA Directive, based on the multidisciplinary review across all environmental topics.

The proposed development provides for new residential development on lands zoned for residential use under the South Dublin County Development Plan 2016-2022, Draft South County Development Plan 2022-2028 and the Newcastle Local Area Plan 2012-2022 all of which were subject to the SEA process. As such, consideration of alternative sites for the construction of houses and apartments proposed in this residential development was not considered necessary.

Based on a comparison of the environmental effects, as described for each Iteration above, together with the regulatory requirements of the relevant LAP and Development Plan, it is considered the proposed development has been selected for the following reasons:

- The proposed development maximises the opportunity to protect, and where possible, existing and replace lost, burgage plots and associated hedgerows resulting in significant benefits in terms of biodiversity; cultural heritage and visual impact.
- Includes additional SUDs features within the scheme which is positive from a water perspective compared to previous iterations.
- Includes a footpath for pedestrians along the Athgoe Road, which is positive from a Human Heath and a Material Assets - Traffic and Transportation perspective.
- The relocation of the access point further to the north and the inclusion of an additional pocket pack adjacent to the Tower, reduces Cultural Heritage and Visual Impacts.
- The proposed development minimises the proportion of the proposed development site given over to roads and streets infrastructure, ensuring the efficient use of land and reducing potential traffic and transport impacts and hazards. The inclusion of the 5 storey apartments centrally within the scheme allows the retention of the Burgage Plots as it keeps them within the public realm. Adherence to the LAP design in this regard would lead to a long-term fragmentation and potential of these important hedgerows as they would be located within the rear gardens of dwellings.
- The proposed development results in a high degree of permeability, resulting in a highly connected neighbourhood with strong connections with existing development to the north, emerging development in Graydon to the east, and future development lands, to the south, which will have positive impacts on population and human health.
- Avoids significant environmental impacts on the receiving environment.

Table 2.5 – Summary Table of Comparison of Main Environmental Effects

Criteria	Alternative 1 LAP Layout	Alternative 2	Alternative 3 ABP Pre-app	Alternative 4 Final ABP Layout
Population and Human Health	Positive	Positive	Positive	Positive
Biodiversity	Negative	Neutral	Positive	Positive
Land and Soils	Neutral	Neutral	Neutral	Neutral
Water	Neutral	Neutral	Neutral	Neutral
Air and Noise (Vibration)	Negative	Positive	Positive	Positive
Air Quality and Climate	Neutral	Neutral	Neutral	Neutral
Landscape and Visual	Negative	Neutral	Neutral	Neutral
Material Assets Transportation	Neutral	Neutral	Positive	Neutral
Material Assets Utilities	Neutral	Neutral	Neutral	Neutral
Material Assets Waste Management	Neutral	Neutral	Neutral	Positive
Risk Management	Neutral	Neutral	Neutral	Neutral
Cultural Heritage (Archaeology/Architectural Heritage)	Negative	Negative	Negative	Negative

The key changes between alternative no. 3 and the SHD layout proposed related to:

- Inclusion of footpath along the Athgoe Road.
- Revisions to the Attenuation to provide more SUDs features

Responses to each of these items have been provided as part of this final application pack, and the scheme has been updated and improved where necessary as a result. The design intent has been to address the issues identified in the Board's Opinion.

The proposal as now submitted to the Board (alternative no. 4) is considered to be the optimal design solution for the subject site, having regard to the site's constraints and to the objective of making efficient use of the serviced residential lands, (in accordance with SPPR4 of the Building Height Guidelines) in close proximity to the town centre of Newcastle, while also addressing the potential impacts on the environmental sensitivities relating to the subject lands.

With reference to Population and Human health the potential impacts are broadly similar – the development of the lands will increase the population of the town in line with strategic policy for the area, which is positive.

With regard to Landscape and Visual Impact, alternatives 1 (LAP) would have resulted in the removal of significant elements of the Burgage Plots and is considered negative in that regard compared to the other alternatives which even though propose a higher density than that of the LAP, have retained the Burgage hedgerow as much as possible.

With regard to Landscape and Visual Impact, the alternatives are similar. While the LAP proposed a lower density, the typology of the units comprised relatively large scale dwellings, and as such the impact is similar. The preferred alternative also includes the retention of the majority of the Burgage hedgerows which allows for the 5 no. storey apartment buildings to be absorbed into the overall site, with no appreciable difference or negative impact on the Landscape Character or the Architectural Conservation Area.

Air and noise impacts from the alternatives are broadly similar. Principally these impacts will occur as a result of the construction phase of the development as operational impacts would be largely restricted to traffic and these volumes are generally low. As these impacts can be largely mitigated through good construction practices, the residual impact is considered low and temporary in all cases. For Risk Management the comparison is neutral across the alternatives due to the similar nature of the proposals (residential).

With regard to Material Assets (Utilities), it is considered the alternatives are similar as they would require servicing and also ESB etc. While the additional quantum of houses will result in increased demand for foul and water supply, these can be accommodated, which is confirmed by Irish Water. For Material Assets (Waste Management), the preferred alternative was positive because the design was refined to include appropriate waste management.

During the design process, the layout and design of the proposed development evolved in response to architectural, landscape and environmental requirements and several iterations of the site layout and alternative designs were considered. Any difficulties from an architectural, landscape or environmental viewpoint were assessed and, where necessary, the design was amended to address the issues encountered. The evolution of the current scheme was informed by consideration of a number of environmental aspects; vehicular and pedestrian movements; maximisation of pedestrian connectivity through the site; protection of adjoining residential amenity and retention of existing burgage plots, hedgerows and natural features.

In summary, the overall design of the proposed development takes into account all environmental effects and provides for a sustainable development that has been optimised to emphasise positive environmental effects whilst reducing negative environmental impacts wherever possible. The preferred alternative is not considered to give rise to any significant adverse environmental impacts following the mitigation measures to be implemented at the construction and operational phases. The final proposed scheme also responds to the characteristics and constraints of the subject site vis a vis the previous iterations of the scheme and the alternative layouts considered

2.26 DESCRIPTION OF THE OPERATION STAGE OF THE PROJECT

Pursuant to the EIA Directive an EIAR document is required to set out a description of the project processes, activities, materials and natural resources utilised; and the activities, materials and natural resources and the effects, residues and emissions anticipated by the operation of the project.

The proposed development is a residential development including associated infrastructural works, creche areas of open space. The primary direct significant environmental effects will arise during the construction stage. As a result, post-construction, the operation of the proposed development is therefore relatively benign and not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on population and human health, biodiversity, soils, water, air, climate, or landscape.

The primary likely and significant environmental impacts of the operation of the proposed development are fully addressed in the EIAR document; and relate to Population and Human Health, Landscape and Visual Impact and Noise and Air impacts associated with the traffic generated.

The proposed development also has the potential for cumulative, secondary and indirect impacts particularly with respect to such topics as traffic – which in many instances – are often difficult to quantify due to complex inter-relationships. However, cumulative secondary and indirect impacts are unlikely to be significant and are addressed in the content of this EIAR document.

2.26.1 Description of Changes to the Project

The Guidelines on the information to be contained in environmental impact assessment reports were published by the EPA in May 2022.

The EPA EIAR Guidelines 2022 state in relation to change:

"Very few projects remain unaltered throughout their existence. Success may bring growth; technology or market forces may cause processes or activities to alter. All projects change and – like living entities – will someday cease to function. The life cycles of some types of projects, such as quarries, are finite and predictable. Such projects often consider their closure and decommissioning in detail from the outset, while for most projects a general indication of the nature of possible future changes may suffice. While the examination of the potential consequences of change (such as extension) does not imply permission for such extension, its identification and consideration can be an important factor in the determination of the application. Descriptions of likely changes may cover:

- *Extension*
- *Decommissioning*
- *Other Changes."*

As per the draft EPA guidelines and in the interests of proper planning and sustainable development it is important to consider the potential future growth and longer-term expansion of a proposed development in order to ensure that the geographical area in the vicinity of the proposed development has the assimilative carrying capacity to accommodate future development.

Given the proposed site layout extent and the limitations of physical boundaries, adjoining land uses and land ownership the potential for growth of the proposed development is considered limited and confined primarily to potential minor domestic extensions which will have a negligible impact.

The parameters for the future development of the area in the vicinity of the subject site are governed by the Newcastle LAP 2012-2022 as well as the South Dublin Development Plan 2016-2022 and the Draft South Dublin Development Plan 2022-2028. Any adjacent undeveloped lands will be the subject of separate planning applications in the future, where they are identified as being suitable for development, and where the provision of the requisite physical and other infrastructure is available.

2.26.2 Description of Secondary and Off-Site Developments

No significant secondary enabling development is deemed necessary to facilitate the proposed development. The planning application includes details of the necessary road works, which are required to facilitate this development. These works are assessed within this Environmental Impact Assessment Report.

2.26.3 Risks of Major Accidents and/or Disasters

The surrounding context consists of a mix of residential, agricultural, employment, educational and open space public amenity lands. It does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which would be likely to result in a risk to human health and safety.

Article 3 of the Environmental Impact Assessment (EIA) Directive 2014/52/EU, requires the assessment of expected effects of major accidents and/or disasters within an EIA. Article 3(2) of the Directive states that *"The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned".*

2.27 RELATED DEVELOPMENT AND CUMULATIVE IMPACTS

The proposed development also has the potential for cumulative, secondary and indirect impacts particularly with respect to such topics as traffic which in many instances are often difficult to quantify due to complex inter-relationships. All cumulative, secondary and indirect impacts are unlikely to be significant and, where appropriate, have been addressed in the content of this EIAR document.

The EPA Guidelines on Information to be contained in Environmental Impact Assessment Reports (2022) defines 'Cumulative Effects' as:

"The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects."

The cumulative impacts of the proposed development in combination with other relevant existing or approved projects will be considered during the preparation of this SHD application to determine whether these would give rise to significant impacts on the environment.

The EIAR under preparation for the current application will include a cumulative assessment of existing and permitted development in the area.

The details of these permissions / applications, along with the planned development adjoining the current proposals, have been provided to the EIAR consultancy team and inform the cumulative impact assessment to be undertaken as part of the preparation of this EIAR, with each consultant considering and undertaking their own planning history search in respect to their cumulative impact assessment where necessary.

Existing and Permitted Development

The identification of relevant existing and permitted developments in terms of cumulative impacts has been undertaken based on a review of the planning history of the surrounding area. Site visits have also informed the consideration of potential cumulative effects, allowing for identification of developments which are currently under construction or recently completed in the vicinity.

Relevant developments have been identified with regard to their size and scale, their use mix and composition, and their proximity to the proposed development, within the settlement of Newcastle, in particular to identify any substantial / strategic residential development or larger scale commercial development. Applications of a minor nature were discounted from the planning history search, for example applications for under 5 no. dwellings, or applications relating to minor extensions, works to existing dwellings, and change of use applications. The planning history search focussed on relevant permitted developments in the last 5 years, with a search also undertaken for permitted longer term permissions (i.e. with a 10 year permission).

Each Chapter of the EIAR includes a cumulative impact assessment of the proposed development with other permitted projects in the immediate area (e.g., Graydon to the east – SHD currently under construction including associated permitted amendments as well as a supermarket (currently under construction to the east). The potential cumulative impacts primarily relate to traffic, dust, noise and other nuisances from the construction of the development, with other planned which are in the course of construction, and each of the following EIAR chapters has regard to these in the assessment and mitigation measures proposes.

It is noted while the proposed development can be catered for by an underground pumping station (as part of the proposed development), in the event there is an upgrade undertaken to the Newcastle Pumping Station (at Grant's View) to the east of Newcastle by Irish Water the potential cumulative effects to Material Assets is deemed to be

slight positive and long term. As indicated by Irish Water, in the Confirmation of Feasibility, this SHD is not reliant on the Irish Water Newcastle pumping station project by reason of the installation of the on-site pumping station proposed. Potential impacts where relevant are set out.

As such, with the necessary mitigation for each environmental aspect, it is anticipated that the potential cumulative impact of the proposed development in conjunction with the other permitted developments will be minimal.

To determine traffic impacts in Chapter 10 the traffic generated by the proposed development is combined with the baseline traffic generated by the traffic on the road network in the area. The potential traffic impacts from other developments were also considered in the assessment (e.g. sites adjacent as well as Graydon under construction).

For the noise impact assessment in Chapter 8 the potential noise emissions arising from the proposed development during construction and operation are combined (using cumulative AADT figures from Traffic chapter) with background noise levels (predominantly road traffic) were assessed.

Each of the relevant specialists has considered the potential for cumulative impact in preparing their assessments. While there is the potential for negative impacts to occur during the construction stage of the scheme, with the implementation of the appropriate mitigation outlined in the EIAR, the residual cumulative impact is not considered to be significant.

3.0 POPULATION AND HUMAN HEALTH

3.1 INTRODUCTION

This chapter of the EIAR was prepared by Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates who has a Masters in Environmental Resource Management and a Diploma in EIA Management (both from UCD) as well as a Masters in Town and Country Planning. In addition, Rory is a corporate member of the of the Irish Planning Institute and has 18 years of experience of Environmental Impact Assessment and urban development.

In preparing this chapter, detail from the chapters addressing Air Quality and Climate, Noise and Vibration, Traffic and the separate reports addressing Construction and Demolition Waste Management, Sunlight and Daylight and the Construction and Management Plan.

Population and Human Health is a broad ranging topic and addresses the existence, activities and wellbeing of people as groups or '*populations*'. While most developments by people will affect other people, this EIAR concentrates on those topics which are manifested in the environment, such as the construction of the development, new land uses, more buildings or greater emissions.

3.2 STUDY METHODOLOGY

At the time of writing there is no specific guidance from the EU Commission on the 2014 EIA Directive to indicate how the new term 'Human Health' should be addressed. However, the European Commission's *Guidance on the preparation of the Environmental Impact Assessment Report* (2017) does reference the requirement to describe and, where appropriate, quantify the primary and secondary effects on human health and welfare. Moreover, the European Commission guidance states the following in relation to the assessment of Human Health:

"*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*."

EU Commission's SEA Implementation Guidance from 2003, as it gives an indication of how 'human health' should be considered in terms of environmental assessment and notes

"The notion of human health should be considered in the context of the other issues mentioned [in the list of factors to be identified, described and assessed] and thus environmentally related health issues such as exposure to traffic noise or air pollutants are obvious aspects to study." (para 5.26).

In accordance with this approach to Human Health espoused in the Commission Guidance, this chapter addresses human health in the context of other factors addressed elsewhere in further detail within the EIAR where relevant. Relevant factors identified include inter alia water, air quality, noise, and the risk of major accidents and disasters.

In addition, this chapter of the EIAR has been prepared with reference to recent national publications which provide guidance on the 2014 EIA Directive including the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018) and the Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in May 2022.

The insight provided by the IEMA Health in Environmental Impact Assessment A Primer for a Proportionate Approach document (2017) has also been considered in the preparation of this chapter. The IEMA document posits that human health spans environmental, social and economic aspects and does not merely represent an absence of disease. A broad conception of human health is put forward, that should encompass factors such as local economy and community, rather than relying on a narrower focus on biophysical health factors and determinants. In this regard, the current chapter seeks to address population and human health in a holistic manner, including consideration of economic factors, settlement patterns, landscape and visual impact, and land-use.

The 2018 EIA Guidelines published by the Department of Housing, Planning and Local Government (DHPLG) state that there is a close interrelationship between the SEA Directive and the 2014 EIA Directive. The Guidelines state that the term '*Human Health'* is contained within both of these directives, and that a common interpretation of this term should therefore be applied.

To establish the existing receiving environment / baseline, site visits were undertaken to appraise the location and likely and significant potential impact upon human receptors of this proposed development. A desk-based study of published reference documents such as Central Statistics Office Census data, the ESRI Quarterly Economic Commentary, the *Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly, 2019*, *South Dublin County Development Plan 2016-2022, Draft South Dublin County Development Plan 2022-2028* (including Chief Executive's Report) and the *Newcastle Local Area Plan 2012 (as extended)* has also been undertaken. The Strategic Environmental Assessments (SEA) for the County Development Plan and the Newcastle LAP 2012 has also been reviewed, as both provide a consideration of Population and Human Health.

It should be noted that there are numerous inter-related environmental topics described throughout this EIAR document which are also of relevance to Population and Human Health. Issues such as the potential likely and significant impacts of the proposed development on townscape and visual impact, daylight and sunlight, archaeology and cultural heritage, air quality and climate, noise and vibration, water, land and soils, microclimate, material assets including traffic and transport impacts, are of intrinsic direct and indirect consequences to human health. For detailed reference to particular environmental topics please refer to the corresponding chapter of the EIAR and other accompanying application reports.

The Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA states that '*in an EIAR, the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc'.*

This chapter of the EIAR document focuses primarily on the direct and indirect significant effects on Population, which includes Human Beings, and Human Health in relation to health effects/issues and environmental hazards arising from the other environmental factors. Where there are identified associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document, these are referred to. The reader is directed to the relevant environmental chapter of this EIAR document for a more detailed assessment.

3.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

3.3.1 Introduction

A description of the relevant aspects of the current state of the environment (baseline scenario) in relation to population and human health is provided below. Specific environmental chapters (water, noise and vibration, air quality and climate) in this EIAR provide a baseline scenario relevant to the environmental topic being discussed. Therefore, the baseline scenario for separate environmental topics is not duplicated in this section; however, in line with guidance provided by the European Commission, the EPA and the DHPLG, the assessment of impacts on population and human health refers to those environmental topics under which human health effects might occur, e.g. noise, water, air quality etc. An outline of the likely evolution without implementation of the project as regards natural changes from the baseline scenario is also provided. This is the "Do Nothing" scenario.

The existing environment is considered in this section under the following headings:

- Economic & Employment Activity;
- Social Patterns;
- Land Use and Settlement Patterns;
- Housing
- Health & Safety;
- Risk of Major Accidents and Disasters.

The application site is located to the south-western section of the built-up area of Newcastle, located c. 20km to the south-west of Dublin City Centre – within the development triangle of Clondalkin, Citywest and Celbridge – and

situated within the boundaries of South Dublin County Council. The application/project site comprises a large undeveloped, greenfield site, located to the south of Newcastle, and extends to c. 8.47 ha (including creche site of 0.07 hectares).

Figure 3.1 – Project Site

Source: Google Maps

The application site is bound to the north by a number of private residential dwellings and commercial premises along Main Street, Newcastle. To the east, the application site shares a contiguous boundary with the Graydon residential estate that is currently under construction in part. Greenfield, agricultural lands are found to the south of the application site. The site is accessed from the existing entrance from the 'L6001 - Athgoe Road' in the west, which is currently being used as an access road for the construction of the Graydon development in the east.

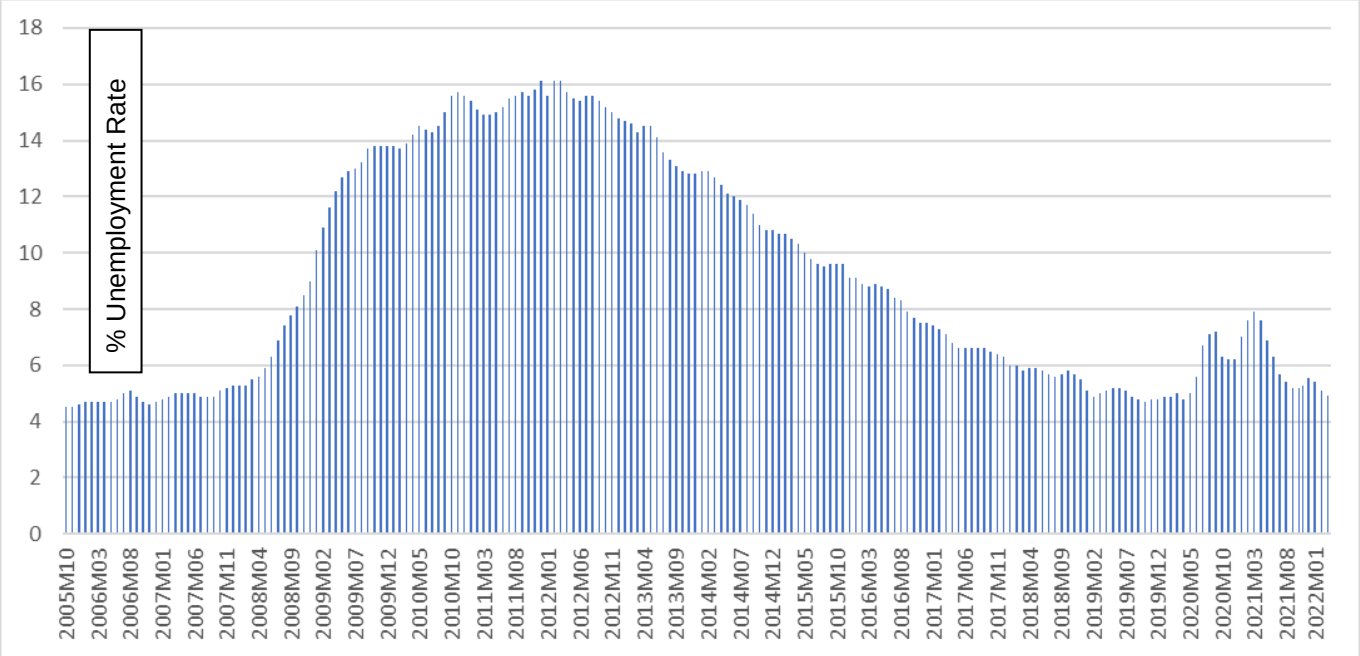
This entrance provides access onto the Main Street of Newcastle which is formed by the R120 and R405. The R120 links the M4 Motorway at Lucan with the N7 National Primary Route at Rathcoole Interchange. The R405 links the M4 Motorway via Celbridge and Hazelhatch Rail Station to the N7 at Rathcoole. Additionally, the site is c. 550m from the closest bus stop in Newcastle which is served by the 68 Dublin bus route, which operates an hourly service, and the 68X, which serves an express service at peak times only. The site is also c. 500m walk from Newcastle village centre which supports a range of commercial and social facilities including a church; a national school; a range of local village shops; a pharmacy, and a medical centre along the Main Street. Located opposite Newcastle Manor is a Texaco Service Station which accommodates a post office and convenience store. The Greenogue Industrial Estate and Aerodrome Business Park are located just beyond the village to the east also.

3.3.2 Economic & Employment Activity

The CSO's Quarterly Labour Force Survey for Q4 2021 (published February 17th 2022), indicated that the number of persons in employment was up 10.1% (+229,100) from 2,276,800 over the year while the employment rate was up from 67.8% in Q4 2020 to 73% in Q4 2021. The wider context of employment activity is a driver of demand for new housing.

Because employment was up over the year and the number of absences from work decreased over the year, the number of employed persons at work in the reference week increasing by 13.8% (+272,800) over the year. The COVID-19 Adjusted Measure of Employment, or the lower bound for the number of employed persons aged 15 years and over, decreased from 2,439,099 to 2,430,587 between the end of December 2021 and the end of January 2022. This was accompanied by a decrease from 70.9% in December 2021 to 70.7% in the associated COVID-19 Adjusted Employment Rate, for those aged 15-64.

Figure 3.2 – Unemployment by Month 2005-2022



3.3.2.1 Monthly Unemployment[9]

According to the CSO, the COVID-19 crisis continued to have an impact on the labour market in Ireland in February 2022. While the standard measure of Monthly Unemployment was 5.2% in February 2022, the COVID-19 Adjusted Measure of Unemployment could indicate a rate as high as 7.0%, if all claimants of the Pandemic Unemployment Payment (PUP) were classified as unemployed. This alternative measure is down from a revised rate of 7.8% in January 2022 and down from 27.0% in February 2021.

The CSO Monthly release (5th May 2022) note that the application of the standard methodology gives a seasonally adjusted Monthly Unemployment Rate of 4.8% for February 2022, down from the rate of 5.1% in March 2022 and down from 7.5% in April 2021. The seasonally adjusted number of persons unemployed was 129,000 in April 2022, compared to 135,800 in March 2022. When compared to April 2021, there was an annual decrease of 56,500 in the seasonally adjusted number of persons unemployed.

The Economic Social Research Institute (ESRI) quarterly economic commentary for Spring 2022[10] notes that *"Notwithstanding the significant headwinds associated with the Ukrainian crisis, we still see domestic economic activity increasing in 2022 with GDP and modified domestic demand (MDD) growing by 6.2 and 5.0 per cent respectively. This is, however, somewhat less than the forecasts in our previous Commentary, 1 reflecting the impact of the Ukrainian crisis. We expect growth of 4.3 and 4.5 per cent respectively in 2023 for GDP and MDD"*

The ESRI notes that Unemployment is now set to fall to 5% by the end of 2022, down from the average 26% in Q1 of 2021.

[9] CSO Statistical Release 5th May 2022.

[10] Published March 23rd 2022.

The ESRI Commentary outlines that *"The Russian invasion of Ukraine will have a negative impact on global economic activity and further exacerbate inflationary pressures, which had already been accumulating…. The fallout from the recent invasion of Ukraine by Russia will, amongst other issues, further exacerbate inflationary pressures, which have already been evident in the economy. Any rise in inflation will pose significant challenges for households in terms of the cost of living. It also poses major questions concerning the future sources of energy used across Europe."*

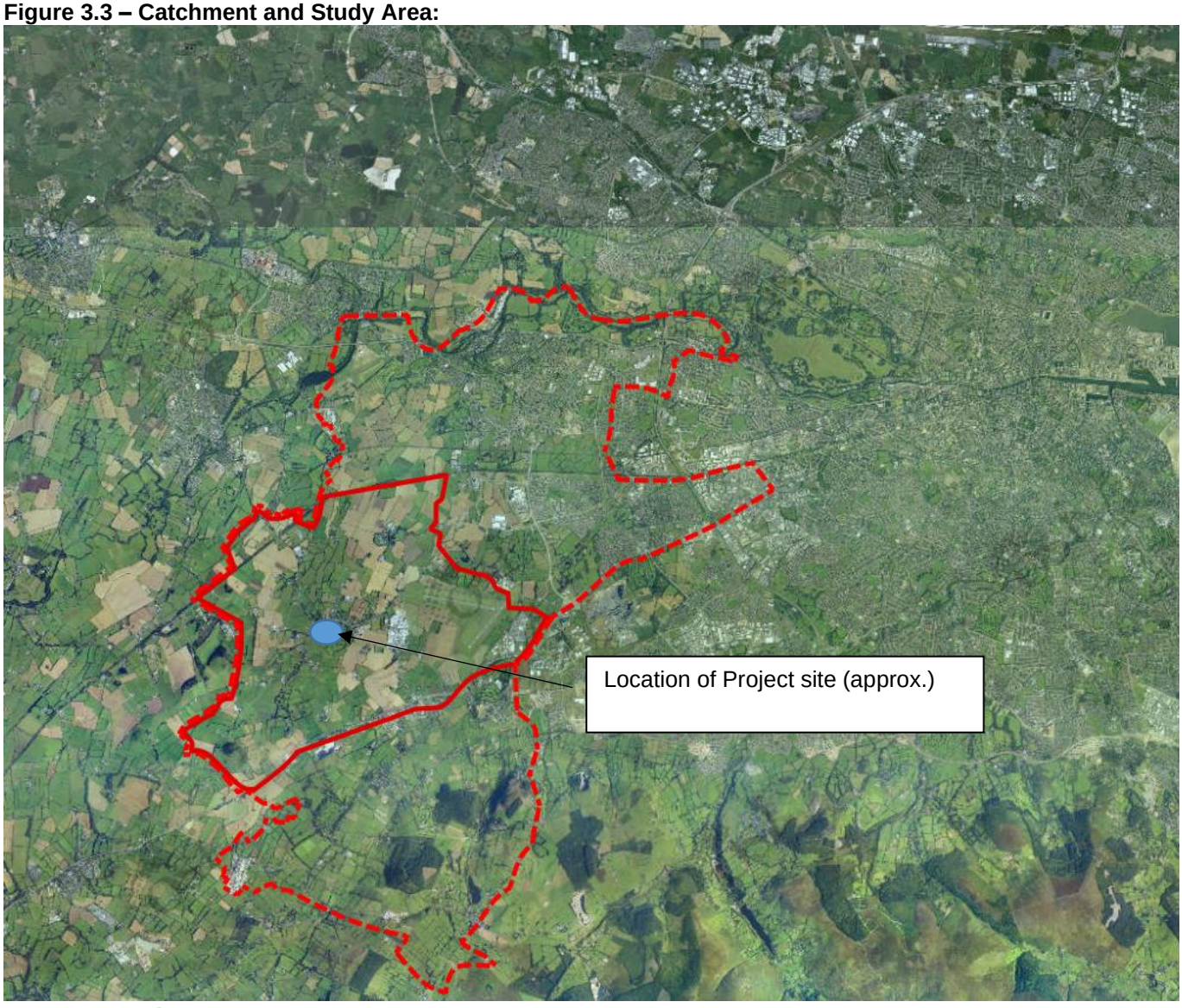
3.3.3 Population

For the purposes of this chapter, a review has been carried out of data from the 2006, 2011 and the 2016 Census of Population in order to identify any significant changes in population levels and age profile at national, regional, county, city and local levels. The 2016 Census results provide for an overview of the current population, employment and economic statistics and trends of the State.

The application site is located within the boundaries of the Electoral division (ED) of Newcastle as defined by the Central Statics Office. This Electoral Division comprised the immediate catchment area of the application site.

The ED's comprising the wider study area of the Dublin Mid-West constituency include the Clondalkin-Dunawley, Clondalkin-Moorfield, Clondalkin-Rowlagh, Clondalkin Village, Lucan-Esker, Lucan Heights, Lucan-St. Helens, Newcastle, Palmerston Village, Palmerston West, Rathcoole and Saggart. Figure 3.2 indicates the geographical extent of the immediate catchment and the wider study area.

Figure 3.3 – Catchment and Study Area:



Source: Google Maps

A review was also carried out of the census data relating to social class and household size at each of these levels. The following section provides a summary description.

3.3.3.1 Population

Table 3.1 below shows the population of the State, the Greater Dublin Area, Dublin County and City, South Dublin and the wider study area of Dublin Mid-West constituency and the Clondalkin-Cappaghmore electoral division area for 2006, 2011 and 2016. (It should be noted that that the Greater Dublin Area (GDA) includes Dublin County as well as Wicklow, Kildare and Meath. Dublin County includes Fingal, South Dublin, Dún-Laoghaire Rathdown and Dublin City).

Table 3.1 – Population at State, Regional, County and Local Level, 2006- 2016

Area	2006	2011	2016	Change 06 - 16	% change
State	4,239,848	4,588,252	4,757,976	518,128	**12.2%**
Greater Dublin Area	1,662,536	1,804,156	1,904,806	242,270	**14.5%**
Dublin County	1,187,176	1,273,069	1,345,402	158,226	**13.3%**
Dublin City	506,211	527,612	553,165	46,954	**9.2%**
South Dublin	246,935	265,205	278,767	31,832	**12.9%**
Dublin Mid-West	99,459	110,427	117,986	18,527	**18.6%**
Newcastle ED	2,631	3,749	4,257	1,626	**61.8%**

Source: Census of Population 2006, 2011 and 2016

Table 3.2 indicates that the population of the state grew from approximately 4.2 million to 4.7 million between 2006 and 2016, representing an increase of 12.2% in 10 years. The population of Dublin County increased by 13.3% (158,226 persons) over the same period while Dublin City grew by 9.2% (46,954 persons) between 2006 and 2016. The population of South Dublin county grew faster than the city with a growth rate of 12.9%.

In particular, population growth within the wider study area of Dublin Mid-West constituency rose from 2006 to 2011 by 18.6%, while the Newcastle electoral division itself experienced major growth of 61.8% since 2006 to 2016. This trend of rapid growth in the surrounding area of Newcastle brings with it a proportional increase in demand for housing and associated services provision in the area to accommodate present and future population growth in the area. The proposed development at Newcastle-Ballynakelly would help alleviate such demand pressures while also providing much needed social and affordable housing options for a range of family and individual demographics. Assuming a figure of 2.74 persons per household (average for the State in 2016), the proposed development could result in a population of c. 767 persons when fully developed.

3.3.3.2 Age Profile

Table 3.2 shows the population of the State, the Greater Dublin Area, Dublin County and City, South Dublin, the wider study area of Dublin-Mid West constituency and the Newcastle ED level for 2006, 2011 and 2016.

Table 3.2 – Age Profile at State, County and Local Level, 2006-2011-2016

Area	0-14	15-24	25-44	45-64	65+
State 2006	20.4%	14.9%	31.7%	21.9%	11.0%
State 2011	21.3%	12.6%	31.6%	22.7%	11.7%
State 2016	21.1%	12.1%	29.5%	23.8%	13.4%
GDA 2006	19.6%	15.6%	34.4%	20.7%	9.7%
GDA 2011	20.8%	13.1%	34.2%	21.5%	10.4%
GDA 2016	20.7%	12.4%	32.5%	22.5%	11.9%
Dublin County 2006	18.3%	16.2%	34.5%	20.6%	10.3%
Dublin County 2011	19.3%	13.6%	34.9%	21.3%	10.9%
Dublin County 2016	19.3%	12.7%	33.8%	22.0%	12.2%
Dublin City 2006	15.0%	16.9%	35.7%	19.7%	12.7%

Area	0-14	15-24	25-44	45-64	65+
Dublin City 2011	15.2%	14.5%	37.2%	20.5%	12.6%
Dublin City 2016	15.0%	13.2%	37.4%	21.3%	13.0%
South Dublin 2006	21.7%	16.4%	33.1%	21.6%	7.2%
South Dublin 2011	23.1%	13.1%	33%	22.1%	8.7%
South Dublin 2016	23%	12.3%	31.4%	22.3%	11%
Dublin Mid-West 2006	22.9%	15.9%	36.4%	19.2%	5.6%
Dublin Mid-West 2011	24.7%	12.8%	35.7%	20.2%	6.5%
Dublin Mid-West 2016	24.5%	12%	33.2%	21.6%	8.7%
Newcastle ED 2006	14.9%	12%	32.8%	27.9%	12.3%
Newcastle ED 2011	21.4%	9.2%	37.2%	21.2%	11%
Newcastle ED 2016	24.6%	9%	33.9%	18.8%	13.7%

Source: Census of Population 2006, 2011 and 2016

The table indicates that the highest percentage of population in the study area relates to the working age group (25-44). It is considered that the available working population in the immediate vicinity of the proposed development will enhance the attractiveness of investors to locate in this area to benefit from the significant available work force.

3.3.3.3 Social Class

The Census of Population determines social class by the nature of employment and is therefore useful as a guide to the principal types of occupation in which the population is employed or in which the population is capable of being employed. Table 3.3 shows the number and percentage of people in each of the 11 socio-economic groups identified in the 2016 Census of Population.

Table 3.3 – Persons by Socio-Economic Group, 2016

Socio-Economic Group	State	GDA	Dublin County	Dublin City	South Dublin	Dublin Mid-West	Newcastle ED
A Employers and managers	735,031 (15.4%)	348,591 (18.7%)	241,883 (18.5%)	78,685 (15.0%)	47,948 (17.3%)	18,354 (15.8%)	882 (21.5%)
B Higher professional	338,897 (7.1%)	163,667 (8.8%)	124,836 (9.5%)	49,281 (9.4%)	18,435 (6.7%)	6,870 (5.9%)	269 (6.6%)
C Lower professional	623,756 (13.1%)	237,363 (12.7%)	171,934 (13.1%)	67,162 (12.8%)	32,421 (11.7%)	13,014 (11.2%)	491 (12%)
D Non-manual	996,696 (20.9%)	364,033 (19.5%)	261,082 (19.9%)	107,212 (20.4%)	58,882 (21.2%)	25,330 (21.7%)	809 (19.8%)
E Manual skilled	359,586 (7.6%)	150,215 (8.1%)	96,384 (7.4%)	37,527 (7.1%)	26,593 (9.6%)	12,037 (10.3%)	404 (9.9%)
F Semi-skilled	369,501 (7.8%)	134,146 (7.2%)	88,725 (6.8%)	38,039 (7.2%)	22,152 (8%)	9,926 (8.5%)	266 (6.5%)
G Unskilled	153,784 (3.2%)	61,768 (3.3%)	43,541 (3.3%)	22,222 (4.2%)	9,663 (3.5%)	4,535 (3.9%)	68 (1.7%)
H Own account workers	179,281 (3.8%)	92,556 (5.0%)	60,087 (4.6%)	19,790 (3.8%)	15,243 (5.5%)	6,422 (5.5%)	237 (5.8%)
I Farmers	154,022 (3.2%)	21,105 (1.1%)	3,174 (0.2%)	390 (0.1%)	442 (0.1%)	268 (0.2%)	77 (1.9%)
J Agricultural workers	23,145 (0.5%)	5,469 (0.3%)	1,384 (0.1%)	269 (0.1%)	176 (0.1%)	49 (0.1%)	3 (>0.1%)
Z All others gainfully occupied and unknown	828,166 (17.4%)	286,242 (15.3%)	215,824 (16.5%)	104,652 (19.9%)	45,213 (16.3%)	19,710 (16.9%)	587 (14.3%)

Totals	**4,761,865**	**1,865,155**	**1,308,854**	**525,229**	**277,168**	**116,515**	**4,093**

Source: Census of Population 2016

Table 3.3 indicates that the wider study area of Dublin Mid-West is predominantly in tune with the norms of the Dublin region, GDA and the State. The electoral division of Newcastle is also relatively in harmony in comparison to its broader context in this area, however, it does show some divergent results with respect to the difference between more professional occupations and lower skilled jobs. The Newcastle ED indicates a higher percentage of its population are employed amongst higher skilled and professional socio-economic groups such as 'Employers and mangers', 'higher professionals' and 'lower professionals', while the ED also sees proportionate lower percentages of people in unskilled or partially skilled professions. This would indicate that there is a considerable decrease in uneducated persons in the area's workforce in comparison to the norms of the State, GDA and wider study area of Dublin Mid-West.

3.3.3.4 Educational Attainment

Advancing from second level education to third level assists the ability of the population to gain access to employment and enter the labour market for higher earnings. Table 3.4 overleaf contains CSO data from 2016 relating to the educational attainment of people at national, regional, county, city and local level.

Table 3.4 – Persons by Educational Attainment, 2016

Education	State	GDA	Dublin County	Dublin City	South Dublin	Dublin Mid-West	Newcastle ED
No Formal Education	52,214 (1.7%)	16,711 (1.4%)	11,856 (1.3%)	5,807 (1.5%)	2,727 (1.6%)	1,252 (1.8%)	79 (2.9%)
Primary Education	334,284 (10.8%)	113,325 (9.2%)	81,187 (9.2%)	43,102 (11.3%)	18,045 (10.4%)	7,067 (10%)	255 (9.5%)
Lower Secondary	449,766 (14.5%)	152,464 (12.4%)	102,020 (11.6%)	44,219 (11.6%)	25,123 (14.4%)	10,473 (14.8%)	343 (12.8%)
Upper Secondary	573,643 (18.5%)	217,173 (17.7%)	149,177 (17.0%)	56,059 (14.7%)	34,240 (19.6%)	13,896 (19.6%)	487 (18.1%)
Technical or Vocational qualification	271,532 (8.8%)	99,092 (8.1%)	65,919 (7.5%)	25,005 (6.6%)	15,819 (9%)	6,861 (9.7%)	271 (10.1%)
Advanced Cert. / Completed Apprenticeship	182,318 (5.9%)	63,322 (5.1%)	40,123 (4.6%)	14,191 (3.7%)	9,912 (5.7%)	4,230 (6%)	210 (7.8%)
Higher Certificate	153,351 (5.0%)	59,886 (4.9%)	40,165 (4.6%)	14,340 (3.8%)	8,598 (4.9%)	3,542 (5%)	161 (6%)
Ordinary Bachelor Degree or National Diploma	237,117 (7.7%)	99,679 (8.1%)	70,487 (8.0%)	27,047 (7.1%)	13,073 (7.5%)	5,339 (7.5%)	231 (8.6%)
Honours Bachelor Degree, and/or Professional Qualification	231,293 (10.7%)	156,350 (12.7%)	118,090 (13.4%)	50,756 (13.3%)	18,568 (10.7%)	6,826 (9.6%)	270 (10%)
Postgraduate Diploma or Degree	284,107 (9.2%)	147,700 (12.0%)	116,562 (13.3%)	43,063 (13.9%)	15,260 (8.8%)	5,669 (8%)	179 (6.7%)
Doctorate (Ph.D.) or higher	28,759 (0.9%)	15,550 (1.3%)	12,643 (1.4%)	5,897 (1.5%)	1,322 (0.7%)	441 (0.6%)	23 (>1%)
Not Stated	198,668 (6.4%)	89,037 (7.2%)	70,870 (8.1%)	41,268 (10.8%)	11,603 (6.7%)	5,330 (7.4%)	181 (6.7%)
Totals	**3,097,052**	**1,230,289**	**878,829**	**380,754**	**174,290**	**70,926**	**2,690**

Source: Census of Population 2016

The table indicates that 10% of people living in the Newcastle ED have studied up to Honours Bachelor Degree / Professional Qualification level. A further 6.7% have studied to Postgraduate Diploma or Degree level, which is only slightly lower than the national averages of 10.7% and 9.2% respectively.

Predominantly, as the data in Table 3.4 illustrates, the majority of the population in the Newcastle ED chose to leave their education reasonably early with 9.5% leaving their education at primary school level and a further 12.8% only attaining their education to junior certificate level. However, the rates of completion at Leaving Certificate level (18.1%) and at lower levels of education as discussed remains relatively coordinated with national and regional norms. Nevertheless, the incidence of 'No Formal Education' amongst the population of the Newcastle ED (2.9%) is almost 2 times greater on average than that of the state, GDA, Dublin county and wider study area of Dublin Mid-West constituency. Overall, Table 3.4 indicates that when compared to other areas, the resident population of the wider study area, and the Newcastle ED is characterised by considerably reasonably low to average levels of educational attainment. This is consistent with the indicative data in Table 3.3 showing the concentration of unskilled workers in the area.

3.3.4 Land Use & Settlement Patterns

The site is located within the administrative area of South Dublin County Council and is therefore subject to the land use policies and objectives of the County Development Plan 2016-2022, the Draft County Development Plan 2022-2028 and the Newcastle Local Area Plan 2012 (extended to 2022). The subject lands are zoned 'Objective RES-N', under the South Dublin County Development Plan 2016-2022. The zoning designation has an objective 'to provide for new residential communities in accordance with approved area plans'. The zoning map of the County Development Plan 2016-2022 also nominates the southern portion of the application site for an indicative Traveller Accommodation 'TA' objective. The Applicant has been in discussions with South Dublin County Council and 31st May 2022 from the Housing Department of South Dublin County Council which confirms that:

"representatives from the Housing, Social and Community Development Directorate have held discussions with Cairn Homes regarding compliance with the objective of providing a Traveller Group Housing Scheme under a Part V agreement in the Newcastle area in accordance with South County Council's Development Plan 2016-2022. The Council can confirm that Cairn Homes proposals to fulfil the Traveller Accommodation objective are satisfactory."

It is also noted that there are no changes proposed to the land-use zoning policy of the subject lands in the South Dublin County Draft Development Plan 2022-2028.

Figure 3.4 – Land Use Zoning Map (South Dublin County Development Plan 2016-2022),

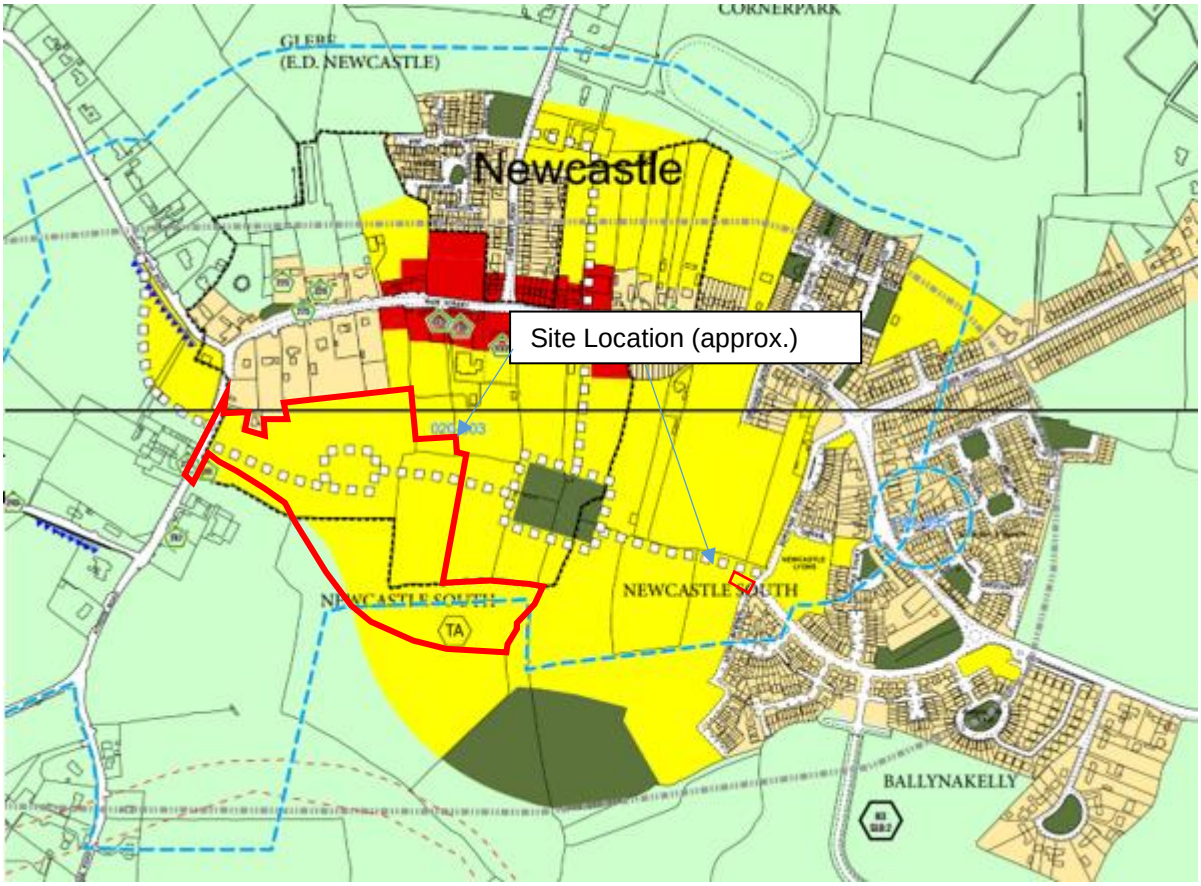
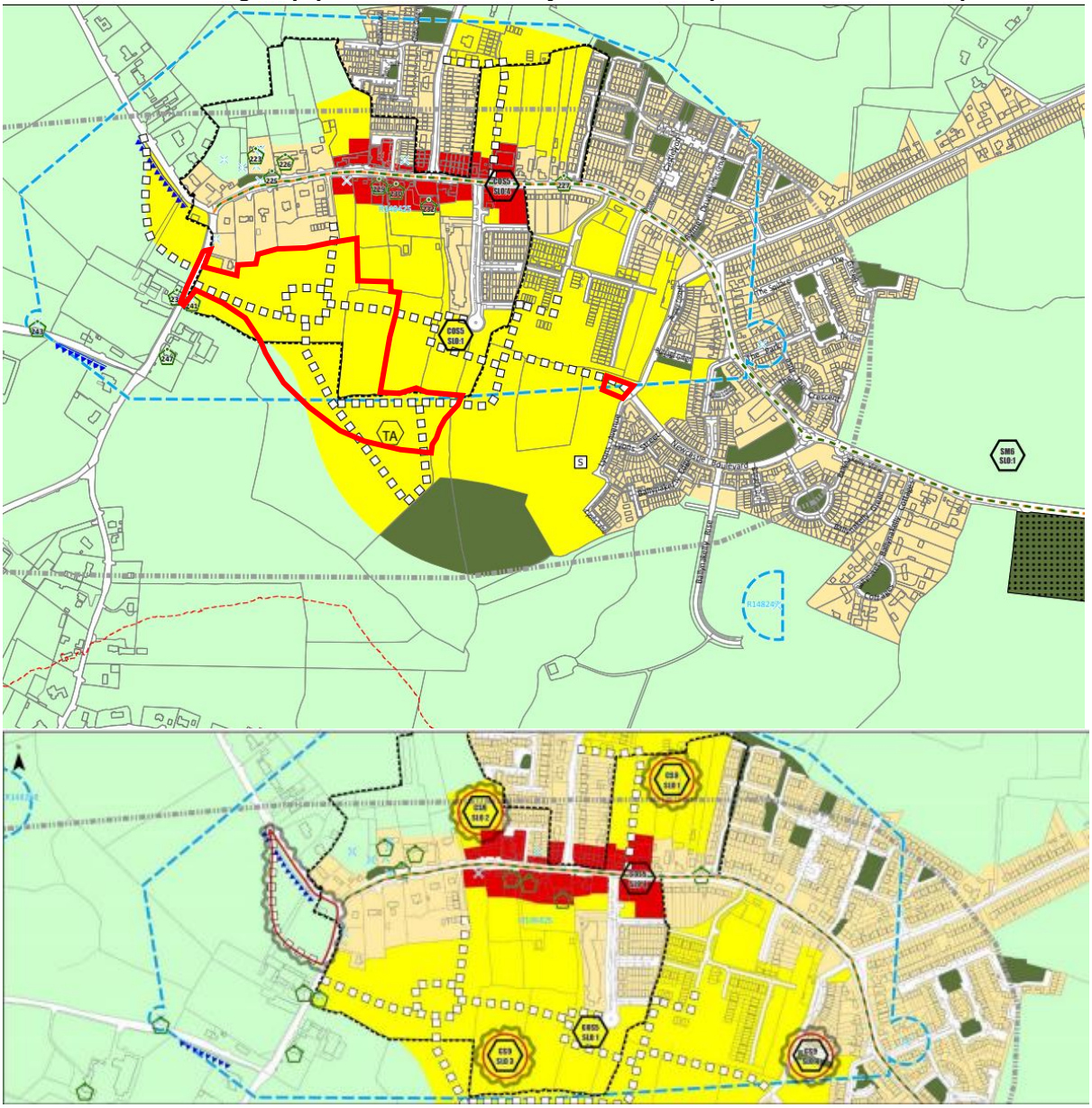


Figure 3.5 – Land Use Zoning Map (South Dublin County Draft Development Plan 2022-2028)



(includes Material Amendments March 2022)

The following land uses are permissible in the zoning objective 'RES-N':

Figure 3.6 – Land Use Zoning Matrix (South Dublin County Development Plan 2016-2022)

Use Classes Related to Zoning Objective	
Permitted in Principle	Childcare Facilities, Community Centre, Cultural Use, Doctor/Dentist, Education, Enterprise Centre, Funeral Home, Garden Centre, Guest House, Health Centre, Housing for Older People, Industry-Light, Nursing Home, Offices less than 100 sq.m, Open Space, Primary Health Care Centre, Public House, Public Services, Recreational Facility, Recycling Facility, Residential Institution, Residential, Restaurant/Café, Retirement Home, Shop-Local, Shop-Neighbourhood, Sports Club/Facility, Stadium, Traveller Accommodation, Veterinary Surgery.
Open for Consideration	Advertisements and Advertising Structures, Agriculture, Allotments, Bed & Breakfast, Betting Office, Camp Site, Car Park, Caravan Park-Residential, Cemetery, Crematorium, Embassy, Fuel Depot, Home Based Economic Activities, Hotel/Hostel, Industry-General, Live-Work Units, Motor Sales, Nightclub, Office-Based Industry, Offices 100 sq.m - 1,000 sq.m, Off-Licence, Petrol Station, Place of Worship, Refuse Transfer Station, Science and Technology Based Enterprise, Social Club, Wholesale Outlet.

Figure 3.7 – Land Use Zoning Matrix (South Dublin County Draft Development Plan 2022-2028)

Use Classes Related to Zoning Objective	
Permitted in Principle	Childcare Facilities, Community Centre, Cultural Use, Doctor/Dentist, Education, Enterprise Centre, Funeral Home, Garden Centre, Guest House, Health Centre, Housing for Older People, Industry-Light, Nursing Home, Offices less than 100 sq.m, Open Space, Primary Health Care Centre, Public House, Public Services, Recreational Facility, Recycling Facility, Residential Institution, Residential, Restaurant/Café, Retirement Home, Shop-Local, Shop-Neighbourhood, Sports Club/Facility, Stadium, Traveller Accommodation, Veterinary Surgery.
Open for Consideration	Advertisements and Advertising Structures, Agriculture, Allotments, Bed & Breakfast, Betting Office, Camp Site, Car Park, Caravan Park-Residential, Cemetery, Crematorium, Embassy, Fuel Depot, Home Based Economic Activities, Hotel/Hostel, Industry-General, Live-Work Units, Motor Sales, Nightclub, Office-Based Industry, Offices 100 sq.m - 1,000 sq.m, Off-Licence, Petrol Station, Place of Worship, Refuse Transfer Station, Science and Technology Based Enterprise, Social Club, Wholesale Outlet, Work-Live Units.

Therefore, the residential and open space uses are permitted in principle.

The application site comprises a 8.47 greenfield site (on 2 no. parcels of land – the main development site and the creche site). The predominant land-use typology of the surrounding area is characterised by a remainder of undeveloped greenfield land to the south and west, while a number of residential districts occupy the lands to the east in the form of the under-construction Graydon development, and the Newcastle Boulevard and Aylmer estates. A mix of commercial and community facilities accommodate the northern environs of the application site along the Main Street of Newcastle village. Within a short walking distance, the core of the village of Newcastle provides a wide array of retail (i.e. Newcastle Village Store, Spar, and Newcastle Shopping Centre), healthcare (i.e. Newcastle Dental, Medical Centre and Newcastle Lyons Pharmacy) and community (i.e. St. Finian's National School, St. Finian's Community Hall, St. Finian's Church and Annie May's public house) facilities and amenities.

It is also noted that there is a permitted Supermarket currently under construction located at the eastern side of the town adjacent to Graydon and the Main Street comprising a convenience supermarket (GFA c.1,759sq.m); 1 two storey mixed-use building (c.10.7m overall height) comprising of a café (c.225sq.m) at ground floor and a community centre at the first floor (c.140sq.m).

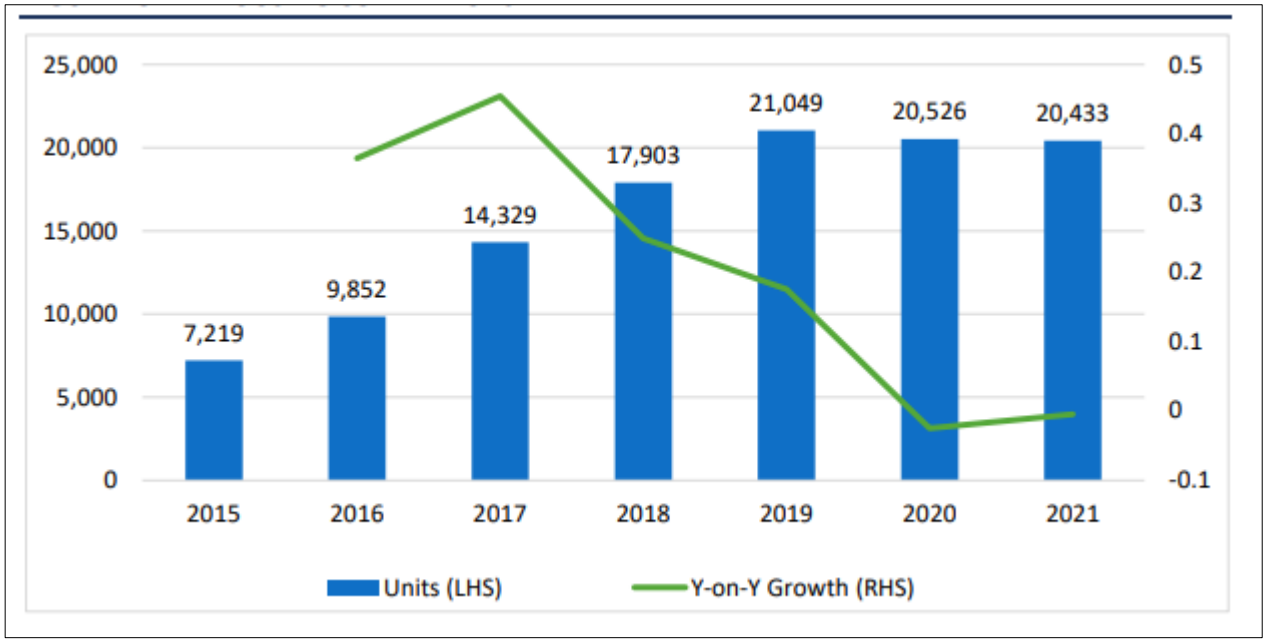
3.3.5 Housing

In terms of housing delivery, the proposed development is located at a location which is zoned for development, and which is appropriate for the uses proposed. There is a significant and established housing need in the Greater Dublin Area, including South Dublin, and the State as a whole, as recognised within Government housing and planning policy, including the 2016 Rebuilding Ireland Plan for Housing and Homelessness and Housing for All 2021, published in September 2021, reinforces the critical and strategic need for new dwellings where it is a target to provide 300,000 housing units by the year 2030. The government's vision for the housing system over the longer term is to achieve a steady supply of housing in the right locations with economic, social and environmental sustainability built into the system. The proposed development will allow for new residential community, built to a high standard and quality, within an existing settlement, with its range of amenities and services, in proximity to public transport services.

While the number of residential units being completed yearly nationally has rebounded, compared to the period 2010-2015, the level of completions remains significantly less than the estimated equilibrium demand for housing (estimated at 35,000 per annum by the ESRI) in the State. Moreover, the current level of housing need and demand is not at equilibrium, being significantly augmented by the extremely low level of housing completions in the decade since 2010 (See figure below). Over this period, a significant shortfall in housing has amassed year on year, which is reflected in the data collected in Census 2016 – which revealed overcrowding and increasing numbers of households living in cramped conditions.

It is further noted that the number of housing completions in the state reduced significantly (falling well below projected completions) since 2020, due to the impact of the ongoing Covid-19 public health crisis. There had been a gradual increase (see figure below) in the number of completions over the past decade as supply increased to meet the level of structural demand, estimated by the ESRI to be in the region of 35,000 new homes a year (ESRI 2022).

Figure 3.8 – Yearly housing completions for the State



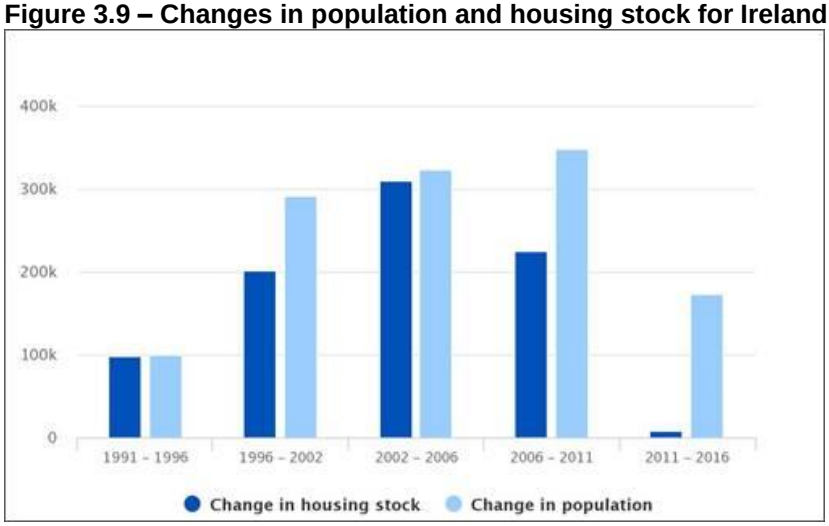
Source: ESRI Spring Commentary 2022

The ESRI (2022)[11] note in the order of 20,430 residential completions during 2021, while an increase is expected in 2022 to a forecasted output of c. 26,000 units. A further increase to 30,000 units in 2023 is forecast within the ESRI quarterly economic commentary for Spring 2022. An increase in construction activity over the coming years is also likely to be facilitated by recently announced policy measures contained within the Housing for All plan, the aim of which is to increase the supply of housing.

The ESRI state that on the back of the rebound in construction activity in Q2 2021 and the continued and sustained economic growth outlook, they expect an outturn of close to 21,000 units in 2021 and that supply to increase further in 2022 with a completions level of just over 26,000 units (Figure 3.4). An increase in construction activity over the coming years is also likely to be facilitated by recently announced policy measures such as Housing for All.

[11] ESRI Spring Commentary 2022

Figure 3.9 – Changes in population and housing stock for Ireland, 1991-2016

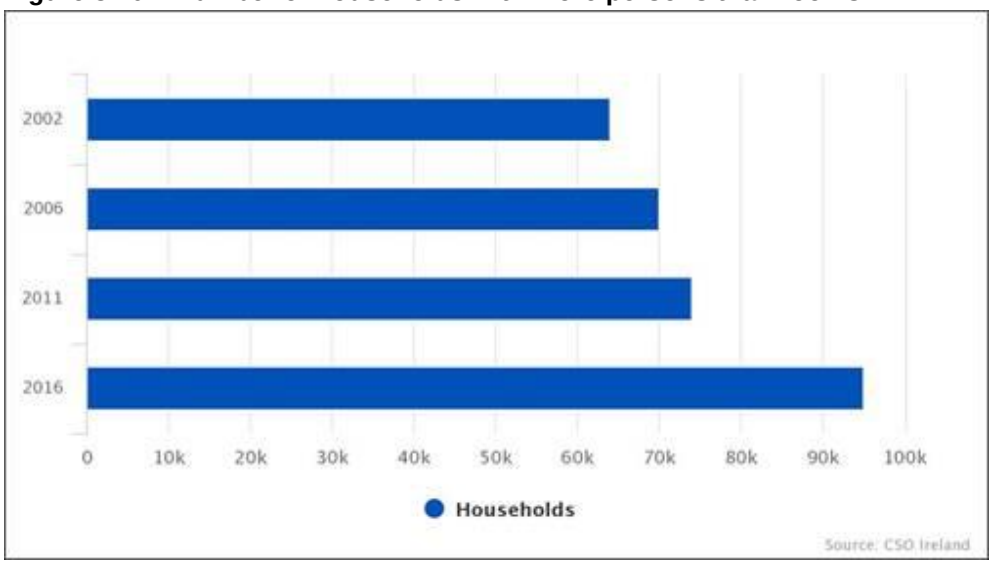


Source: Central Statistics Office, 2017

Census 2016 revealed an increase in the national housing stock of just 8,800 units during the five-year intercensal period (taking into account obsolescence during that period) representing an increase of just 0.4 percent (as shown in the figure below).

This is notable given the increase in population seen concurrently (173,613 or 3.8%). Furthermore, almost 40% of these additional units were one off houses, the majority of which would never have come to market. Census 2016 also revealed a rise in the average household size (from 2.73 to 2.75) (CSO, 2017). This was attributed to household formation falling behind population growth, another indicator of lacking housing availability and increasing housing need.

Figure 3.10 – Number of households with more persons than rooms



Source: Central Statistics Office, 2017

The 2011-2016 intercensal period also saw a notable increase in the number of households with more persons than rooms in their dwelling (see figure below). There were 95,013 permanent households with more persons than rooms according to Census 2016, a 28 per cent rise on the equivalent number in 2011 (73,997).

Close to 10% of the population resided within these households in 2016 at an average of 4.7 persons per household. This is an indicator of increased overcrowding (and housing need) which may be attributed to lack of housing availability and rising costs.

These figures set out above all point to a significant and increasing housing need in the state which is not being met at present.

The Central Bank of Ireland has published a study entitled 'Population Change and Housing Demand in Ireland'[12], which includes the following key points:

- *"Growth in population has significantly exceeded the increase in the housing stock since 2011 and the average household size has risen, reversing a previous long-running trend.*
- *To keep pace with population growth and changes in household formation, our estimates indicate that an average of around 27,000 dwellings would have been required per annum between 2011 and 2019.*
- *Assuming unchanged household formation patterns and net inward migration close to current levels, around* ***34,000*** *new dwellings would be required each year until 2030."*

The detail above demonstrates that there has been a continued shortfall in the delivery of housing over an extended period. The project will provide 280 no. dwellings. Assuming a figure of 2.74 persons per household (average for the State in 2016), the proposed development could result in a population of c. 767 persons when fully developed.

3.3.6 Health & Safety

The surrounding context consists of a mix of residential, employment, retail and agricultural lands. This project does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which might result in a risk to human health and safety. From a review of the South Dublin County Council Development Plan maps there are 2 no SEVESO Sites in the environs of the proposed development (comprising Benntag Chemicals located to the north west Unit 405, Greenouge Industrial Estate, Rathcoole, Dublin 24 and Johnston Logistics, Blackchurch Business Park, Naas Rd, Rathcoole, Co. Dublin).

3.3.7 Risk of Major Accidents and Disasters

The EIA Directive states 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.

In this respect, taking cognisance of the other chapters contained within this EIAR document, the proposed application site does not present risks of major accidents or disasters, either caused by the scheme itself or from external man made or natural disasters. Chapter 8 (Water) sets out that the proposed application site is located within Flood Risk Zone C, which is appropriate for a residential development.

3.4 'DO NOTHING' SCENARIO

In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely impacts upon the receiving environment should the proposed development not take place.

A '*do nothing'* scenario would result in the subject lands remaining fallow and undeveloped. This would be an underutilisation of the application site from a sustainable planning and development perspective.

In the do-nothing scenario, the absence of the proposed development would perpetuate the housing shortfall in the Dublin area, contrary to the aims and objectives of national, regional, and local planning and housing policy, all of which promote the delivery of additional housing at strategic locations such as the application site.

The local economy would not experience the direct and indirect positive effects of the construction phase of development, including employment creation. The local construction sector and associated industries and services would be less viable than they might otherwise be.

[12] Available at: https://www.centralbank.ie/news-media/press-releases/press-release-economic-letter-population-change-and-housing-demand-in-ireland-10-december-2019

The '*do-nothing'* scenario would result in the status of the environmental receptors described throughout this EIAR document remaining unchanged. The potential for any likely and significant adverse environmental impacts arising from both the construction and operational phases of the proposed development would not arise. In terms of the likely evolution without implementation of the project as regards natural changes from the baseline scenario, it is considered there would be limited neutral change from the baseline scenario in relation to population (human beings) and human health.

3.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Consideration of the characteristics of the proposed development allows for a projection of the level of impact on any particular aspect of the environment that could arise. In this chapter the potential impact on population and human health is assessed. A full description of the proposed development is provided in Chapter 2 of this EIAR document.

In summary, the proposed development comprises 280 no. residential units consisting of 128 no. 2-storey semi-detached and terraced houses providing 2, 3 4 and 5 bed units, 18 no. 3-bed duplex units over 18 no. ground floor 2-bed apartments in 3 separate no. 3-storey blocks and 116 no. apartments (1, 2 and 3 bed units) provided within 2 no. 5-storey buildings, all associated site work, access, infrastructure, car parking, open space and boundary treatments. Assuming a figure of 2.74 persons per household (average for the State in 2016), the proposed development could result in a population of c. 767 persons when fully developed.

3.6 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

3.6.1 Introduction

This section provides a description of the specific, direct and indirect, impacts on population and human health that the proposed development may have during both the construction and operational phases of the proposed development. As stated, guidance documents from the EPA and the Department outline that the assessment of impacts on population and human health should focus on health issues and environmental hazards arising from the other environmental factors and does not require a wider consideration of human health effects which do not relate to the factors identified in the EIA Directive. Additionally, this section addresses the socio-economic and employment impacts of the proposed development.

The specific chapters of the EIAR (4-16) assess the environmental topics outlined in the EIA Directive.

3.6.1.1 Water

Construction Phase

Provision of water infrastructure for the proposed development would involve construction activities within the subject lands involving trench excavations conducted in parallel with the other services. The potential impact on the local public water supply network would be temporary and imperceptible, noting that the construction will be undertaken under the requirements of the PCEMP, which includes mitigation measures contained in the EIAR. Therefore, the impact on human health and population in this regard is considered to be not significant.

During the course of the construction phase of the proposed development, there is potential for surface water runoff to suffer from increased levels of silt or other pollutants, in addition to potential pollution from spillages, wheel washing and water from trucks on the application site. The Preliminary Construction Environmental Management Plan (see Appendix D2 of Volume III of the EIAR), and the Resource and Waste Management Plan (see Appendix E of Volume III of the EIAR) set out how all materials will be managed, stored and disposed of in an appropriate manner, mitigating the potential negative effects as outlined.

Potential impact on water is addressed in Chapter 6 (Water) and a number of mitigation measures are outlined in in that chapter of this Environmental Impact Assessment Report. These mitigation measures will serve to minimise potential adverse impacts of the construction phase to the water environment, thereby minimising any associated risk to human health from water contamination. Therefore, the impact of construction of the proposed development in relation to water is likely to be short-term and imperceptible with respect to human health.

Operational Phase

All new foul drainage lines will be constructed in accordance with Irish Water Standards (see Infrastructure Design Report by DBFL). Foul sewers will be pressure tested and will be subject to a CCTV survey in order to identify any possible defects prior to being made operational.
The design of proposed site levels (roads, buildings etc.) as set out on the Site Layout Maps, prepared by MOLA Architects, has been carried out in such a way as to replicate existing surface gradients, therefore replicating existing overland flow paths, and not concentrating additional surface water flow in a particular location.

Surface water run-off from the project site (subject site, future phases and zoned lands as outlined on drawing number 210026-DBFL-CS-SP-DR-C-1202) will be attenuated to greenfield runoff rates. This is calculated as 17.40l/s for the proposed development using the Institute of Hydrology equation as recommended in the Greater Dublin Strategic drainage Study (GDSDS) based on an area of 8.22Ha. The overall catchment and a catchment plan strategy is shown on drawing number 210026-DBFL-CS-SP-DR-C-1202.

Sustainable Urban Design Systems, (SuDS) features such as swales and filter drains to provide additional storage and promote infiltration of and treatment of surface water run-off have been provided in landscaped areas.

Attenuation facilities have been designed as above ground storage in order to maximize the use of SuDs and reduce the requirement of underground tanks to promote biodiversity. This approach was adopted in line with SDCCs Sustainable Drainage Explanatory Design Guide 2022.

3.6.1.2 Noise and Vibration

Construction Phase

Noise and Vibration are addressed in Chapter 8 (Noise and Vibration) which was prepared by AWN Consulting.

Construction noise levels are predicted to be above the Construction Noise Threshold to varying degrees at the limited number of residential noise sensitive receivers located at distances less than 35m from construction works. Construction noise levels are predicted to be below the Construction Noise Threshold at the offsite residential noise sensitive receivers located at distances greater than 35m from construction works, which represents the majority of nearby (Noise Sensitive Locations) NSLs. Good practice noise control measures have been presented to reduce the impact of construction works. The impact of construction works at distances of 20-30m is predicted to be negative, moderate to significant and short-term. At distances of 35m and greater, the impact is predicted to be negative, slight to moderate and short-term.

Noise levels associated with construction traffic have been predicted to represent an increase of less than 1 dB and therefore predicted to be of negative, not significant and short-term impact.

Due to the distances between construction works and the nearest offsite receptors it is predicted that for the receptors (including the protected structures) the impact of construction vibration will be neutral, imperceptible and short-term.

Operational Phase

Plant items will be located and selected by the Contractor so that cumulative plant noise emissions from the development achieve the appropriate noise criteria, the noise impact is predicted to be neutral, imperceptible and long-term.

Additional Traffic on Surrounding Roads
Based on the traffic flows associated with the operation of the proposed development the impacts are predicted to be neutral, imperceptible and permanent.

There are no appreciable sources of vibration associated with the operation of the proposed development. The vibration impact is predicted to be neutral, imperceptible and long-term.

3.6.1.3 Air Quality & Climate

Construction and Operational Phase

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 as set out in the Air Quality, Climate chapter of the EIAR (Chapter 7) including a dust management plan contained in Appendix C Volume III of this EIAR). 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 (see Chapter 7) which are based on the protection of human health. Therefore, the impact of construction of the proposed development is considered to be negative, short-term and imperceptible with respect to human health.

As the operational phase air dispersion modelling has shown that emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are long-term, neutral and imperceptible.

3.6.2 Economic Activity

Construction Phase

The construction phase of the proposed development is likely to result in a positive net improvement in economic activity in the area of the proposed development site, particularly in the construction sector and in associated and secondary building services industries. The sector has grown strongly in recent years and this project comprising 280 no. dwellings will help to further enhance growth and reduce the increasing pressure on the housing market.

The construction of the development and all associated infrastructure will precipitate a short term imperceptible positive impact on construction-related employment (of c. up to 150 employees depending on stage of construction) for the duration of the construction phase. The phased construction of the proposed residential units, open space, and a childcare facility, alongside associated physical infrastructure will result in a construction period over an approximate 36-48 month timeline (noting that some phasing due to market demand may result in an overall extended period of up to 7 years) and will consequently enhance economic activity during this period, which is considered to be a slight temporary positive impact. Work will be undertaken by sub-contractors who will also work elsewhere on a phased basis over the construction phase.

The construction phase will also have secondary and indirect '*spin-off*' imperceptible short term positive impacts on ancillary support services in the wider area of the application 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 positive impacts on economic activity will be largely short term but will contribute to the overall future viability of the construction sector and related services and professions over the phased construction period.

Operational Phase

The operational phase of the proposed development will result in the provision of 280 residential units, employment floorspace and a creche. This has the potential to provide accommodation for approximately 767 persons, based upon the existing average occupancy rate of 2.74 per household (based on CSO 2016 Census figures for the State). This increase in occupancy 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, which will accrue as the development of the Planning Scheme progresses. The proposal will provide much needed residential accommodation and is considered a positive permanent slight impact.

3.6.3 Population

Construction Phase

The construction phase of the proposed development is unlikely to have any significant impact on social patterns within the surrounding area. Some additional temporary additional local populations may arise out of construction activity. However, these impacts are imperceptible, temporary in nature and therefore not significant, due to the duration of the construction phase.

It is acknowledged that the construction phase of the project may have the potential for some short-term not significant negative impacts on local residents. Such impacts are likely to be associated with construction traffic and possible nuisances associated with noise and dust. These impacts are dealt with separately and assessed elsewhere in the EIAR, including Chapter 2 - Project Description and Alternatives Examined, Chapter 7 - Air Quality and Climate and Chapter 9 - Noise and Vibration and also Chapter 10 - Traffic and Transportation. Any disturbance is predicted to be commensurate with disturbance associated with the construction industry where a site is efficiently and properly

managed having regard to neighbouring activities. The construction methods employed, and the hours of construction proposed will reduce potential impacts to nearby residents. A Preliminary Construction Environmental Management Plan PCEMP (prepared by DBFL) has been prepared and is submitted with this planning application (contained in Appendix D2 Volume III of this EIAR. The mitigation contained in Chapter 16 of this EIAR and PCEMP will be contained in the contractor's CEMP/CMP.

Operational Phase

The addition of new residents and an additional employment to the area will improve the vibrancy and vitality of the area and will help to support existing community and social infrastructure. This is an imperceptible positive long term impact.

The proposed development includes the provision of a childcare facility with a GFA of c. 778 sq.m. This childcare facility will accommodate the likely demand arising from the proposed development and Graydon.

Once operational, the proposed development will give rise to much needed additional residential accommodation. Residents will spend a portion of their income locally which would not happen without the proposed development. The creche and employment hub will provide employment opportunities in the operational phase of the development.

The proposal includes an element of Part V provision in accordance with the requirements of the Planning Authority, and Hosing Department which will provide for an enhanced mix of tenures, (including Part V Social Housing) and add to the existing social housing stock. The overall benefit to the social patterns of the surrounding area resulting from the development can be considered slight, long term, and positive.

Having regard to the fact that the area within which the development is situated benefits from a good level of social and community infrastructure and noting the elements of the proposed development which will improve and strengthen this infrastructure, it is concluded that the proposed development will precipitate a slight positive, long-term impact on social patterns in the operational phase.

3.6.4 Land-Use & Settlement Patterns

Construction Phase

The construction phase of the proposed development will comprise site clearing, excavation and construction works, and the erection of the proposed new buildings on site and has the potential to impact adversely and result in the temporary degradation of the local visual environment on a short-term basis. The visual impacts precipitated by the proposed development are assessed in greater detail in Chapter 9 of the EIAR 'Landscape and Visual Impacts'.

Secondary land use impacts include off-site quarry activity and appropriate disposal sites for removed spoil and other materials transported off site. Chapter 11 Material Assets Waste considers these potential impacts in more detail and Chapter 11 (as well as the Construction and Demolition Waste Management Plan) describes the relevant mitigation measures).

It is noted the proposed development provides for a higher density and height compared to what is set out in the Newcastle LAP. The potential additional effects on the receiving environment has been considered in the relevant Chapters of the EIAR (Air Quality and Climate, Noise and Vibration) and supporting documentation submitted with the SHD.

The construction phase may result in a marginally increased population in the wider area due to increased construction employment in the area, however, this would be short term in nature and the impact would be imperceptible.

Operational Phase

The operational phase of the proposed development will result in the introduction of a sustainable density of residential development, delivering wider public realm improvements, in accordance with national and local planning policy objectives which seeks to deliver compact growth at suitable locations. Adequate provision of high-quality housing to serve the existing and future population of the county and the wider Greater Dublin Area is an important contributor to the establishment and maintenance of good human / public health. The high-quality design which

includes a series of linked open space areas, the retention of trees of the proposed development, will contribute to a positive impact on the wellbeing of future residents.

3.6.5 Housing

Construction Phase

The proposed development will not result in any impact in terms of loss of housing stock during the construction stage.

Operational Phase

The operational phase of the proposed development will see the delivery of 280 residential units, in a range of housing typologies (houses, apartments, duplex apartments).

The proposed development will respond to established housing need and demand in the area of the proposed development, and the wider region. The proposed residential units will assist in addressing the significant shortfall of residential development, which has been further impacted by the COVID-19 crisis.

The proposed development delivers a range of housing unit sizes and types, including one, two, and three bedroom apartments as well as 2, 3, 4 and 5 bedroom dwellings. The scheme also benefits from a high level of good quality public open space, with new greenway linkages provided through the site improving connectivity to the Graydon residential development to the east.

The delivery of 280 no. well-designed high-quality residential units at an appropriate location close to public transport links will have a direct, positive, and significant impact on the future residents of the proposed development and will support the population growth targeted for the South County Dublin area and Dublin City.

3.6.6 Employment

The impact of the proposed development in relation to employment has been discussed under economic activity.

3.6.7 Health & Safety

The surrounding context consists of a mix of residential, employment, retail and agricultural lands. The project does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which might result in a risk to human health and safety. Seveso sites in the wider locality comprise Benntag Chemicals located to the north west Unit 405, Greenouge Industrial Estate, Rathcoole, Dublin 24 and Johnston Logistics, Blackchurch Business Park, Naas Rd, Rathcoole, Co. Dublin.

Chapter 14 – Risk Management addresses the potential health and safety aspects of the proposed development during the construction and operational phases.

In the absence of mitigation, the proposed development could have a slight negative, short-term impact on the surrounding area during construction phase due to traffic and associated nuisance, dust and noise. These issues and appropriate mitigation measures are addressed in Chapters 7, 8 and 12 of the EIAR, in the Traffic and Transportation Assessment, Construction Environmental Management Plan and the Waste Management Plan which accompany the application. The Traffic and Transportation Chapter includes a PCEMP, to be implemented for the application site which will minimise disruption to the surrounding road network, which will be submitted and agreed with the Planning Authority. The PCEMP will include the mitigation measures contained in the EIAR. A Construction Traffic Management Plan (CTMP) will be developed by the appointed contractor and submitted to South Dublin County Council for approval prior to commencement of work. It will implement the relevant Mitigation Measures in this EIAR including the PCEMP accompanying this planning application (contained in Appendix D2 Volume III of this EIAR).

No significant health and safety effects are envisaged during either the construction or operational phases of the proposed development. The standard Health and Safety policy, procedures and work practices of the proposed

development will conform to all relevant health and safety legislation both during the construction and operational stages of the proposed development. The proposed development will be designed and constructed to best industry standards, with an emphasis being placed on the health and safety of employees, local residents and the community at large.

Construction Phase

The construction methods employed and the hours of work proposed will be designed to minimise potential impacts. The development will comply with all Health & Safety Regulations (see Chapter 15) during the construction of the project. The PCEMP will include the mitigation measures contained in the EIAR. A Construction Traffic Management Plan (CTMP) will be developed by the appointed contractor and submitted to South Dublin County Council for approval prior to commencement of work. It will implement the relevant Mitigation Measures in this EIAR including the PCEMP accompanying this planning application (contained in Appendix D2 Volume III of this EIAR).

Operational Phase

The operational stage of the development will not precipitate long term negative impacts in terms of health and safety. The design of the proposed development has been formulated to provide for a safe environment for future residents and visitors alike. The paths, roadways and public areas have all been designed in accordance with best practice and the applicable guidelines including DMURS (Design Manual for Urban Roads and Streets (DMURS), 2013 (updated in 2019). 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.

The Air Quality Chapter (Ch 7) of the EIAR predicts that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or local human health and that there will be a negligible impact on local air quality generated by increased traffic movements associated with the development.

The proposed development will not cause significant impacts on human health and safety once completed and operational and any impact will be imperceptible, and unlikely.

3.6.8 Risk of Major Accidents or Disasters

Chapter 14 – Risk Management addresses the potential risks of major accidents or disasters relating to the proposed development during the construction and operational phases.

Construction Phase

The location of the proposed development is within Flood Zone C and it is unlikely there will be any impacts related to flooding, given the Flood Zone C location, during the construction phase of the proposed development, stemming internally from within the development, or externally.

The works proposed in proximity to roadways will be governed by best practice and appropriate safety procedures, ameliorating any risk of a major accident in those contexts (as set out in Chapter 15).

Operational Stage

The proposed development will be located on land which is not at any significant risk of flooding. The Eastern CFRAM (Catchment Flood Risk Assessment and Management) study details the predicted risk for a variety of fluvial and coastal flood scenarios. The mapping does not include the watercourse reaches affected by the proposed scheme and only maps downstream flooding. The proposed development is therefore outside of the Q100 and Q1000 flood extents and is therefore in within Flood Zone C (low risk of flooding). The proposed development is appropriate for the application site's flood zone categories and that the proposed development is considered to have the required level of flood protection.

Therefore, it is considered that there is no likely significant risk related to major accidents or disasters, external or internal, man-made or natural in respect of the proposed development.

3.7 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

Avoidance, remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential likely and significant environmental impacts. As per the 2022 EPA guidelines:

"Undertakings to mitigate are specific parts of the project that must be complied with – in the same way as features that are described in drawings or specifications. Therefore, it is in the applicant's interest to ensure that all undertakings to mitigate are fully understood and accepted and the resources will be available to ensure compliance with such commitments."

3.7.1 Construction Phase

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics examined and the inter-relationships between each topic. These remedial and mitigation measures are likely to result in any significant and likely adverse environmental impacts on population and human health during the construction phases being avoided. Readers are directed to Chapter 16 of this EIAR document which summarises all of the remedial and mitigation measures proposed as a result of this EIAR.

In order to protect the amenities enjoyed by nearby residents, premises and employees a Construction Environment Management Plan will be submitted by the contractor and implemented during the construction phase. The content of the CEMP will be based on the mitigation set out in this EIAR.

With reference to the construction phase of the proposed development, the objectives of the Construction & Demolition Waste and By Product Management Plan prepared by AWN Consulting (and also Chapter 11 of the EIAR) is to ensure that waste generated during the proposed construction and operation phases will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts 1996 (as amended) are complied with.

3.7.2 Operational Phase

The operational phase is considered to have likely positive impacts on population in relation to the provision of additional residential units, open space, childcare provision, to cater for the demands of a growing population in accordance with the residential zoning objectives pertaining to the application site.

During the operational phase of the development the design of the scheme has had regard to Design Manual for Urban Roads and Streets (DMURS) during its design. the design maximises connectivity between key local destinations and constructed development through the provision of a high degree of permeability and legibility for all network users particularly for sustainable forms of travel. Accordingly, the proposed residential scheme delivers greater mode and route choices along direct, attractive and safe linkages to a range of amenities and local service destinations. This will promote a pedestrian friendly environment, promoting sustainable development and reducing the influence of cars. This has the potential to reduce accidents within the proposed development.

For the operational phase, no further specific mitigation is required having regard to the mitigation included within the other chapters of this EIAR.

3.8 PREDICTED RESIDUAL IMPACTS OF THE PROPOSED DEVELOPMENT

This section provides a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied. It should be noted that in addition to remedial and mitigation measures, impact avoidance measures have also been built in to the EIAR and project design processes through the assessment of alternatives described in Chapter 2 of this EIAR document. Impact interactions are considered further in Chapter 15.

There are numerous inter-related environmental topics described throughout this EIAR document which are also of relevance to Population and Human Health. For detailed reference to the residual impacts of particular environmental topics please refer to the relevant corresponding chapter of the EIAR (land and soils, water and hydrology, air quality and climate, noise and vibration, traffic, and risk management).

3.8.1 Construction Phase

The construction phase of the proposed development will consist of site clearance, excavation and construction works, which will be confined to the project site. Notwithstanding the implementation of remedial and mitigation measures there will be some minor temporary residual impacts on population (human beings) and human health most likely with respect to nuisance caused by construction activities, predominantly related to noise and traffic as detailed in chapters, 8 and 10.

It is anticipated that subject to the implementation of the remedial and mitigation measures proposed throughout this EIAR document, and as controlled through the Construction Environmental Management Plan, any adverse likely and significant environmental impacts will be avoided. The overall predicted likely impact of the construction phase will be short-term not significant, and neutral. A CEMP (with the mitigation contained in this EIAR and PCEMP) will be prepared by the contractor and submitted to the Local Authority.

Imperceptible, positive short-term impacts are likely to arise due to an increase in employment and economic activity associated with the construction of the proposed development.

3.8.2 Operational Phase

The project will comprise the development of an undeveloped site in terms of the provision of residential units to serve the growing residential population of the area. The proposed development will result in a positive alteration to the existing underutilised site in terms of the provision of residential units and community facilities to serve the growing population of the area in accordance with national and regional planning policy.

The provision of creche on site enhances the quality of the development and helps to create sustainable communities.

It is noted the proposed development provides for a higher density and height compared to what is set out in the Newcastle LAP. The heights in the LAP are 2 storeys for the majority of the LAP lands and the densities are lower (20-30 units per hectare), whereas the heights range from 2 storeys, 3 storeys and 5 storeys and the density is c. 38 units per hectare net. The potential additional impacts on the receiving environment have been considered in the relevant Chapters of the EIAR and supporting documentation submitted with the SHD.

Notwithstanding the increase in height and density set out in the Newcastle LAP, the implementation of the range of remedial and mitigation measures included throughout this EIAR document will reduce significant and likely environmental impacts of the operational phase of the proposed development on population and human health (as set out in relevant chapters land and soils, water and hydrology, air quality and climate, noise and vibration, landscape and visual, cultural heritage, traffic, and risk management).

3.9 CUMULATIVE

3.9.1 Potential Cumulative Impacts

The potential cumulative impacts of the proposed development on population and human health have been considered in conjunction with the ongoing changes in the surrounding area. Visits to the application site and surrounding area and desk-based review of online planning files have been undertaken to identify the existing pattern of development, nearby uses, and any permitted / ongoing developments of relevance to the current proposals in the context of population and human health. The surrounding area is defined by a broad and varied mix of uses, including residential, commercial, recreational and civic uses.

The lands on which the proposed development is to take place have been zoned under the South Dublin County Council Development Plan 2016-2022 and Draft South Dublin County Development Plan 2022-2028 "*To provide for new residential communities in accordance with approved area plans".* In the case of the subject lands for substantial residential development, this zoning with the associated approved Newcastle Local Area Plan 2012 (as extended) will see more development to the south of Newcastle. The permitted roads infrastructure works as part of the Graydon development application (ABP-305343-19), to the east provides connectivity to the east, which the proposed development will utilise.

The construction of the proposed development will influence demographic change, population growth, and the intensity of commercial use in this area, cumulatively contributing to increasing population and employment growth in the wider area which represents a positive cumulative impact which accords with the planning policy context for the area.

An increase in local housing, and some increase in employment opportunities and service provision (i.e. crèche) has the potential to generate direct and indirect impacts. The visual appearance of the landscape will be altered with the introduction of the proposed built elements including infrastructure, in cumulation with other development in the area. Implementation of the remedial and reductive measures in respect of noise/traffic management etc. in the EIAR would ensure a minimal impact on the existing communities of this area during the construction phase.

The cumulative impact of the proposed development, along with other permitted and existing developments in the vicinity, will be a further increase in the population of the wider area. This will have a moderate positive long term impact on the population in the immediate area of the application site, including the wider area of Newcastle. The (under construction) Graydon development by Cairn is located adjacent to the east (ABP-305343-19). In addition, there is a Supermarket under construction (SD20A/0037), and associated amendment (SD20A/0343 & SD21A/0311) comprising the Demolition of 3 existing structures on site (total c.226sq.m) and the construction of 1 double storey (c.9.2m overall height) retail development in the form of a convenience supermarket (GFA c.1,759sq.m); 1 two storey mixed-use building (c.10.7m overall height) comprising of a café (c.225sq.m) at ground floor and a community centre at the first floor (c.140sq.m).

To the north of the project site is a proposal (SD22A/0045) comprising the construction of 6 three-bedroom dwelling houses. On the 7th of April 2022, South Dublin County Council issued a Further Information Request for development construction of proposed access road and footpaths; provision of car parking facilities. At the time of writing the response to Further Information had not been submitted. Further to the north there is a proposal under construction PRR SD19A/0040 (28 no. dwellings) & SD21A/0335 (currently under appeal ABP Ref.312960-22 6 no. dwellings).

In addition, in the event there is an upgrade undertaken to the Newcastle Pumping Station (at Grant's View) to the east of Newcastle by Irish Water the potential cumulative effects to Population and Human Health to the local and surrounding area is deemed to be insignificant. As indicated by Irish Water, in the Confirmation of Feasibility, this SHD is not reliant on the Irish Water Newcastle pumping station project by reason of the installation of the on-site pumping station proposed. These works would be subject to Irish Water standards in respect of noise and there are no additional significant impacts will occur.

Chapter 7 (Air Quality) states that the operational phases of the subject development and other permitted residential developments in the local area will not generate cumulative air emissions that will have an adverse impact on local ambient air quality. Measured baseline air quality and National published air quality data confirm that the existing air quality is good and that the operational phases of the subject development and other local proposed developments will have a long-term imperceptible impact on existing air quality.

Chapter 8 (Noise and Vibration) states that once the subject development is completed, there will be no residual adverse noise impact on the receiving environment associated with their operation. Increased traffic movements associated with the development will generate a long-term, insignificant impact on the local noise climate during peak hour times.

The cumulative impact of the proposed development, along with other permitted and existing developments in the vicinity, will be a further increase in the population of the wider area. The cumulative impact of the proposed development, along with other permitted and existing developments in the vicinity, will be a further increase in the population of the wider area. This will have a not significant positive long term impact on the population in the immediate area of the application site, including the wider area of Newcastle. It is noted the Traffic chapter has taken into account the cumulative aspects of recently constructed and under construction development in the area.

The cumulative impact of the proposed development, along with other permitted, existing and proposed developments in the vicinity, will be a further increase in the population of the wider area. This will have a moderate impact on the population (human beings) in the area. This impact is likely to be long term and positive, having regard to the zoning objective for the subject lands, and their strategic location in close proximity to public transport, and the high level of demand for new housing in the area.

The cumulative impact of the proposed development, along with other permitted, existing and proposed developments in the vicinity, will be a further increase in the population of the wider area. This will have a moderate

impact on the population (human beings) in the area. This impact is likely to be long term and positive, having regard to the zoning objective for the subject lands, and their strategic location in close proximity to public transport, and the high level of demand for new housing in the area.

Chapter 7 (Air Quality) states that the operational phases of the subject development and other permitted residential developments in the local area will not generate cumulative air emissions that will have an adverse impact on local ambient air quality. Measured baseline air quality and national published air quality data confirm that the existing air quality is good and that the operational phases of the subject development and other local proposed developments will have a long-term neutral imperceptible impact on existing air quality.

Chapter 8 (Noise and Vibration) states that the cumulative noise and vibration impacts associated with the proposed development and future local developments will not result in an increased impact on the closest receptors to the application site.

This chapter of the EIAR has provided an assessment of the likely impact of the proposed development on population and human health. As set out above, the proposed development will result in a long-term positive impact on housing and is not likely to result in any significant negative effects on population and human health, and will result in some other positive impacts, including settlement patterns of a sustainable density at an appropriate location and economic benefits derived from the employment opportunities within the childcare facility proposed. Through generating additional economic activity in the area, and providing for a high standard of residential accommodation, there will be a slight positive impact arising from the proposed development in the short-term (for economic activity) and in the long term for residential accommodation.

3.10 'WORST-CASE' SCENARIO

The worst-case scenario is the effects arising from a project in the case where mitigation measures substantially fail. The failure of the mitigation measures will not lead to any profound, irreversible or life-threatening consequences for the residential population. However, this scenario is considered unlikely.

3.11 MONITORING

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in this EIAR in regard to the other environmental topics such as water, air quality and climate and noise and vibration sufficiently address monitoring requirements.

3.12 REINSTATEMENT

While not applicable to every aspect of the environment considered within the EIAR, certain measures may be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact to the environment.

No reinstatement measures are proposed with respect to Population and Human Health

3.13 DIFFICULTIES ENCOUNTERED IN COMPILING

No particular difficulties were experienced in compiling this chapter of the EIAR document.

4.0 BIODIVERSITY

4.1 INTRODUCTION

This section of the EIAR was carried out by Altemar Ltd. It assesses the biodiversity value of the proposed development area and the potential impacts of the development on the ecology of the surrounding area and within the potential zone of influence (ZOI).

The development will consist of the construction of 280 no. dwellings, a creche, and open space at this site within the townland of Newcastle South, Newcastle, Co. Dublin, on lands of c. 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche c. 0.07 ha. in 'Graydon' as follows:

A) 128 no. 2 storey houses (8 no. 2 bedroom houses, 94 no. 3 bedroom houses, 25 no. 4 bedroom houses and 1 no. 5 bedroom house;
B) 116 no. apartments in 2 no. 5 storey buildings comprising (54 no. 1 bedroom apartments & 62 no. 2 bedroom apartments, all with terrace or balcony along with solar panels and green roofs at roof level as well as telecommunications infrastructure comprising 9 no. support poles on ballast mounts (to accommodate 1No. 2m 2G/3G/4G antenna & 1No. 5G antenna each) & 3 no. poles on lift overrun (to accommodate 2No. Ø0.3m Microwave links each at roof level of Apartment building B, together with associated equipment and cabinets/shrouds);
C) 36 no. apartments/duplex apartments in 3 no. 3 storey buildings – (18 no. 2 bedroom apartments and 18 no. 3 bedroom duplex apartments) all with terrace;
D) Amendment to permitted Creche (c. 518sqm) in 'Graydon' (ABP References: TA06S.305343 & ABP-305343-19) to now provide a Creche of c. 778 sq. m of 2 no. storeys;
E) Open space, hard and soft landscaping (including public lighting & boundary treatment), communal open space for duplex apartments and apartments; along with single storey bicycle/bin stores and ESB substations;
F) Vehicular access from the Athgoe Road from a new signalised junction along with upgrades to footpath and pedestrian crossing as well as provision of vehicular/pedestrian/cycle link to permitted 'Graydon' (TA06S.305343) 'Newcastle Boulevard' to the east, as well as 423 no. car parking spaces and 370 no. bicycle spaces and all internal roads, cycleways, green routes and paths;
G) Provision of Surface water attenuation measures and underground attenuation systems, connection to water supply, and provision of foul drainage infrastructure as well as underground local pumping station to Irish Water specifications and all ancillary site development/construction/landscaping works.

The programme of work in relation to biodiversity aspects of the Report have been designed to identify and describe the existing ecology of the area and detail sites, habitats or species of conservation interest. It also assesses the significance of the likely impacts of the scheme on the biodiversity elements and designs mitigation measures to alleviate identified impacts. Mitigation measures and the phasing of the project are contained in the accompanying Preliminary Construction Environmental Management Plan (PCEMP), which has been prepared by DBFL Consulting Engineers.

A separate AA Screening, in accordance with the requirements of Article 6(3) of the EU Habitats Directive, has been produced to identify potential impacts of the development on Natura 2000 sites, Annex species or Annex habitats. It concludes that '*No Natura 2000 sites are within the zone of influence of this development. Having taken into consideration the proposed project, the effluent discharge from the proposed development works, the distance between the proposed development site to designated conservation sites, lack of direct hydrological pathway or biodiversity corridor link to conservation sites and the settlement of silt over the intervening distance and dilution effect with other effluent and surface runoff, it is concluded that this development would not give rise to any significant effects to designated sites. The construction and operation of the proposed development will not impact on the conservation objectives of features of interest of Natura 2000 sites*.'

Standard construction and operational phase control measures, in addition to monitoring measures are proposed to minimise potential impacts and to improve the biodiversity potential of the proposed development site. However, it is important to note that none of the measures proposed are necessary for the protection of Natura 2000 sites or their conservation objectives. These are standard measures to comply with legislation and in particular Water Pollution Acts.

4.1.1 Background to Altemar

Altemar Ltd. is an established environmental consultancy that is based in Greystones, Co. Wicklow that has been in operating in Ireland since 2001. Bryan Deegan MCIEEM is the Managing Director of Altemar Ltd. and holds a M.Sc. Environmental Science, BSc (Hons.) in Applied Marine Biology and a National Diploma in Applied Aquatic Science. He has over 26 years' experience as an environmental consultant in Ireland and was the ecologist for all aspects of

this project. Previous projects where Altemar were the lead project ecologists include the Lidl Ireland GmbH regional distribution centres in Newbridge and Mullingar, 18 airside projects for DAA at Dublin Airport and 7 fibre optic cable landfalls in Ireland including the New York to Killala cable project in 2015.

4.2 METHODOLOGY

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

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2022)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017)

A pre-survey biodiversity data search was carried out in August 2020 and updated in September 2021. This included examining records and data from the National Parks and Wildlife Service (NPWS), National Biological Data Centre (NBDC) and the Environmental Protection Agency (EPA), in addition to aerial, 6-inch maps and satellite imagery. A habitat survey of the site was undertaken within the appropriate seasonal timeframe for terrestrial fieldwork. Field surveys were carried out as outlined in Table 4.1. All surveys were carried out in the appropriate seasons and in compliance with survey guidance.

Table 4.1 **– Field Surveys**

Area	Surveyors	Survey Dates
Terrestrial and avian Ecology	Bryan Deegan (MCIEEM) of Altemar	September 16th 2020, September 30th 2021, 27th April 2022.
Mammal Survey	Bryan Deegan (MCIEEM) of Altemar	September 16th 2020, September 30th 2021, 8th March 2022, 27th April 2022, (14th & 17th May 2022.Camera traps)
Bat Fauna	Bryan Deegan (MCIEEM) of Altemar	September 16th 2020, September 30th 2021 & 6th June 2022.

Desk studies were carried out to obtain relevant existing biodiversity information within the ZOI. The assessment also extends beyond the immediate development area to include those species and habitats that are likely to be impacted upon by the proposed residential development. Details of the proposed development are seen in Chapter 2 of this Environmental Report. The proposed project including the layout, drainage strategy and landscape design were reviewed to inform this assessment. Further, Chapter 2, Development Description, Chapter 5, Land and Soils and Chapter 6 Water of this submission were reviewed. Altemar provided input into the proposed development throughout the design process.

4.2.1 Proximity to designated conservation sites and habitats or species of conservation interest

The designated conservation sites within 15km of the proposed combined development site were examined for potential impact. Sites beyond 15km have no direct or indirect pathways or are across the marine environment where significant dilution, mixing and settlement would occur and given the scale of the proposed development, impacts on sites beyond 15km would be at negligible levels. This assessment included sites of international importance; Natura 2000 sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA)) and Ramsar sites and sites of National importance ((Natural Heritage Areas (NHA), proposed Natural Heritage Areas (pNHA). Up to date GIS data (NPWS data shapefiles) were acquired and plotted against 1, 5, 10 and 15km buffers from the proposed development site. GIS data of rare and threatened species within proximity of the site was provided by NPWS. Additional information on rare and threatened species was researched through the National Biodiversity Data Centre maps

4.2.2 Terrestrial and Avian Ecology

A pre-survey data search was carried out. This included a literature review to identify and collate relevant published information and ecological studies previously conducted and comprised of information from the following sources;

the National Parks and Wildlife Service, NPWS Rare and Protected Species Database, National Biodiversity Data Centre, EPA WMS watercourses data, in addition to aerial, 6 inch, satellite imagery. Following the desktop study, walk-over assessments of the site were carried out on the September 16th 2020, September 30th 2021 and the 27th April 2022. Surveys were carried out by means of a thorough search within the potential ZOI at the appropriate times of year for relevant survey. The presence of mammals is indicated principally by their signs, such as resting areas, feeding signs or droppings - though direct observations are also occasionally made. It should be noted that several signs of mammal activity and burrows were noted on site. These were investigated in greater detail in 2022 and included the use of camera traps.

Habitat mapping was carried out according to Fossitt (2000) using AcrGIS 10.5 and displayed on Bing satellite imagery or street mapping based on the 27th April 2022.site visit. Any rare or protected species or habitats were noted. As part of the fieldwork an invasive species assessment was carried out. Birds noted on site were classed based on the Birds of Conservation Concern in Ireland classification of red, amber and green, which is based on an assessment of the conservation status of all regularly occurring birds on the island of Ireland. It should be noted that the site is proximate to a housing development that is currently under construction and elements of the project site form part of the construction site e.g, access and site compound. In addition, much of the site has undergone site clearance in the recent past.

4.2.3 Bat Fauna

Onsite trees were inspected for bats and/or their signs using a powerful torch (141 Lumens) – Petzl MYO RXP. The site survey was supplemented by a review of Bat Conservation Ireland's (BCIreland) National Bat Records Database. A bat detector and emergent survey that covered the entire application site was carried out on the September 30th 2021 within optimal conditions.

4.2.4 Rating of Effects

The terminology for rating impacts is derived from the EPA Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

4.2.5 Difficulties Encountered

No difficulties were encountered in relation to the preparation of the Biodiversity report. The bat survey was undertaken within the latter stages of the active bat period (April to September) and a detector survey was possible. Insects were observed in flight during the bat survey. The mammal assessment was carried within the optimal survey period. Much of the site has undergone site clearance and the site is significantly disturbed.

4.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

4.3.1 Zone of Influence

Best practice guidance suggests that an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995). The potential zone of influence (ZOI) was set at a radius of 2km from the proposed Project. It should be noted that where there was a potential for the ZOI to be influenced by drainage connections, natural biodiversity corridors e.g. rivers or woodland these were also take into account and the assessment was extended. After consultation with DBFL Consulting Engineers, it was outlined that all surface water outfalls are to local field drainage, including existing drainage in the Athgoe Road. Specifically, there are 4 catchments within the subject site. Catchments 1 and 2 will share the same outfall to an existing drainage ditch on the subject site and will be attenuated to 11.67l/s. Catchment 3 will outfall to the existing surface water network in the Athgoe road and will be attenuated to 1l/s. Catchment 4 will outfall to the same existing drainage ditch as catchment 1 and 2 and will be attenuated to 3.83l/s. Further investigation is required to determine the precise pathway and ultimate destination of surface water drainage from the proposed residential development at Newcastle, Co. Dublin. Out of an abundance of caution, this report continues on the premise that all surface water drainage ultimately outfalls to the River Liffey, via the Griffeen Stream. In this case, the potential ZOI extends beyond the site, with the potential for downstream impacts to extend beyond the proposed development area via the surface water/foul water networks. The application site outline is shown in figure 4-1.

4.3.2 Designated Sites

As can be seen from Figures 4.2 (SAC's within 15km), 4.3 (SPA's within 15km), 4.4 (NHA and pNHA within 15km), 4.5 (Watercourses proximate to the site.), there are no Natura 2000 sites within 5km, and two National conservation sites (Grand Canal pNHA & Slade of Saggart and Crooksling Glen pNHA) are within five kilometres of the proposed development site. There are no Ramsar sites within 15km of the proposed development site. The distance and details of the conservation sites within 15km of the proposed development and outside 15km with potential for a pathway are seen in Table 4.2a and Table 4.2b. There is no direct pathway to designated sites. The nearest designated site (Grand Canal pNHA) is at a minimum of 2.1 km from the development with no direct or indirect hydrological connection. Figures 4.6 – 4.9 demonstrate watercourses proximate to the subject site and designated conservation sites with the potential for a hydrological pathway. In addition, foul water is treated in the Ringsend WwTP which is operating within capacity[13]. No impacts are foreseen on this designated site outlined in Table 4-2a and 4-2b due to the significant distance from the application site and the dilution, settlement and mixing within the marine environment. Foul water will discharge to a WwTP that is currently operating within capacity.

Table 4.1a – Natura 2000 sites within 15km (and outside 15km with potential for a pathway) of the proposed development

Natura 2000 Sites	Distance	Direct Hydrological / Biodiversity Connection
Special Areas of Conservation (SAC)		
Rye Water Valley/Carton SAC	7.1 km	**No**
Glenasmole Valley SAC	9.2 km	**No**
Wicklow Mountains SAC	10.2 km	**No**
Red Bog, Kildare SAC	11 km	**No**
South Dublin Bay SAC	19.3 km	**No**
North Dublin Bay SASC	22.1 km	**No**
Special Protection Areas (SPA)		
Poulaphouca Reservoir SPA	12.5 km	**No**
Wicklow Mountains SPA	13.6 km	**No**
South Dublin Bay and River Tolka Estuary SPA	19.3 km	**No**
North Bull Island	22.1 km	**No**

Table 4.2b –Designated conservation sites within 15km (and outside 15km with potential for a pathway) of the proposed development

Designation	Conservation Sites	Distance	Direct Hydrological / Biodiversity Connection
pNHA	Grand Canal	2.1 km	**No**
pNHA	Slade of Saggart and Crooksling Glen	4.7 km	**No**
pNHA	Lugmore Glen	6.5 km	**No**
pNHA	Kilteel Wood	6.7 km	**No**
pNHA	Liffey Valley	6.9 km	**No**
pNHA	Rye Water Valley/Carton	7.1 km	**No**
pNHA	Royal Canal	8.4 km	**No**
pNHA	Glenasmole Valley	9.5 km	**No**

13 https://www.water.ie/__uuid/eed266bd-5646-4b6a-bf9d-6ddb57049930/2020-IW-WWCR-Web-Version_Dublins.pdf

Designation	Conservation Sites	Distance	Direct Hydrological / Biodiversity Connection
pNHA	Dodder Valley	9.6 km	**No**
pNHA	Red Bog, Kildare	10.8 km	**No**
pNHA	Poulaphouca Reservoir	12.4 km	**No**
pNHA	Liffey At Osbertown	14.7 km	**No**
pNHA	Donadea Wood	14.8 km	**No**
pNHA	North Dublin Bay	18.8 km	**No**
pNHA	South Dublin Bay	19.2 km	**No**
Ramsar	Sandymount Strand/Tolka Estuary	19.3 km	**No**
Ramsar	North Bull Island	22.2 km	**No**

Figure 4.1 – Proposed Development Site Outline (red)

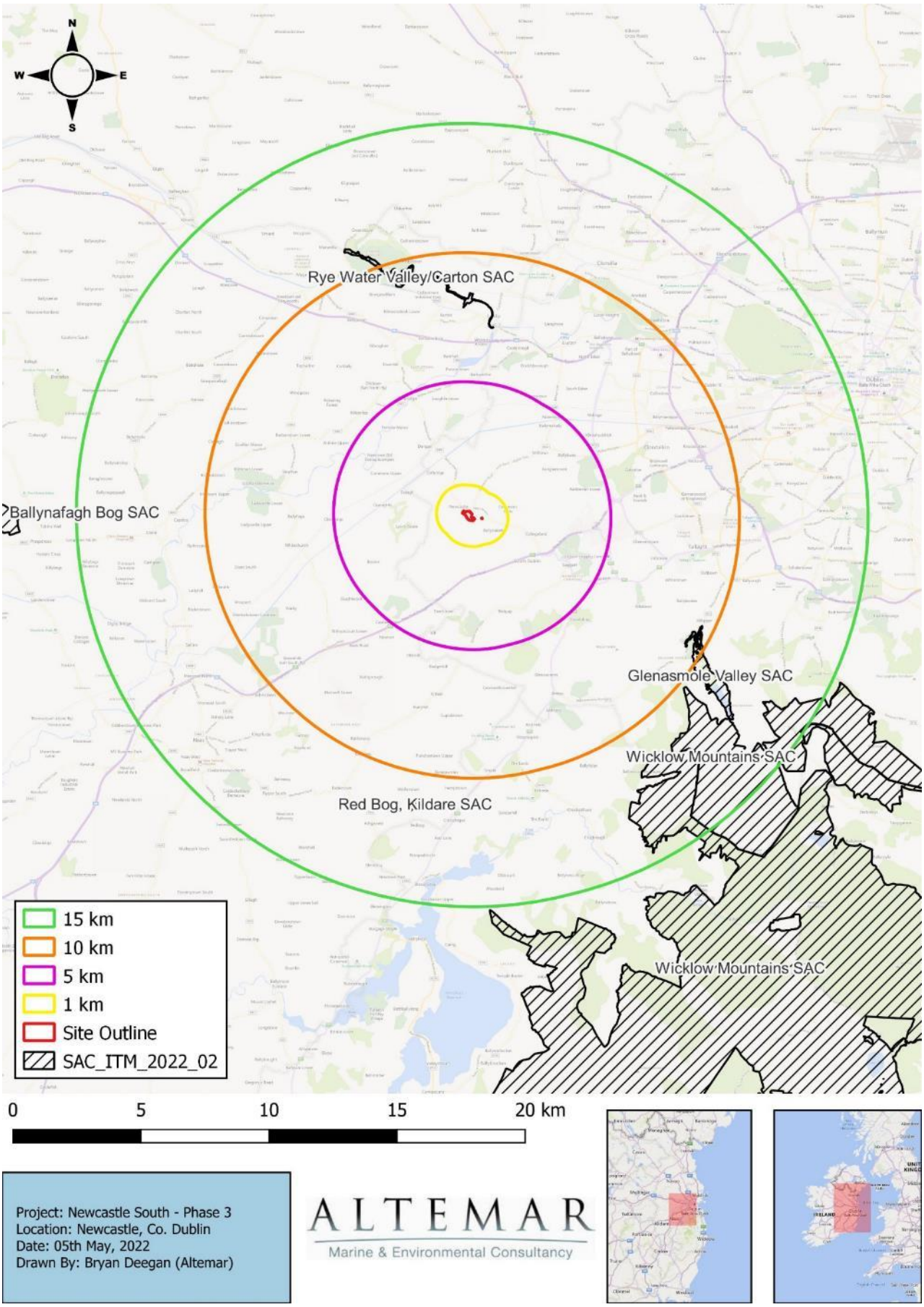


Figure 4.2 – Special Areas of Conservation within 15km of the proposed development site

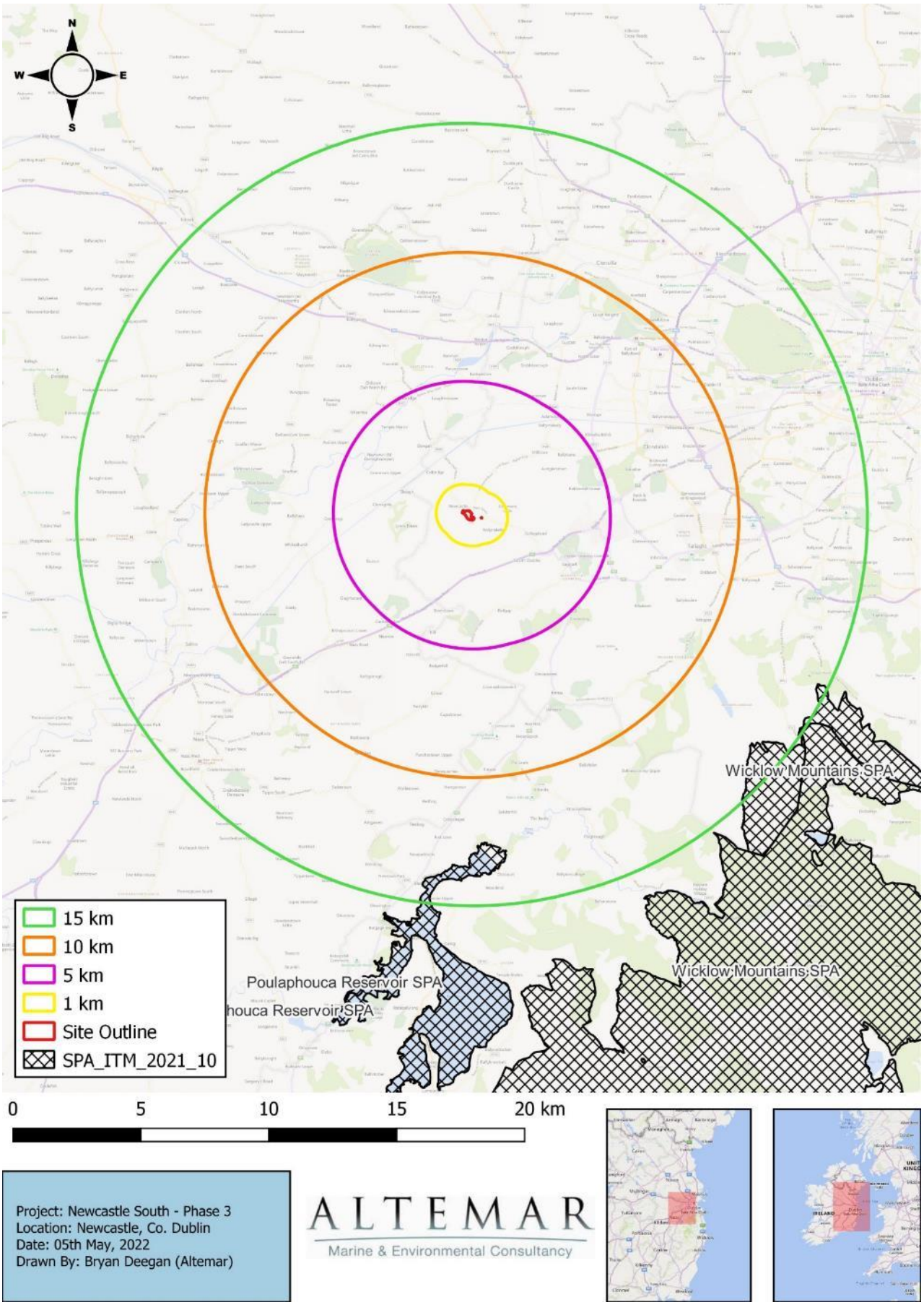


Figure 4.3 – Special Protection Areas within 15km of the proposed development site

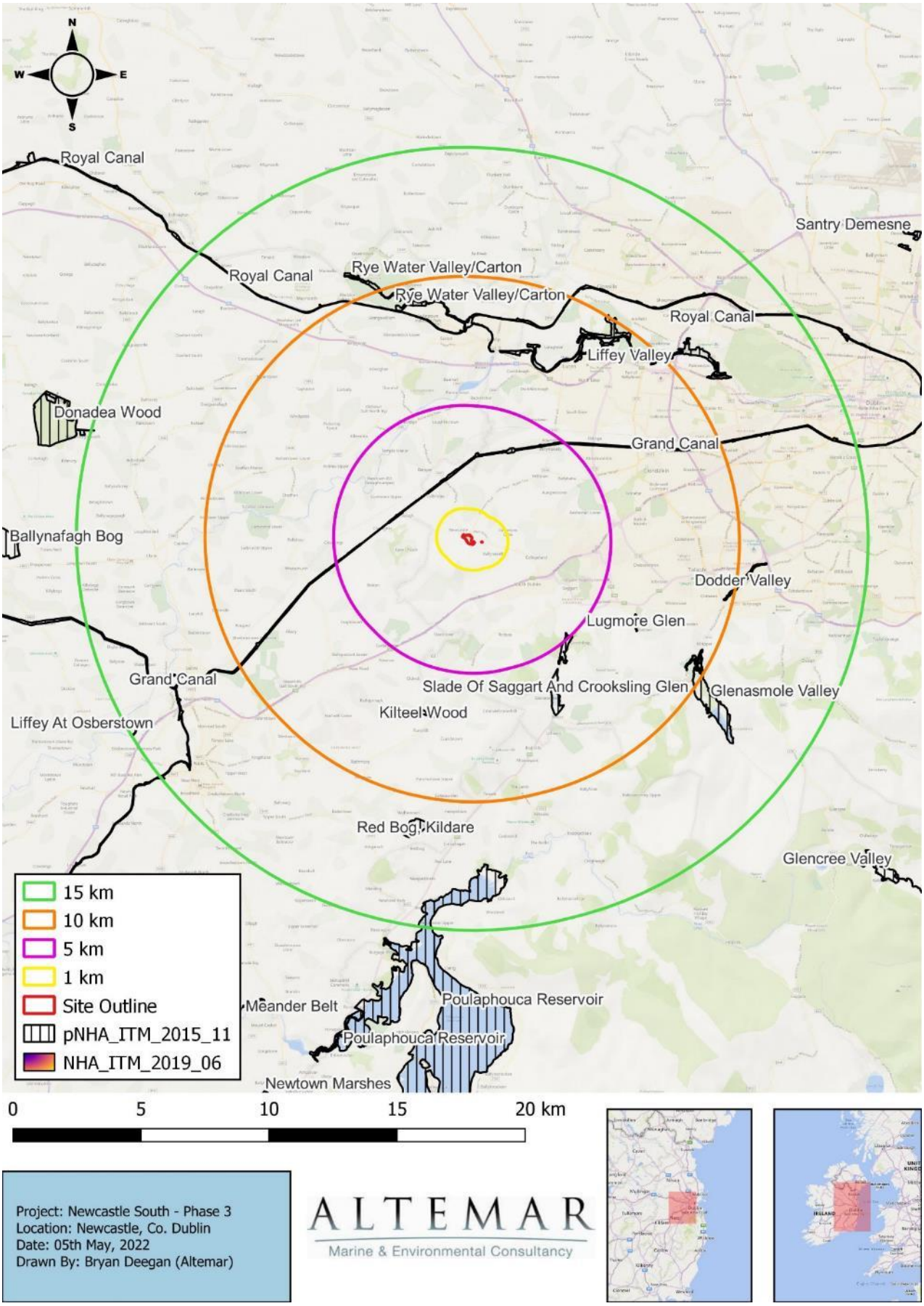


Figure 4.4 – NHAs and pNHAs within 15km of the proposed development site

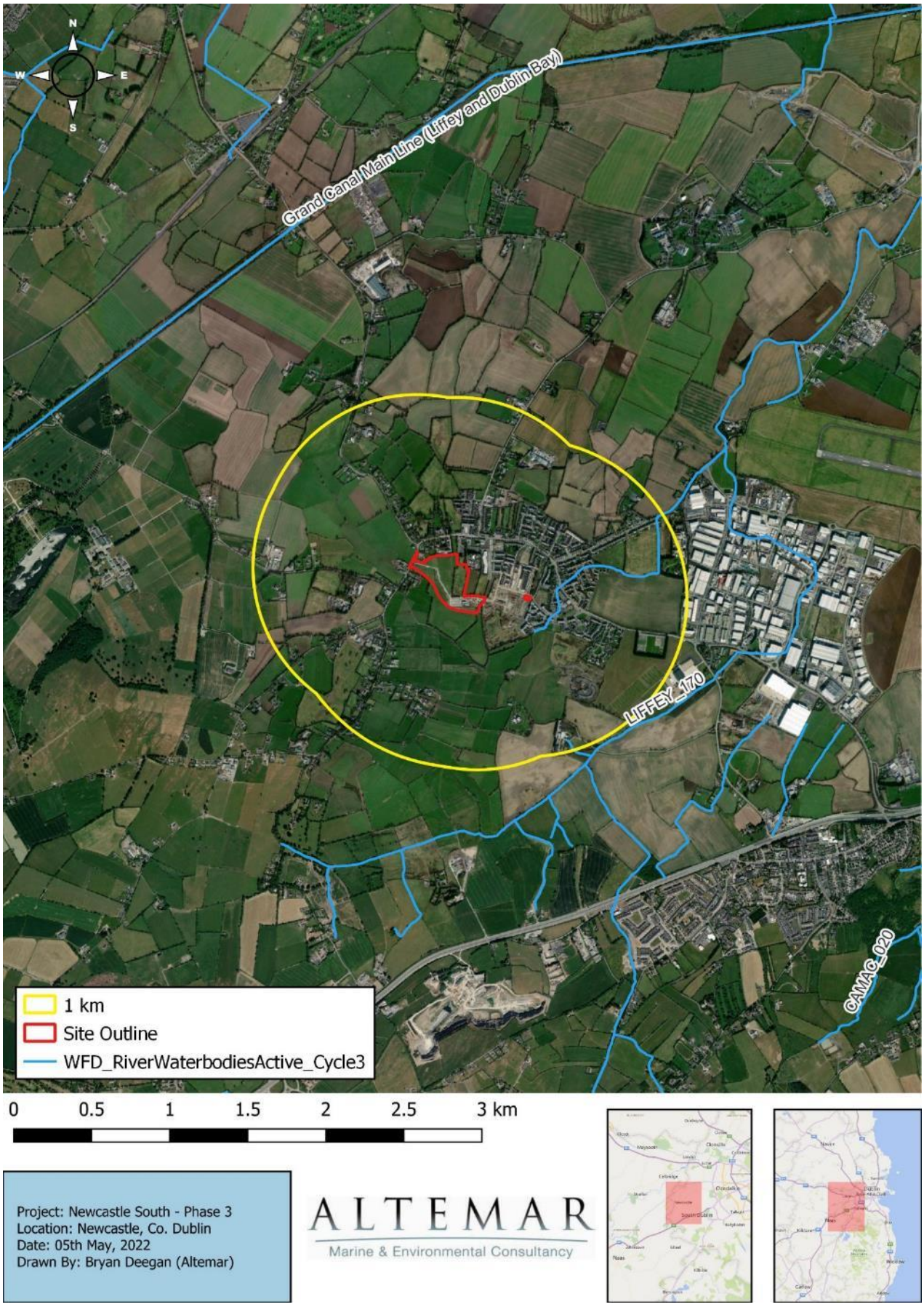


Figure 4.5 – Watercourses proximate to the proposed development site

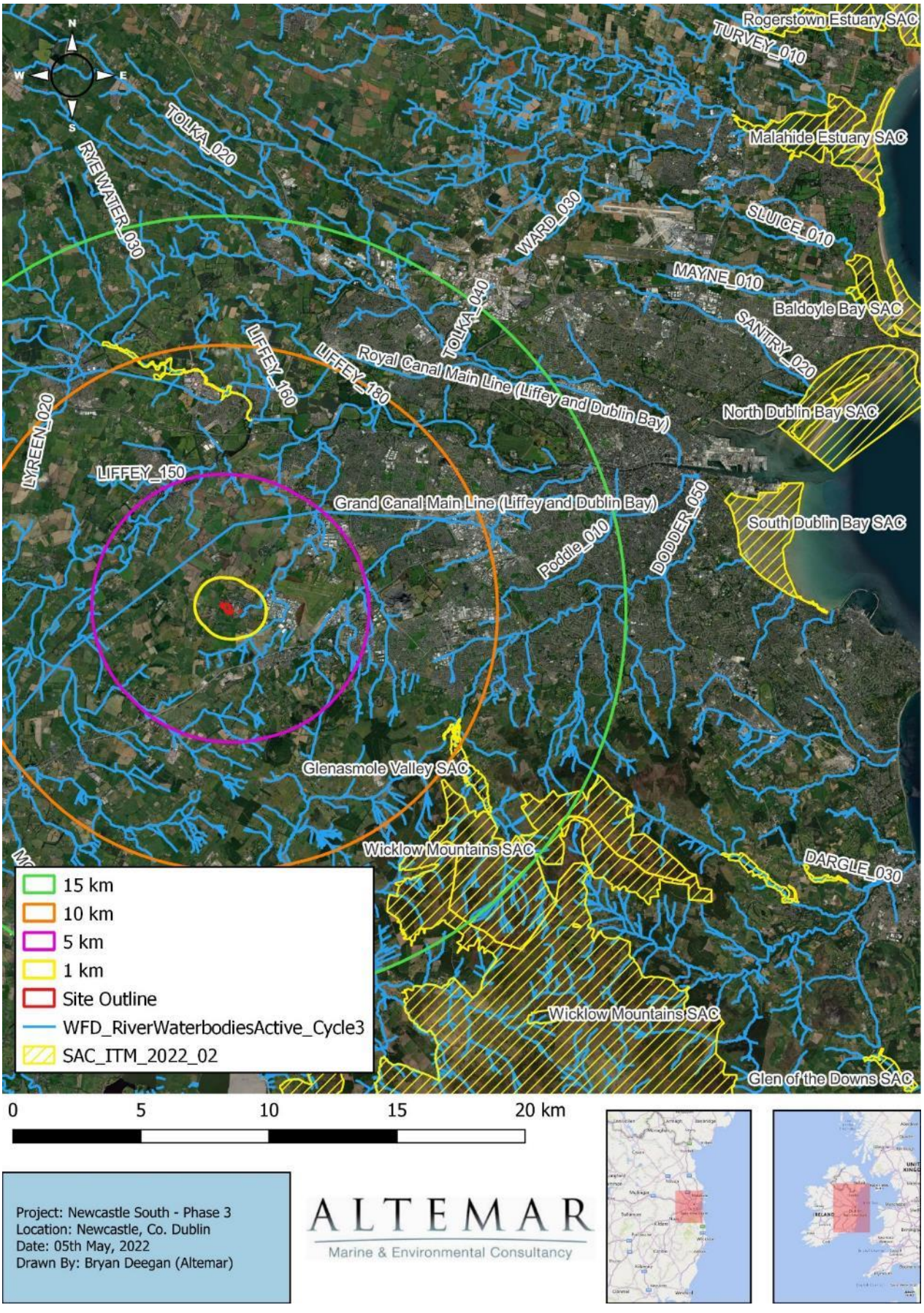


Figure 4.6 – Watercourses proximate to the subject site and SACs with a potential hydrological pathway

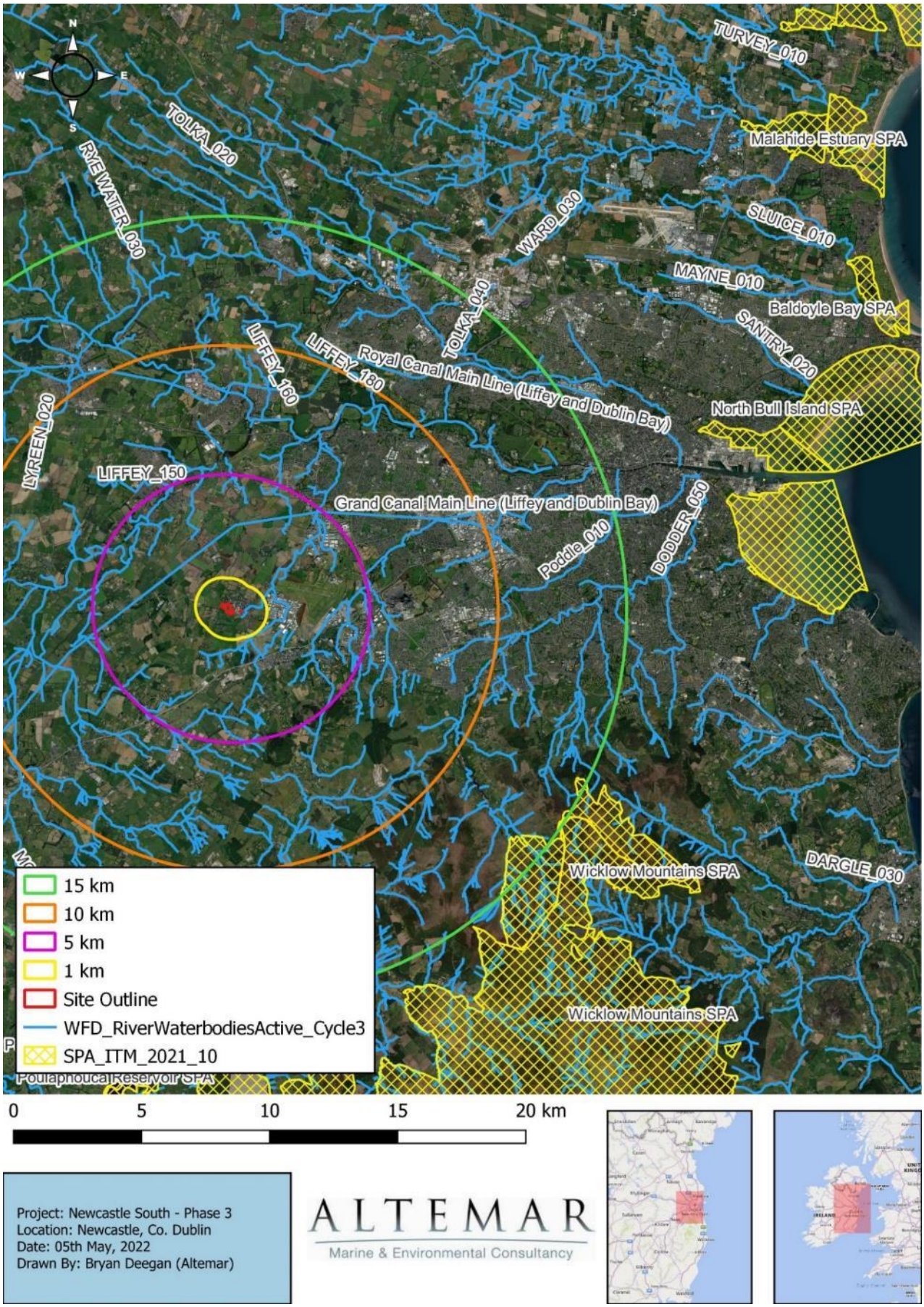


Figure 4.7 – Watercourses proximate to the subject site and SPAs with a potential hydrological pathway

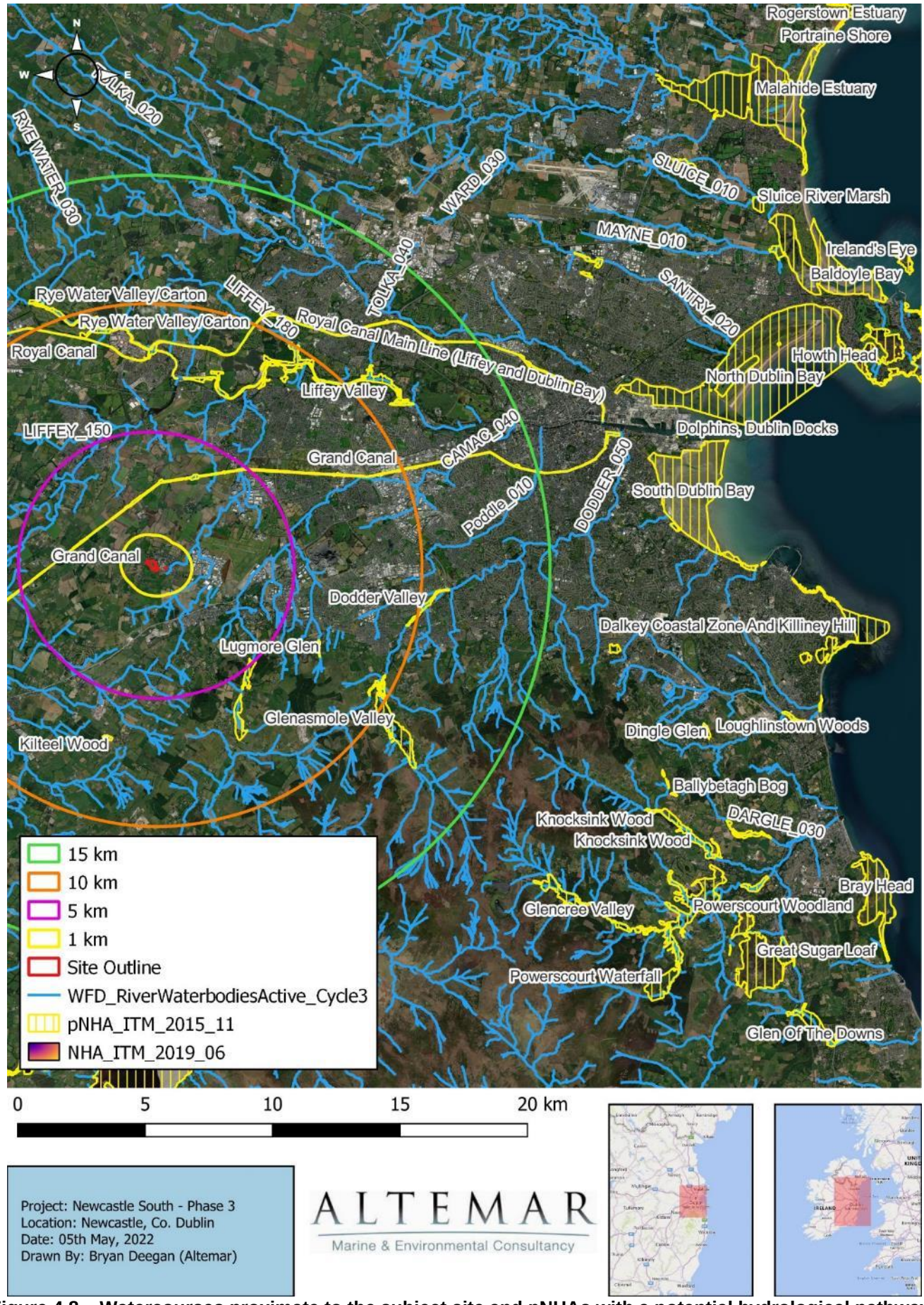


Figure 4.8 – Watercourses proximate to the subject site and pNHAs with a potential hydrological pathway

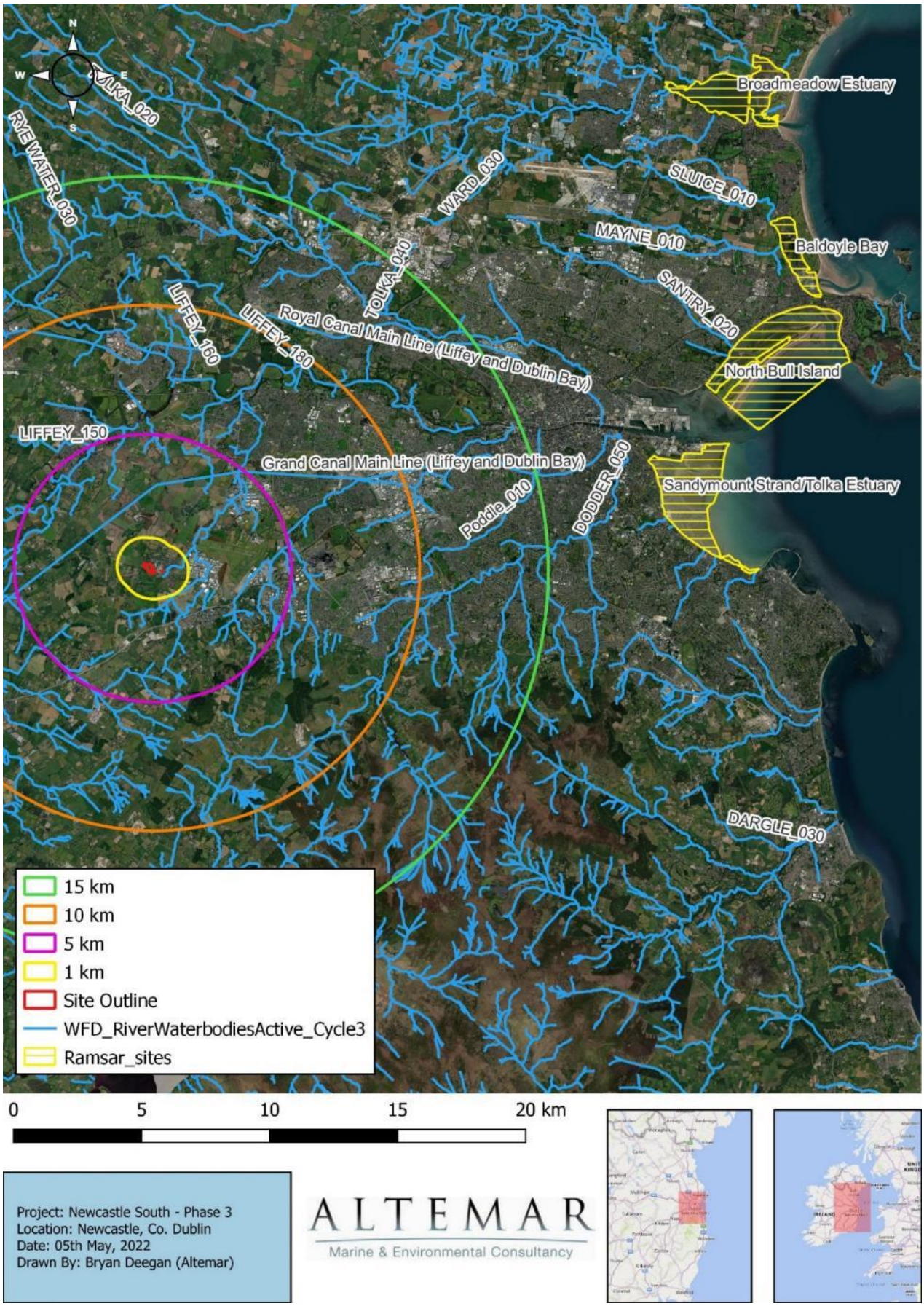


Figure 4.9 – Watercourses proximate to the subject site and Ramsar sites with a potential hydrological pathway

4.3.3 Species Data

It should be noted that no species of conservation importance were noted on site, based on NPWS and NBDC records as fine resolution. Species recorded within the 10km grid include are seen in Table 4.3a.

Table 4.3a – National Biodiversity Data Centre Records within the 10 km grid (N92)

Common Frog (Rana temporaria); Smooth Newt (Lissotriton vulgaris); Barn Owl (Tyto alba); Barn Swallow (Hirundo rustica); Black-headed Gull (Larus ridibundus); Common Coot (Fulica atra); Common Grasshopper Warbler (Locustella naevia); Common Kestrel (Falco tinnunculus); Common Kingfisher (Alcedo atthis); Common Linnet (Carduelis cannabina); Common Pheasant (Phasianus colchicus); Common Pochard (Aythya ferina); Common Snipe (Gallinago gallinago); Common Starling (Sturnus vulgaris); Common Swift (Apus apus); Common Wood Pigeon (Columba palumbus); Corn Crake (Crex crex); Eurasian Teal (Anas crecca); Eurasian Tree Sparrow (Passer montanus); Eurasian Woodcock (Scolopax rusticola); European Golden Plover (Pluvialis apricaria); Great Black-backed Gull (Larus marinus); Great Cormorant (Phalacrocorax carbo); Hen Harrier (Circus cyaneus); Herring Gull (Larus argentatus); House Martin (Delichon urbicum); House Sparrow (Passer domesticus); Lesser Black-backed Gull (Larus fuscus); Little Egret (Egretta garzetta); Little Grebe (Tachybaptus ruficollis); Mallard (Anas platyrhynchos); Merlin (Falco columbarius); Mute Swan (Cygnus olor); Northern Lapwing (Vanellus vanellus); Northern Wheatear (Oenanthe oenanthe); Peregrine Falcon (Falco peregrinus); Ringed Plover (Charadrius hiaticula); Rock Pigeon (Columba livia); Sand Martin (Riparia riparia); Sky Lark (Alauda arvensis); Spotted Flycatcher (Muscicapa striata); Stock Pigeon (Columba oenas); Tufted Duck (Aythya fuligula); Water Rail (Rallus aquaticus); Wood Lark (Lullula arborea); Yellowhammer (Emberiza citrinella); Freshwater White-clawed Crayfish (Austropotamobius pallipes); Butterfly-bush (Buddleja davidii); Giant Hogweed (Heracleum mantegazzianum); Japanese Knotweed (Fallopia japonica); Opposite-leaved Pondweed (Groenlandia densa); Sycamore (Acer pseudoplatanus); Three-cornered Garlic (Allium triquetrum); Dingy Skipper (Erynnis tages); Small Heath (Coenonympha pamphilus); Andrena (Oreomelissa) coitana; Gooden's Nomad Bee (Nomada goodeniana); Large Red Tailed Bumble Bee (Bombus (Melanobombus) lapidarius); Moss Carder-bee (Bombus (Thoracombus) muscorum); Ephemerella notata; Leptophlebia marginate; Procloeon bifidum; Rhithrogena germanica; Bifid Crestwort (Lophocolea bidentata); Blueish Veilwort (Metzgeria violacea); Crescent-cup Liverwort (Lunularia cruciata); Dilated Scalewort (Frullania dilatata); Endive Pellia (Pellia endiviifolia); Even Scalewort (Radula complanata); Forked Veilwort (Metzgeria furcata); Greasewort (Aneura pinguis); Jagged Germanderwort (Riccardia chamedryfolia); Marchantia polymorpha subsp. ruderalis; Minute Pouncewort (Cololejeunea minutissima); Scarce Notchwort (Leiocolea badensis); Budapest Slug (Tandonia budapestensis); Common Garden Snail (Cornu aspersum); Common Whorl Snail (Vertigo (Vertigo) pygmaea); Desmoulin's Whorl Snail (Vertigo (Vertigo) moulinsiana); Heath Snail (Helicella itala); Jenkins' Spire Snail (Potamopyrgus antipodarum); Marsh Whorl Snail (Vertigo (Vertigo) antivertigo); Moss Chrysalis Snail (Pupilla (Pupilla) muscorum); Physella acuta; Pisidium pulchellum; Prickly Snail (Acanthinula aculeata); Smooth Grass Snail (Vallonia pulchella); Striated Whorl Snail (Vertigo (Vertigo) substriata); Anomalous Bristle-moss (Orthotrichum anomalum); Bendy Ditrichum (Ditrichum flexicaule); Bird's-claw Beard-moss (Barbula unguiculata); Blunt Feather-moss (Homalia trichomanoides); Bruch's Pincushion (Ulota bruchii); Bryum dichotomum; Capillary Thread-moss (Bryum capillare); Clustered Feather-moss (Rhynchostegium confertum); Common Aloe-moss (Aloina aloides); Common Cord-moss (Funaria hygrometrica); Common Feather-moss (Eurhynchium praelongum); Common Pottia (Tortula truncata); Common Striated Feather-moss (Eurhynchium striatum); Common Tamarisk-moss (Thuidium tamariscinum); Ctenidium molluscum var. molluscum; Cylindric Beard-moss (Didymodon insulanus); Drab Brook-moss (Hygrohypnum luridum); Dusky Beard-moss (Didymodon luridus); Dwarf Neckera (Neckera pumila); Dwarf Swan-neck Moss (Campylopus pyriformis); Elegant Silk-moss (Pseudotaxiphyllum elegans); Fallacious Beard-moss (Didymodon fallax); Fatfoot Pocket-moss (Fissidens crassipes); Fern-leaved Hook-moss (Cratoneuron filicinum); Flat Neckera (Neckera complanata); Fox-tail Feather-moss (Thamnobryum alopecurum); Frizzled Crisp-moss (Tortella tortuosa); Fountain Feather-moss (Amblystegium tenax); Golden Feather-moss (Campyliadelphus chrysophyllus); Great Plait-moss (Hypnum lacunosum var. lacunosum); Grey-cushioned Grimmia (Grimmia pulvinata); Hair-pointed Feather-moss (Cirriphyllum piliferum); Hart's-tongue Thyme-moss (Plagiomnium undulatum); Hooded Bristle-moss (Orthotrichum cupulatum); Hornschuch's Beard-moss (Pseudocrossidium hornschuchianum); Intermediate Screw-moss (Syntrichia intermedia); Kneiff's Feather-moss (Leptodictyum riparium); Lateral Cryphaea (Cryphaea heteromalla); Lesser Bird's-claw Beard-moss (Barbula convoluta); Long-beaked Thyme-moss (Plagiomnium rostratum); Lyell's Bristle-moss (Orthotrichum lyellii); Maidenhair Pocket-moss (Fissidens adianthoides); Many-fruited Leskea (Leskea polycarpa); Marble Screw-moss (Syntrichia papillosa); Montagne's Cylinder-moss (Entodon concinnus); Ash (Fraxinus excelsior);

Holly (Ilex aquifolium); Neat Feather-moss (Scleropodium purum); Olive Beard-moss (Didymodon tophaceus); Pale Thread-moss (Bryum pallens); Petty Pocket-moss (Fissidens pusillus); Philibert's Tamarisk-moss (Thuidium assimile); Pill Bryum (Bryum violaceum); Pink-fruited Thread-moss (Pohlia melanodon); Pointed Spear-moss (Calliergonella cuspidata); Red Beard-moss (Bryoerythrophyllum recurvirostrum); Revolute Beard-moss (Pseudocrossidium revolutum); Rigid Beard-moss (Didymodon rigidulus); River Feather-moss (Brachythecium rivulare); Rock Pocket-moss (Fissidens dubius); Rough-stalked Feather-moss (Brachythecium rutabulum); Sessile Grimmia (Schistidium apocarpum); Silky Wall Feather-moss (Homalothecium sericeum); Silver-moss (Bryum argenteum); Slender Ditrichum (Ditrichum gracile); Slender Stubble-moss (Gyroweisia tenuis); Small Hairy Screw-moss (Syntrichia laevipila); Spiral Extinguisher-moss (Encalypta streptocarpa); Springy Turf-moss (Rhytidiadelphus squarrosus); Streaky Feather-moss (Brachythecium glareosum); Supine Plait-moss (Hypnum cupressiforme var. resupinatum); Swartz's Feather-moss (Oxyrrhynchium hians); Tall Thyme-moss (Plagiomnium elatum); Tender Feather-moss (Rhynchostegiella tenella); Thick-nerved Apple-moss (Philonotis calcarea); Thickpoint Grimmia (Schistidium crassipilum); Tree-moss (Climacium dendroides); Variable Forklet-moss (Dicranella varia); Wall Screw-moss (Tortula muralis); Wall Thread-moss (Bryum radiculosum); Waved Silk-moss (Plagiothecium undulatum); Wavy Beard-moss (Didymodon sinuosus); White-tipped Bristle-moss (Orthotrichum diaphanum); Whorled Tufa-moss (Eucladium verticillatum); Wood Bristle-moss (Orthotrichum affine); Yellow Feather-moss (Homalothecium lutescens); Zygodon viridissimus var. viridissimus; American Mink (Mustela vison); Brown Long-eared Bat (Plecotus auritus); Brown Rat (Rattus norvegicus); Chinese Muntjac (Muntiacus reevesi); Daubenton's Bat (Myotis daubentonii); Eastern Grey Squirrel (Sciurus carolinensis); Eurasian Badger (Meles meles); Eurasian Pygmy Shrew (Sorex minutus); European Otter (Lutra lutra); European Rabbit (Oryctolagus cuniculus); Lesser Noctule (Nyctalus leisleri); Pine Marten (Martes martes); Pipistrelle (Pipistrellus pipistrellus sensu lato); Red Deer (Cervus elaphus); Sika Deer (Cervus nippon); Soprano Pipistrelle (Pipistrellus pygmaeus); West European Hedgehog (Erinaceus europaeus); Daisy (Bellis perennis); Gorse (Ulex europaeus); Groundsel (Senecio vulgaris)

Further, a section of the subject site is located within the 2km^2 grid O02E. Species recorded within this grid are outlined in Table 4.3b.

Table 4.3b – National Biodiversity Data Centre Records within the 2km^2 grid (O02E)

Barn Swallow (Hirundo rustica); Black-billed Magpie (Pica pica); Blue Tit (Cyanistes caeruleus); Chaffinch (Fringilla coelebs); Common Blackbird (Turdus merula); Common Buzzard (Buteo buteo); Common Pheasant (Phasianus colchicus); Common Starling (Sturnus vulgaris); Common Swift (Apus apus); Common Wood Pigeon (Columba palumbus); Eurasian Jackdaw (Corvus monedula); Eurasian Sparrowhawk (Accipiter nisus); European Goldfinch (Carduelis carduelis); Goldcrest (Regulus regulus); Grey Wagtail (Motacilla cinerea); House Martin (Delichon urbicum); House Sparrow (Passer domesticus); Northern Wheatear (Oenanthe oenanthe); Rook (Corvus frugilegus); Song Thrush (Turdus philomelos); White Wagtail (Motacilla alba); Willow Warbler (Phylloscopus trochilus); Winter Wren (Troglodytes troglodytes); Cowslip (Primula veris); Cuckooflower (Cardamine pratensis); Giant Hogweed (Heracleum mantegazzianum); Great Willowherb (Epilobium hirsutum); Three-cornered Garlic (Allium triquetrum); 7-spot Ladybird (Coccinella septempunctata); Green-veined White (Pieris napi); Orange-tip (Anthocharis cardamines); Peacock (Inachis io); Small Tortoiseshell (Aglais urticae); Wood White (Leptidea sp.); Aeshna dragonfly (Aeshna); Bombus (Bombus) lucorum; Enderleinellus longiceps; Hoplopleura sciuricola; Neohaematopinus sciuri; Angle Shades (Phlogophora meticulosa); rimstone Moth (Opisthograptis luteolata); Silver Y (Autographa gamma); Gorse Shieldbug (Piezodorus lituratus); European Otter (Lutra lutra); Greater White-toothed Shrew (Crocidura russula); Lesser Noctule (Nyctalus leisleri); Pipistrelle (Pipistrellus pipistrellus sensu lato); Red Fox (Vulpes vulpes)

The NBDC record sightings of the following species proximate to the proposed development:

- Common Frog *(Rana temporaria)*
- European Badger *(Meles meles*) (Within 1km grid from 2005)

Table 4.3 – Species found by NPWS within 10km

Common Frog (*Rana temporaria*); European Badger (*Meles meles*); Otter (*Lutra lutra*); Irish Hare (*Lepus timidus subsq. hibernicus*); Blue Fleabane (*Erigeron acer*); Smooth Newt (*Lissotriton vulgaris*); Freshwater Crayfish (*Austropotamobius pallipes*); Opposite-leaved Pondweed (*Groenlandia densa*); Desmoulin's Whorl Snail (*Vertigo moulinsiana*); Green Figwort (*Scrophularia umbrosa*); Green-winged Orchid (*Orchis morio*); Hairy St. John's-wort (*Hypericum hirsutum*); Yellow Bird's-nest (*Monotropa hypopitys*);

The closest species recorded by NPWS to the site was Common Frog (*Rana temporaria*) at 0.25 km west of the site and high resolution sighting of European Badger (*Meles melss*), 1.6 km north east of the site, but it is noted within the 1km^2 grid. No species of conservation importance have been noted on site by NPWS within the subject site boundaries.

4.3.3.1 Site Survey

Habitats within the combined site were classified according to Fossitt (2000) (Figure 4.10) based on the September 16th 2020, September 30th 2021, 27th April 2022 site visits and the species noted within each habitat are described.

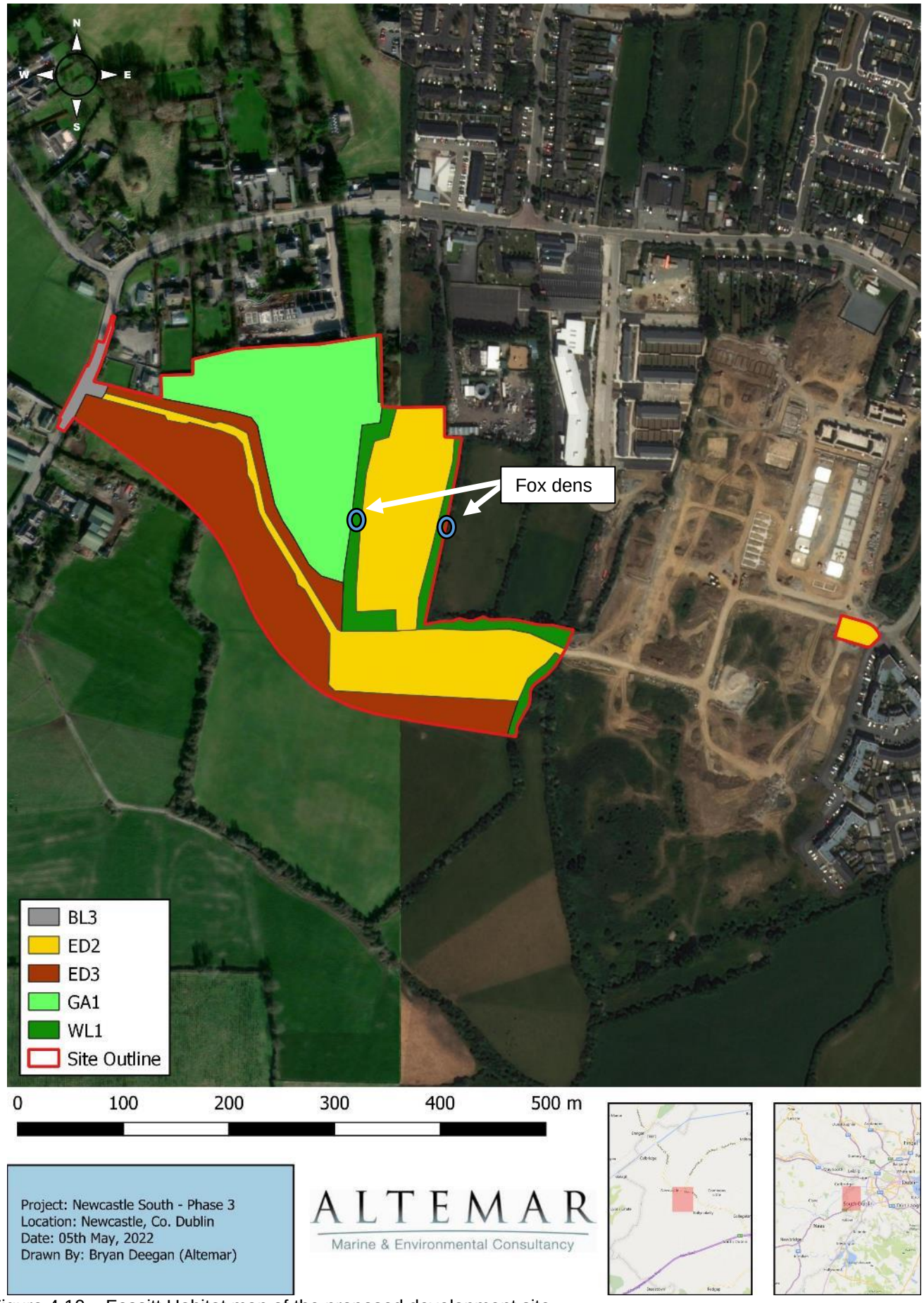


Figure 4.10 – Fossitt Habitat map of the proposed development site.

4.3.3.2 Habitats within the proposed development site.

ED3 Recolonising Bare Ground

As can be seen from figure 4.10 a substantial portion of the proposed development site consists of an area of Recolonising Bare Ground. This area appears to have been as a result of previous site clearance works for the adjacent development, including the preparation of a haul road and site compound which are within the site outline and classed as Spoil and Bare Ground (ED2). Based upon an examination of historic satellite imagery (Google Historic Imagery) significant works and site clearance and spoil storage was observed in the area from 2019. Since the initial site clearance for the haul road and site compound, the activity appears to have ceased while vegetation is recolonising the area. Of note is recent site clearance in an adjacent field surrounded by hedgerows. This now is an area of bare ground.

This section of recolonising bare ground is being recolonised by opportunistic species such as rape (*Brassica napus*), bramble (*Rubus fruticosus agg*.), clover (*Trifolium spp*.), docks (Rumex spp.), thistles (*Cirsium arvense & C. vulgare*), plantains (*Plantago spp*.), dandelion (Taraxacum spp.), hoary willowherb (*Epilobium parviflorum*), pineappleweed (*Matricaria discoidea*), cow parsley (*Anthriscus sylvestris*), daisy (*Bellis perennis*), creeping buttercup (Ranunculus repens), common vetch (*Vicia sativa ssp. Segetalis*) and oxeye daisy (Leucanthemum vulgare).

Plate 1. Recolonising bare Ground (2021)

WL1- Hedgerows

Unmaintained hedgerows are present in the centre and eastern section of the site. Species included ash (*Fraxinus excelsior*), holly (*Ilex aquifolium*), elder (*Sambucus nigra*), blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), dog-rose (*Rosa canina*), bramble (*Rubus fruticosus agg*.), sycamore (*Acer pseudoplatanus*), ivy (*Hedera helix*), hedge bindweed (*Calystegia sepium*), honeysuckle (*Lonicera periclymenum*), cleavers (*Galium aparine*),

gorse (*Ulex europaeus*), devils poker (*Arum maculatum*) and bramble (*Rubus fruticosus agg*.). Within the central hedgerow is a drainage ditch. The outer edge of the hedgerow were suffering from bramble encroachment.

Bats As outlined in Appendix G 4.1 (Bat fauna impact assessment) Volume III of the EIAR, bat surveys were carried out and noted Soprano Pipistrelle (*Pipistrellus pygmaeus*) , Leisler's Bat (*Nyctalus leisleri*) and common pipistrelle (*Pipistrellus pipistrellus*) foraging on site, primarily in the vicinity of hedgerows.

Plate 2. WL1-Hedgerow.

GA1-Improved Agricultural Grassland
The grassland areas appeared to be regularly managed. Species noted within the Improved agricultural grassland included creeping buttercup (*Ranunculus repens*), dandelion (*Taraxacum spp*.), docks (Rumex spp.), plantains (*Plantago spp*.), meadowsweet (*Filipendula ulmaria*),nettle (*Urtica dioica),* cat's-ear (*Hypochaeris radicata*) and Common Vetch (*Vicia sativa ssp. Segetalis*). No species of conservation importance were noted.

4.3.4 Flora

The plant species encountered at the various locations on site are detailed at 4.3.3 above. No plant species that are rare or are of conservation value were noted during the field assessment. Records of rare and threatened species from NBDC and NPWS were examined. No rare or threatened plant species were recorded in the vicinity of the proposed site. No invasive plant species that could hinder removal of soil from the site during groundworks, such as Japanese knotweed, giant rhubarb, Himalayan balsam or giant hogweed were noted on site.

4.3.5 Fauna

Amphibians/Reptiles
The common frog (*Rana temporaria*) was not observed on site. Drainage ditches are present on site and the presence of frogs on site cannot be ruled out. The common lizard (*Zootoca vivipara*) or smooth newt (*Lissotriton vulgaris*) were not recorded on site.

Plate 3. Camera trap image of fox beside western den.

Terrestrial Mammals

Badgers have been noted within the 1km^2 grid (NBDC). No terrestrial fauna of conservation importance were noted on the proposed development site. Camera traps were placed at several large burrows on site. A family of foxes are noted in the den to the west seen in figure 4.10.

Bats

As outlined in Appendix G 4.1 Volume III of this EIAR '*Foraging activity on site was moderate on site with soprano pipistrelle (Pipistrellus pygmaeus), Leisler's Bat (Nyctalus leisleri) and a common pipistrelle (Pipistrellus pipistrellus) bats foraging along hedgerows.' 'There is no evidence of a current bat roost on site*'**.**

Birds

Although there is construction activity proximate to the site the birds noted on site were traditional hedgerow/farmland species. The following bird species were noted on site:

Table 4.4 – Bird Species noted in the vicinity of the proposed development.

Common Name	***Scientific Name***
Woodpigeon	*Columba palumbus*
Jackdaw	*Corvus monedula*
Goldfinch	*Carduelis carduelis*
Dunnock	*Prunella modularis*
Coal Tit	*Periparus ater*
Wren	*Troglodytes troglodytes*
Robin	*Erithacus rubecula*
Blue Tit	*Cyanistes caeruleus*
Blackbird	*Turdus merula*

Common Name	***Scientific Name***
Goldfinch	*Carduelis carduelis*
Great Tit	*Parus major*
Song Thrush	*Parus major*
Pheasant	*Phasianus colchicus*
House Martin	*Delichon urbicum (Amber)*
Mistle Thrush	*Turdus viscivorus*
Buzzard (overhead)	*Buteo buteo*

4.3.6 Overall Evaluation of the Context, Character, Significance and Sensitivity of the Proposed Development Site

As seen in Figure 4.10, the proposed development site is primarily the Fossitt (2000) habitat Recolonising Bare Ground (ED3) and Spoil and Bare ground (ED2), Improved Agricultural Grassland (GA1) and Hedgerows (WL1). Sections of the site consist of elements of a construction site including a compound, storage areas and access roads. The site also consists of hedgerows which would be considered to be of local biodiversity importance due to the nesting and foraging resource for birds and providing foraging corridors for bats. No other habitats of conservation significance were noted within the site outline.

4.4 ANALYSIS OF THE POTENTIAL EFFECTS

This section of the report examines the potential causes of impact that could result in likely significant effects to the species and habitats that occur within the ZOI of the combined site. These effects could arise during either the construction or operational phases of the proposed development. The following terms are derived from EPA EIAR Guidance (2022) and are used in the assessment to describe the predicted and potential residual impacts on the ecology by the construction and operation of the proposed development.

Table 4.5 – Impact description terminology

Magnitude of impact and typical descriptions.

Magnitude of effect (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SACs, SPAs, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species or

Importance	Ecological Valuation
	habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the site boundary

Quality of Effects

	Effect Description
Negative /Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral Effect	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).

Significance of Effects

Significance of Effect	Description of Potential Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Duration and Frequency of Effects

Duration and Frequency of Effect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Describing the Probability of Effects	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Prior to the implementation of mitigation measures the proposed development of the combined site has the potential to impact on biodiversity during both the construction and operational phases of the project.

4.4.1 Construction Impacts

The construction of the proposed development would potentially impact on the existing ecology of the site and the surrounding area. These potential construction impacts would include impacts that may arise during the site clearance, re-profiling of the site and the building phases of the proposed development. Potential construction impacts on habitats and species within the combined site are outlined in Table 4.7a and Table 4.8b. Construction phase mitigation measures are required on site particularly as hedgerows will be removed and significant reprofiling of the site is proposed which will remove all existing terrestrial habitats and can lead to silt laden and contaminated runoff. Downstream impacts on watercourses could lead to negative impacts on aquatic and bird fauna from dust, surface water and pollution. Impacts on birds could include the removal nesting and foraging habitat, predation and disturbance. Impacts on bats would include a potential loss of commuting habitat.

Designated Conservation Sites

The proposed development is not located within a designated conservation site. Runoff and dust during site works re-profiling and the construction of project elements could impact on the existing road surface water network on Athgoe Road and on the local field drainage network, with potential for negative water quality impacts extending beyond the site outline into the surface water network and adjacent watercourses. However, the nearest conservation site along this pathway is a minimum of 19 km from the proposed development site. Significant mixing, dilution and settlement will take place prior to reaching the marine environment over the 19 km from the development site. Given the significant distance to the conservation sites from the subject site, via surface and foul water networks, across the marine environment no significant impacts are foreseen in the absence of measures on site. The project must comply with Water Pollution Acts and prevent silt laden runoff leaving the site but these measures are not necessary for the protection of European sites.

The AA Screening concludes that "*No Natura 2000 sites are within the zone of influence of this development. Having taken into consideration the proposed project, the effluent discharge from the proposed development works, the distance between the proposed development site to designated conservation sites, lack of direct hydrological pathway or biodiversity corridor link to conservation sites and the settlement of silt over the intervening distance and dilution effect with other effluent and surface runoff, it is concluded that this development would not give rise to any significant effects to designated sites. The construction and operation of the proposed development will not impact on the conservation objectives of features of interest of Natura 2000 sites.*"

4.4.2 Operational Impacts

Once constructed all onsite drainage will be connected to separate foul and surface water systems. Surface water runoff will comply with SUDS. It would be expected that the ecological impacts in the long term would be minor adverse as the majority of the site will be build land. Potential operational impacts on habitats and species are outlined in Table 4.8a and Table 4.8b.

Designated Conservation sites

The development must comply with SDCC drainage requirements and the Water Pollution Acts. Measures will be in place to prevent downstream impacts but these measures are not necessary for the protection of European sites. No significant impacts on designated sites are likely during operation.

4.5 INDIRECT IMPACTS

Appropriate measures should be taken to prevent the movement of silt laden surface water run-off and dust into adjacent habitats and in particular the surface water network including road gullies on neighbouring roads and local field drainage. Mitigation measures need to be in place including silt fencing, a wheelwash and roads sweeping to ensure silt does not enter the drainage network from construction activities, particularly during enabling works.

Table 4.6. – Construction Effects on habitats of the combined site

Habitat	Fossitt	Habitats Directive	Rating	Construction Effect	Effect Significance
Recolonising Bare Ground	ED3	No	E	Construction will result in the complete removal of this habitat.	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.
Improved Agricultural Grassland	GA1	No	D	Construction will result in the complete removal of this habitat.	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.
Spoil and bare ground	ED2	No	E	Construction will result in the complete removal of this habitat.	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.
Hedgerows	WL1	No	C	No species of importance were noted on, or in, the hedgerows. The partial removal of this habitat will not result in the loss of species of importance as no protected species were noted within the hedgerow. However, it will result in a foraging and nesting resource for birds and foraging corridor for bats.	Moderate Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.

Table 4.7. Construction Effects on species of the combined site

Species	Rating	Construction Effect	Effect Significance
Mammal-Bats	A	As bats are not roosting on site, no specific mitigation measures are required and a derogation licence is also not required for the demolition or felling of trees. Light spill during construction has the potential to effect on foraging.	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.
Mammals-Terrestrial	A-D	No terrestrial mammals of conservation importance were noted on site. No badger activity or setts were noted. Foxes are not a protected species. However, the western hedgerow is to be retained.	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.
Birds	A-D	*Mitigation measures are required in relation to the removal of hedgerows within bird nesting season (as outlined below.*	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ temporary..
Amphibians-Frogs	B	No evidence of frog activity was observed on site. There are drainage ditches on site. Mitigation is required.	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.
Terrestrial Flora	A-D	The majority of existing flora will be removed. No species of conservation importance were noted on site.	Slight Adverse/Site//Not Significant/ Likely Effects/Long-term/ permanent.

Table 4.8. Operational Effects on habitats of the combined site

Habitat	Fossitt	Habitats Directive	Rating	Construction Effect	Effect Significance
Recolonising Bare Ground	ED3	No	E	Construction will result in the complete removal of this habitat.	Low Adverse/Site/Negative/Not Significant/Long term/permanent.
Recolonising Bare Ground	ED3	No	D	Construction will result in the complete removal of this habitat.	Low Adverse/Site/Negative/Not Significant/Long term/permanent.
Improved Agricultural Grassland	GA1	No	D	Construction will result in the complete removal of this habitat.	Low Adverse/Site/Negative/Not Significant/Long term/permanent.
Spoil and bare ground	ED2	No	E	Construction will result in the complete removal of this habitat.	Low Adverse/Site/Negative/Not Significant/Long term/permanent
Hedgerows	WL1	No	C	A new green link will be placed on site to reinstate the loss of hedgerows on site.	Neutral/Site/Negative/Not Significant/Long term/permanent

Table 4.9. Operational Effects on species of the combined site

Species	Rating	Construction Effect	Effect Significance
Mammal-Bats	A	As bats are not roosting on site, no specific mitigation measures are required and a derogation licence is also not required. Light spill during operation has the potential to effect on foraging. Light spill will be mitigated within open space areas to comply with bat lighting guidelines.	Low Adverse/Site/Negative/Not Significant/short term
Mammals-Terrestrial	A-D	No terrestrial mammals of conservation importance were noted on site. No badger activity or setts were noted.	Neutral/Not significant/long term/likely
Birds	A-D	It is likely that the proposed development will increase human and vehicular disturbance on the application site. The site is within a suburban area with existing human disturbance on site. No significant effects are foreseen from the operation of the proposed development. The retention of hedgerows in addition to the planting of hedgerows and trees would offset the loss seen during the construction. No significant effects would be foreseen in relation to the heights and types of the buildings proposed and bird collision.	Medium Adverse/National - International/ Negative/Not Significant /Long term/likely
Amphibians-Frogs	B	No evidence of frog activity was noted on site. Surface water will drain to drainage ditches on site, potentially increasing the habitats available for frog species.	Neutral/Not significant/long term/likely
Terrestrial Flora	A-D	The majority of existing flora will be removed. It would be expected that the biodiversity value would improve once landscaping elements have been completed.	Neutral/Not significant/long term/likely

4.6 MITIGATION MEASURES & MONITORING

Construction and operational controls will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (ZoI). These measures are outlined in detail in Table 4.9.

Designated Conservation sites within 15km
No specific measures are required to protect designated sites. However, the project must comply with Water Pollution legislation to ensure that there are no contaminated discharges from the site including surface runoff leading to the marine environment. However, these measures are not necessary for the protection of designated sites.

Development Construction
Contamination of watercourses could potentially occur from silt, runoff and dust. As an existing road surface water network is located at Athgoe Road (to the North West of the site), the Griffeen River is located to the East of the site, and substantial works are proposed, a robust surface water runoff prevention strategy will be in place. All mitigation measures outlined in Table 4.9 will be carried out in consultation with and to the satisfaction of the project ecologist.

All works on site will have sufficient mitigation measures to prevent silt from runoff during works (Table 4.9). This will include measures outlined by the project ecologist including silt fences, phasing of the project and landscaping at early stage of the project to limit surface runoff. These measures are not necessary for the protection of designated sites.

Table 4.10 - Sensitive Receptors/effects and mitigation measures.

Sensitive Receptors	**Potential Effects**	**Designed-in Mitigation**
Downstream impacts on watercourses .	• Habitat degradation • Dust deposition • Pollution • Silt ingress from site runoff • Downstream impacts • Negative impacts on aquatic and bird fauna • Impacts from concrete works	• Appointment of a project ecologist to oversee works. • Local silt traps established throughout site. • Mitigation measures on site include dust control, stockpiling away from drains • Stockpiling of loose materials will be kept to a minimum of 20m from drains. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system. • Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches, excavations and other locations where it may cause pollution. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, including the attenuation tank during construction, that require pumping will not directly discharge to the surface water network. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. • Concrete works will be mitigated to prevent concrete or cement from entering drains or pathways to watercourses/marine environment. • Mitigation measures on site include dust control, stockpiling away from drains • During the construction works silt traps will be put in place in the vicinity of all runoff channels to prevent sediment entering the surface water network.

		• Petrochemical interception and bunds in refuelling area • Maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network. • No entry of solids to the drainage network during the connection of pipework to the public water system • Dewatering of excavations may be necessary. Appropriate monitoring of groundwater levels during site works will be undertaken. Construction phase filtering of surface water for suspended solids will be carried out in compliance with Water Pollution legislation. • Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out area greater than 50m from sensitive receptors including drains and stream.
Biodiversity	• Habitat Degradation and removal • Dust deposition • Pollution • Silt ingress • Potential downstream impacts.	**Air & Dust** Mitigation measures will be carried out reduce dust emissions to a level that avoids the possibility of adverse effects. The main activities that may give rise to dust emissions during construction include the following: • Excavation of material; • Materials handling and storage; • Movement of vehicles (particularly HGV's) and mobile plant. • Contaminated surface runoff *Mitigation measures to be in place:* • Maintain a 10m buffer from drains with a double layer of silt fences • Road sweeping to clean roads proximate to the site • Wheel wash on site. • Consultation will be carried with an ecologist throughout the construction phase; • Trucks leaving the site with excavated material will be covered so as to avoid dust emissions along the haulage routes. • Speed limits on site (15kmh) to reduce dust generation and mobilisation. *Site Management* • Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book. *Monitoring*

		• Undertake daily on-site and off-site inspection. This should include regular dust soiling checks of surfaces within 100 m of site boundary, integrity of the silt control measures, with cleaning and / or repair to be provided if necessary. *Preparing and Maintaining the Site* • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Cover, seed or fence stockpiles to prevent wind whipping. • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. • Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions. *Waste* • Avoid bonfires and burning of waste materials. *Measures Specific to Earthworks* • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. • Only remove the cover in small areas during work and not all at once. • During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. *Storage/Use of Materials, Plant & Equipment* • Materials, plant and equipment shall be stored in the proposed site compound location; • Plant and equipment will not be parked within 50m of the Dawson's Demesne Stream at the end of the working day; • Hazardous liquid materials or materials with potential to generate run-off shall not be stored within 50m of the drains.

		• All oils, fuels and other hazardous liquid materials shall be clearly labelled and stored in an upright position in an enclosed bunded area within the proposed development site compound. The capacity of the bunded area shall conform with EPA Guidelines – hold 110% of the contents or 110% of the largest container whichever is greater; • Drip trays will be turned upside down if not in use to prevent the collection of rainwater; • Waters collected in drip trays must be assessed prior to discharge. If classified as contaminated, they shall be disposed by a permitted waste contractor in accordance with current waste management legal and regulatory requirements; • Plant and equipment to be used during works, will be in good working order, fit for purpose, regularly serviced/maintained and have no evidence of leaks or drips; • No plant used shall cause a public nuisance due to fumes, noise, and leakage or by causing an obstruction; • Re-fuelling of machinery, plant or equipment will be carried out in the site compound as per the appointed Construction Contractor re-fuelling controls;
Birds (National Protection)	• Removal nesting habitat. • Removal foraging habitat. • Destruction and/or disturbance to nests (injury/death). • Predation • Disturbance	• Removal of potential nesting habitats outside of bird breeding season (March to August inclusive). Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. If nesting birds are present a derogation licence will be sought from NPWS. If this is not forthcoming works to remove the nesting habitats will not commence within bird nesting season. • An ecologist will be on site during site clearance to minimise impact on foraging/roosting bird species. The ecologist will have the ability to cease works on site that could cause disturbance, in the event of significant disturbance impacts being possible.
Bats	• Loss of commuting habitat. • Injury/death during construction and operation	• No roosts or potential roosts will be impacted. The foraging areas for bats along hedgerows will be temporarily lost until the trees within the green link area become mature and allow for insects to swarm. A post construction assessment will be carried out in the open space areas to ensure compliance with Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers.

4.7 ADVERSE EFFECTS LIKELY TO OCCUR FROM THE PROJECT (POST MITIGATION)

It should be noted that the early implementation of ecological supervision on site at initial mobilisation and enabling works is seen as an important element to the project, particularly in relation to the implementation of surface water runoff mitigation.

With the successful implementation of outlined mitigation measures to limit surface water impacts and biodiversity mitigation/supervision, no significant impacts are foreseen from the construction or operation of the proposed project. Residual impacts of the proposed project will be localised to the immediate vicinity of the proposed works.

As outlined in Appendix G 4.1 Volume III of this EIAR, "There is no evidence of a current bat roost on site, therefore no negative impacts on roosts these animals are expected to result from the proposed development. The likelihood bat collision is not significant as the materials proposed are generally solid and would have good acoustic properties to reflect echolocation signals. As a result the buildings would be clearly visible to bat species. The impact of the proposed development on bats will be minor adverse, negative, medium term, not significant impact, based on the successful implementation mitigation, until the landscape elements mature. Once mature and the foraging corridors are reinstated, with sensitive lighting, a neutral long term impact would be foreseen."

The construction and operational mitigation proposed for the development satisfactorily addresses the mitigation of potential impacts on biodiversity and designated conservation sites through the application the standard construction and operational phase controls as outlined above. In particular, mitigation measures to ensure compliance with Water Pollution Acts will satisfactorily address the potential impacts on downstream biodiversity. No significant adverse impacts on biodiversity or designated sites are likely from the proposed works following the mitigation described above.

In relation to downstream impacts it is essential that the measures outlined in the report are complied with, to ensure that the proposed development does not have "downstream" environmental impacts on biodiversity. These measures are to protect the groundwater/surface water, which are potentially the primary vectors of impacts from the site.

4.8 CUMULATIVE IMPACTS ARISING FROM OTHER DEVELOPMENTS

There are several developments that received planning permission located in the area immediately surrounding the subject site. The following is a list of planning applications as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Map' portal:

Table 4.11 - In-combination effects evaluated (developments surrounding the subject site)

Planning Ref.	Address	Proposal
SD20A/0192	Ballynakelly, Newcastle, Co. Dublin	11 residential units consisting of (i) 4 three bed duplex apartments above 4 two bed duplex apartments in a three storey building; (ii) 3 two storey terrace houses (1 three bedroom and 2 four bedroom); communal open space; surface parking; bin and bicycle storage and all ancillary site development works at a site bordered by the R120 to the north, Newcastle Boulevard to the west, Ballynakelly Green to the south and Ballynakelly View to the east.
SD20A/0186	Newcastle South & Ballynakelly, Newcastle, Co. Dublin	Option of the inclusion of an ancillary single storey garden room structure (c.12.5sq.m) in gardens of permitted dwellings under planning Reg. Ref. ABP-305343-19.
SD20A/0178	Newcastle South, Newcastle, Co. Dublin	Amendments to the development permitted under Reg. ABP 305343-19 at Newcastle South (development to be known as Graydon) as required under Condition 6(d) of An Bord Pleanala's decision. Amendments consist of: (a) re-alignment of Graydon Drive; (b) provision of 9 three bedroom two storey houses as previously proposed and omitted by Condition 6(d) of permission Reg. ABP 305343-19; (c) extension of Graydon Row by 4m and the provision of 1 additional three bedroom, two storey terraced house; (d) minor revisions to the positioning of 6 houses, necessitated by re-alignment of the road and (e) all associated and ancillary works associated with the development. Proposed amendment will result in the provision of 16 houses where there were 15 previously proposed.
SD20A/0037	Main Street, Newcastle, Co. Dublin	Demolition of 3 existing structures on site (total c.226sq.m) comprising of 1 habitable house and 2 associated outbuildings/sheds (permitted under Ref. ABP-305343-19), and the construction of 1 double storey (c.9.2m overall height) retail

Planning Ref.	Address	Proposal
		development in the form of a convenience supermarket (GFA c.1,759sq.m); 1 two storey mixed-use building (c.10.7m overall height) comprising of a café (c.225sq.m) at ground floor and a community centre at the first floor (c.140sq.m) with associated ground floor access (total GFA c.468sq.m); an ESB sub-station (c.22sq.m); the anchor supermarket unit will provide for a net retail sales area of c.1,222sq.m; a warehouse of c.200sq.m; welfare area of c.190sq.m including ancillary office accommodation; a delivery and loading dock; service yard; customer lobby and wc and entrance lobby; the development shall also provide for 98 car parking spaces and 50 bicycle parking spaces; advertising structures and signage (totalling c.81sq.m); new pedestrian and cyclist connections; public realm areas; refuse storage; a trolley shelter; new priority controlled junction at Main Street; a new access road and shared pedestrian/cyclist greenlink from Main Street (permitted under Ref. ABP-305343-19); vehicular entrances to the surface car park and service yard; all associated site development, site services and landscape works at Lands at Main Street, Newcastle, Co. Dublin, bordered by Main Street to the north, Orchard Grove to the east, greenfield land to the south and residential properties fronting Main Street to the west (new road will be adjacent to 1 Main Street, Newcastle, Co. Dublin.)
SHD3ABP-305343-19	Newcastle South & Ballynakelly, Newcastle, Co. Dublin	(1) The demolition of 5 structures on site, total area measuring 359sq.m, comprising 2 habitable dwellings and 3 associated outbuildings/sheds located to the northwest of the site; (2) development of 406 residential homes; (3) a childcare facility (518sq.m GFA); (4) 1 commercial unit (67.7sq.m GFA); (5) reservation of a school site (1.5ha); (6) new vehicular, cycle and pedestrain access from Main Street; (7) continuation of Newcastle Boulevard forming part of a new east-west link street; (8) a new Public Park (2ha); (9) pocket parks and greenway together with associated internal access roads, pedestrain and cycle paths and linkages; (10) 1 single storey marketing suite (81sqm) and signage (including hoarding) during the construction phase of development only and (11) all associated site and development works. The overall site comprises lands to the south of Main Street (c.15ha) together with 3 additional infill sites at the corner of Burgage Street and Newcastle Boulevard (c. 0.8ha); No. 32 Ballynakelly Edge (c.0.05ha); and Ballynakelly Rise (c.0.18ha)
SD19A/0040	Cornerpark, Peamount Road, Newcastle, Co. Dublin	Demolition of existing stables/sheds; construction of 28 dwellings comprised of 8 three bedroom, two storey semi-detached houses (Type A); 7 three bedroom, 2 storey terraced houses (Type B); 6 three bedroom, 2 storey terraced houses (Type C); 3 three bedroom, 2 storey terraced houses (Type D); 4 three bedroom, 2 storey semi-detached houses (Type E); all associated site development works, car parking, landscaping, open spaces, public lighting, connections to foul and surface water drainage/attenuation and water supply.
SD18A/0363	Main Street, Newcastle, Co. Dublin	(1) Construction of 22 three bedroom dwelling houses; (2) construction of access road and footpaths; (3) provision of car parking facilities to serve the development; (4) construction of a foul sewer network to serve the development which shall connect into adjoining foul sewer network; (5) construction of a surface water sewer network to serve the development including the provision of the necessary attenuation elements and the connection of the surface water network to the adjoining surface water network; (6) provision of a waterman to serve the development and connection to

Planning Ref.	Address	Proposal
		adjoining water main; (7) demolition of the garden sheds; (8) provision of all necessary utility services; (9) all ancillary site works.
SD17A/0010	Drumlonagher, Main Street, Newcastle, Co. Dublin.	(1) Construction of 21 no. 3 bedroom, two storey dwelling houses. (2) Construction of 2 no. 2 bedroom, two storey dwelling houses. (3) Construction of a two storey building with retail unit (convenience) at ground floor level and 2 no. 2 bedroom apartments and 2 no. 1 bedroom apartments at first floor level with a total ground and first floor area of 771sq.m. (4) Construction of a 2 storey corner building with 2 retail units (cafe and convenience) at ground floor level with 1 no. 2 bedroom apartment and 1 no. 1 bedroom apartment at first floor level with a total ground and first floor area of 303sq.m. (5) Construction of a 2m high boundary wall to East and west boundaries and 1.8m high concrete post and timber panel fences between the dwellings. (6) Construction of a Market Square to serve the proposed development and local area. (7) Construction of proposed access road and footpaths. (8) Provision of car parking facilities to serve the proposed development. (9) Construction of a foul sewer network to serve the proposed development which shall connect into the existing adjoining foul sewer network. (10) Construction of a surface water sewer network to serve the proposed development including for the provision of the necessary attenuation elements and for the connection of the surface water network to the existing adjoining surface water network. (11) Provision of a watermain to serve the proposed development and connection to existing adjoining watermain. (12) Provision of necessary utility services. (13) All signage provisions for the proposed commercial buildings and place name for the proposed development and (14) all ancillary site works.
SD17A/0378	Newcastle, Co. Dublin	Residential development consisting of 46 units as follows: (1) Block A: 10 no. 2 storey, 3 bedroom terrace houses on sites 1-10 inclusive; Block B: 9 no. 2 storey, 3 bedroom terrace houses on sites 15-23 inclusive; Block C: 8 no. 2 storey, 3 bedroom terrace houses on sites 24-31 inclusive; Block D: 7 no. 2 storey, 3 bedroom terrace houses on sites 36-42 inclusive; Block E: 4 no. 2 storey, 3 bedroom terrace houses on sites 43-46 inclusive. All 3 bedroom terrace houses above have optional attic accommodation. (2) 8 apartment units in 4 two storey blocks identified as Block F & Block G on sites 11-14 inclusive and sites 32-35 inclusive. The blocks consist of 1 no. 3 bedroom apartment at ground and first floor level and 1 no. 2 bedroom apartment unit at ground floor level. The apartment units include 4 elderly housing units. (3) Landscaping, parklands open space, car parking, street works, junction works onto existing permitted access road, outfall drains, boundary treatments and all associated site development works.
SD14A/0021/EP	Ballynakelly & Rathcreedon, Newcastle, Co. Dublin	Revisions to granted planning permission Reg. Ref. SD06A/0659 (as extended by Reg. Ref. SD06A/0659/EP for a 255 bedroom hotel in a new landmark building consisting of sub-basement and basement, ground floor and five upper floors (with a total hotel development gross floor space of approximately 28,476sq.m.); 680 underground car parking spaces; 5 coach spaces; 50 bicycle spaces; a new 9m wide vehicular, cycleway and pedestrian access approximately 900m in length from a new roundabout on the Newcastle Road (R120) in vicinity of Newcastle Manor housing estate; fire tender access road and site development and landscaping works; revisions to the permitted hotel development (which is partially constructed) will comprise construction of a retirement village in the permitted hotel grounds which will consist

Planning Ref.	Address	Proposal
		of: 69 individual 3 bedroom single storey retirement homes, ranging in size from 112sq.m. to 164.1sq.m; a single storey medical/health centre (146.7sq.m); a two storey community services centre (844.3sq.m); an outdoor recreation and allotment area with an associated recreation equipment store (245sq.m.) and allotment equipment store (22.8sq.m.); a nursing home/care centre to be located within the permitted hotel building necessitating a change of use of part of the hotel's accommodation block (1,653.7sq.m. at ground floor and 2,351.5sq.m. at first floor) from hotel use (comprising 92 hotel bedrooms in total) to nursing home/care centre use (comprising 60 nursing home/care centre bedrooms with associated dining, healthcare and administration facilities) as well as change of use of 302sq.m. at basement level car parking to nursing home/care centre mortuary, deliveries store and clinical waste store and all associated works, including the provision of a new entrance; new 6.4sq.m. porch and a reception area for the nursing home/care centre; new vehicular lay-by and enclosed outdoor areas for nursing home residents (the gross floor space of the hotel incorporating the nursing home/care centre will now be approximately 29,562sq.m.); and site development and landscaping works including revised site levels to facilitate surface drainage, boundary planting including reinstatement of hedgerows; 2.2m to 2.5m high fencing and automatic gates surrounding the retirement homes; a new 2.5m block wall inside the northern boundary of the site and the relocation of 11 car parking spaces at the eastern side of the access road into the development site (serving the adjacent development to the north, Reg. Ref. SD05A/0344) to the western side of the access road. The proposed revised development will have 666 underground car parking spaces, 204 surface car spaces, 5 surface coach spaces, 1 surface ambulance space and 50 bicycle spaces.

In relation to Planning Ref. **SD18A/0363**, an Ecological/Screening Report was prepared by Greentrack Environmental Consultants to accompany this planning application. This report concludes with the following:

'This report has established that the proposed project will not have any significant negative effect on any of the biodiversity found on site as there was nothing of ecological importance / interest found on site. The report has also established that Appropriate Assessment by the consent authority is not required for the proposed development.'

In relation to Planning Ref. **SD19A/0040**, a Screening for Appropriate Assessment report was prepared by Wildlife Surveys to accompany this planning application. This report concludes with the following:

'An analysis of this project has shown that no significant effects are likely to occur to the integrity of Natura 2000 sites within the zone of influence of the project. There will be no measurable negative impacts upon Annex II species. In the absence of any mitigation measures proposed for the project itself, the clearance and construction operations and the final development will not have a significant impact on any European Site (SAC or SPA). Any accidents, poor practice or permissible discharges or other operations would have no foreseeable impacts on the SACs, SPAs, NHAs or Annex II species.'

In relation to Planning Ref. **SHD3ABP-305343-19,** a Screening Report for Appropriate Assessment report was prepared by OPENFIELD Ecological Services to accompany this planning application. This report concludes with the following:

'This project has been screened for AA under the appropriate methodology. It has found that significant effects are not likely to arise, either alone or in combination with other plans or projects that will result in significant effects to the integrity of the Natura 2000 network.'

In relation to Planning Ref. **SD20A/0037**, a Screening Report for Appropriate Assessment report was prepared by OPENFIELD Ecological Services to accompany this planning application. This report concludes with the following:

'Mitigation in an AA context is given as any measure which is introduced in order to avoid or reduce an impact to a Natura 2000 area. In this case no mitigation measures are suggested during either the construction or operation phases.

This project has been screened for AA under the appropriate methodology. It has found that significant effects are not likely to arise, either individually or in combination with other plans or projects to the Natura 2000 network. This conclusion is based on best scientific knowledge.'

Further, it is worth noting that a previous planning application located within the boundaries of the subject site has been granted permission. The table below outlines this application as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Map' portal:

Table 4.12 - In-combination effects evaluated (developments located within the boundaries of the subject site)

Planning Ref.	Address	Proposal
SD05A/0344/EP	Ballynakelly and Newcastle South, Newcastle-Lyons, County Dublin.	A residential development of 743 no. dwellings including a neighbourhood centre of 1,859.2sq.m. and a creche of 846sq.m., at Ballynakelly and Newcastle South, Newcastle-Lyons, County Dublin. An eight year planning permission is sought. The development comprises of the following: 78 no. 2 bedroom houses; 209 no. 3 bedroom houses; 27 no. 4 bedroom houses; 10 no. 5 bedroom houses; 5 no. apartment blocks containing 7 no. 1 bed apartments, 20 no. 2 bed apartments, 12 no. 3 bed apartment, 4 no. 2 bed duplex units and 2 no. 3 bed duplex units; 57 no. duplex blocks containing 48 no. 2 bedroom duplex units, 151 no. 3 bed duplex units, 52 no. 1 bedroom apartments and 123 no. 2 bedroom apartments. The neighbourhood centre comprises of 5 no. retail units from 69sq.m., 84sq.m., 90.5sq.m., 101sq.m. and 134sq.m.; public house measuring 935.4sq.m., off licence measuring 189sq.m. and restaurant measuring 255sq.m.; the proposed development also provides for 4.155ha of public open space including the provision of a landscaped area adjoining the Tower House on the Athgoe Road; roads infrastructure including 3 no. junctions with Newcastle-Lyons Main Street (R120 Rathcoole Road) and 1 no. junction with Athgoe Road; on and off street car parking; and provision of lands for a traveller accommodation site measuring 0.5 ha; on an overall site of 22.789 hectares; planning permission is also sought for the demolition of 2 no. habitable dwellings.

Based on a review of the planning application viewer there are no committed developments in proximity to the subject site which are likely to give rise to cumulative impacts with it. In addition, the development of the combined site, which consist primarily of agricultural fields, would not be seen to have a significant cumulative impact on biodiversity. Given this, it is considered that in combination effects with other existing and proposed developments in proximity to the application area would be unlikely, neutral, not significant and localised. No significant cumulative effects are foreseen on biodiversity from cumulative impacts.

4.9 RESIDUAL EFFECTS CONCLUSION

The construction and operational mitigation proposed for the development satisfactorily addresses the potential adverse effects on the sensitive receptors. The overall effect on the ecology of the proposed development will result in a low adverse not significant impact on the ecology of the area and locality. This is primarily as a result of the loss of terrestrial habitats od low importance on site, the retention of existing hedgerows where possible, supported by the creation of additional biodiversity features and complexity, standard construction and operational controls and a sensitive landscaping strategy.

4.10 "WORST CASE" SCENARIO

In relation to the worst-case scenario event, there is a pathway to watercourses from the proposed development via surface water drainage. Impacts could include silt and pollution including petrochemical release. If the development took place and the detailed mitigation were not to function, it is possible that there could be significant short term

water quality impacts. However, the nearest Natura 2000 sites via the surface water pathway are 19km from the proposed development site. In relation to additional biodiversity on site no additional worst case scenario impacts are foreseen beyond the impacts outlined above. Compliance with Water Pollution Acts would be seen as the principal way to prevent worst case scenario events on biodiversity.

The above is considered unlikely, Negative, Slight, localised, Temporary.

4.11 MONITORING

An Ecologist will be appointed to monitor the Site from pre-construction surveys, during Construction Phases and Post Construction. This would include obtaining derogation licenses, if necessary, from the National Parks and Wildlife Service (NPWS). The landscaping of the site will be monitored by the appointed ecologist.

4.12 INTERACTIONS

The biodiversity elements of this report have involved consultation with a wide section of the Project Team particularly in relation to the Construction Management, design, drainage and landscape elements of the proposed development. There are numerous inter-related environmental topics described in detail throughout this report document which are of relevance to the biodiversity chapter. The biodiversity chapter of the report involves interactions with the Land, Soils and Ground Water, Hydrology (Surface Water and Waste Water), Air and Climate, Noise and Vibration, Traffic and Transportation, Material Assets-Waste and Material Assets-Services. It is considered that there is the potential for slight, temporary negative impacts on biodiversity due to dust (air), noise, emissions to water and construction traffic associated with the Construction Phase of the proposed Project. A significant portion of the site has previously undergone site clearance and these impacts are not considered to be significant. However, post mitigation these impacts are not deemed to be significant.

4.13 DIFFICULTIES ENCOUNTERED IN COMPILING

No difficulties were encountered in the preparation of the Biodiversity Chapter of this report.

4.14 REFERENCES

1. Environmental Protection Agency (2022): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. EPA, Wexford
2. Environmental Protection Agency (September 2015): Draft - Advice Notes on Current
3. Practice (in the preparation on Environmental Impact Statements). EPA, Wexford
4. Environmental Protection Agency 1997 Draft guidelines on the information to be contained in Environmental Impact Statements. EPA, Wexford, Ireland.
5. CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal. Chartered Institute of Ecology and Environmental Management.
6. DoEHLG (2013) Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment. Department of the Environment, Community and Local Government.
7. Environmental Protection Agency 2002 Guidelines on the information to be contained in Environmental Impact Statements. EPA, Wexford, Ireland.
8. Hayden, T. & Harrington, R. 2000 Exploring Irish mammals. Duchas. Town House, Dublin.
9. Institute of Environmental Assessment. 1995 Guidelines for Baseline Ecological Assessment. E&FN Spon, London.
10. Lawrence, M.J. & Brown, R.W. 1973 Mammals of Britain: their tracks, trails and signs. Blandford Press, Dorset, UK.
11. Lysaght, L. & Marnell, F (eds.) 2016 Atlas of Mammals in Ireland 2010-2015. National Biodiversity Centre, Waterford.
12. NPWS 2013 The status of protected EU habitats and species in Ireland. DoEHLG, Dublin, Ireland.
13. Assessment of Plans and Projects Significantly Affecting NATURA 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC;http://ec.europa.eu/environment/nature/Natura2000management/docs/art6/Natura_2000_assess_en.pdf

14. Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission; http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/guidance_art6_4_en.pdf
15. Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging; http://ec.europa.eu/environment/nature/Natura2000/management/docs/guidance_doc.pdf
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21. NPWS (2021) Conservation objectives for Rye Water Valley/Carton SAC [001398]. Generic Version 8.0. Department of Housing, Local Government and Heritage.
22. NPWS (2021) Conservation objectives for Glenasmole Valley SAC [001209]. Generic Version 8.0. Department of Housing, Local Government and Heritage.
23. NPWS (2017) Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
24. NPWS (2019) Conservation Objectives: Red Bog, Kildare SAC 000397. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
25. NPWS (2022) Conservation objectives for Poulaphouca Reservoir SPA [004063]. Generic Version 9.0. Department of Housing, Local Government and Heritage.
26. NPWS (2022) Conservation objectives for Wicklow Mountains SPA [004040]. Generic Version 9.0. Department of Housing, Local Government and Heritage.
27. NPWS (2013) Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
28. NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
29. NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
30. NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

5.0 LAND AND SOILS

5.1 INTRODUCTION

This chapter assesses the proposed development's land, soils and underlying geology during the construction and operation of the proposed development. It also identifies the characteristics, potential effects, mitigation measures and monitoring measures arising from the proposed development.

Noel Gorman is a Chartered Civil Engineer with 9 years post graduate experience in the design and construction of residential and commercial development. Noel graduated from National University of Ireland, Galway in 2012 with a Level 8 degree in Civil Engineering. Noel's relevant project experience includes the Newbridge South Orbital Relief Road project, Dublin Port Multipurpose Storage Yards, Dublin Airport South Apron and the Clonburris Infrastructure Development.

John is a Civil Engineer with 7 years' experience. 3 years' experience in the design and planning of civil engineering deliverables of residential and infrastructure projects including the generation of drawings, specifications, Design Reports, Preliminary Construction and Environmental Management Plans, Site Specific Flood Risk Assessments and compiling Land and Soils Chapters for Environmental Impact Assessment Reports.

5.2 METHODOLOGY

5.2.1 Guidelines

The assessment of the potential impact of the proposed development on land and soils was undertaken with reference to the methodology and specific criteria set out in the following documents:

- Guidelines On the Information To Be Contained In Environmental Impact Assessment Reports (EPA, May 2022)
- EIA Directive 2014/EU/52,
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003),
- EPA Draft EIAR Guidelines 2017,
- Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003),
- Development Management Guidelines (DoEHLG, 2007) and Guidelines for Planning Authorities and
- An Bord Pleanála on Carrying out Environmental Impact Assessments (DoECLG, March 2013).

Effects are characterised using Table 3.3 of the EPA Guidelines on the Information To Be Contained In Environmental Impact Assessment Reports (EPA, May 2022).

5.2.2 Consultation

The following statutory body information sources were consulted:

- Geological Survey of Ireland (GSI) interactive mapping.
- Environmental Protection Agency (EPA) interactive mapping.
- Teagasc soil and sub-soil data interactive mapping.
- Ordnance Survey Ireland (OSI) mapping.

The following investigative surveys / reports were consulted:

- Site inspection / walkover survey.
- Topographical survey.
- Site investigations undertaken by Ground Investigations Ireland Ltd., between May and June 2018 to ascertain the existing ground conditions on the overall lands which is included with this application (refer to Appendix D1. Volume III of this EIAR). This included the following scope of:
  - Visit project site to observe existing conditions;
  - Carry out 50 No. Trial Pits to a maximum depth of 4.20m BGL;
  - Carry out 6 No. Soakaways to determine a soil infiltration value to BRE digest 365;
  - Carry out 9 No. Slit Trenches to locate underground services and concrete tanks;

- Carry out 15 No. Cable Percussion boreholes to a maximum depth of 6.00m BGL;
- Carry out 10 No. Rotary Core Boreholes to a maximum depth of 14.40m BGL;
- Carry out 34 Plate Bearing Tests;
- Installation of 4 No. Groundwater monitoring wells;
- Geotechnical & Environmental Laboratory testing; and
- Report with recommendations

5.2.3 Desktop Study

A desktop study for the site was completed and the relevant bodies and information sources referenced in section 5.2.2 used as information sources.

5.2.4 Application of Methodology

The methodology was applied as per the guidelines referenced in section 5.2.1.

5.2.5 Study Methodology

The methodology was applied as per the guidelines referenced in section 5.2.1.

5.2.6 Project Site

The subject site, of approximately 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche on a site of c. 0.07 ha*)*, comprises the project site and is located to the south of the R120/Main Street at Newcastle Village. The site is bounded by Graydon residential development to the east, the Athgoe Road to the west, by single dwellings to the north and existing agricultural lands to the south. The St Finian's National School and Church is located to the north of the site.

5.3 EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

Details of the existing land / soils receiving environment / baseline scenario are detailed in the following sections which were compiled based on the information sources and consultations above.

5.3.1 Topography, Land Use & Historic Land Use

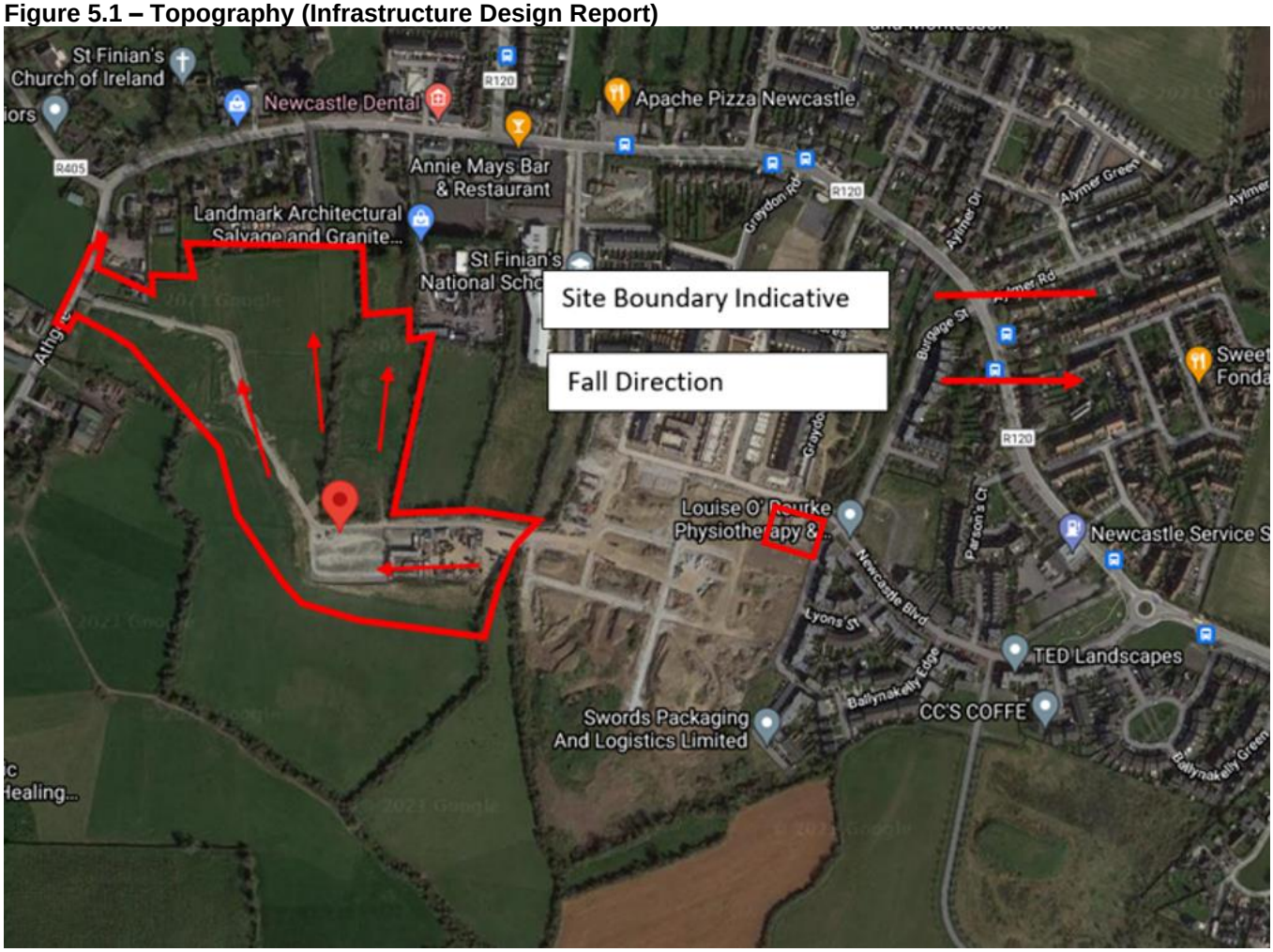
The existing site, of approximately 8.47 hectares, is located to the south of the R120/Main Street at Newcastle Village. The site is bounded by Graydon residential development to the east, the Athgoe Road to the west, by single dwellings to the north and existing agricultural lands to the south. The St Finian's National School and Church is located to the north of the site. The development lands form part of the South Dublin County Development Plan (2016-2022) and the Draft South Dublin County Development Plan 2022-2028. The lands also form part of the Newcastle LAP 2012-2022. *The application site is zoned for residential and open space development.*

The existing site is predominantly "greenfield" and a temporary construction compound has been constructed on the eastern area adjacent to Graydon residential development as well as a construction access across the site from the Athgoe Road to the Graydon residential development lands. Existing boundaries within the site are predominantly hedgerows and fencing with some drainage ditches. The overall topography of the site falls from south to north toward Newcastle Village.

To give context of the proposed subject lands and any potential changes to land, soils, geology and hydrology that have the potential to influence the importance of a feature and the magnitude of any impacts. The lands appear to be used for agricultural use. The historic land use is based on aerial imagery and historic maps:

- OSI 6-inch mapping First Edition B&W, Last Edition B&W
- OSI 25 inch Historic Mapping
- OSI 1995 Aerial Photography
- OSI 2000 Aerial Photography
- OSI 2005 Aerial Photography

Figure 5.1 – Topography (Infrastructure Design Report)



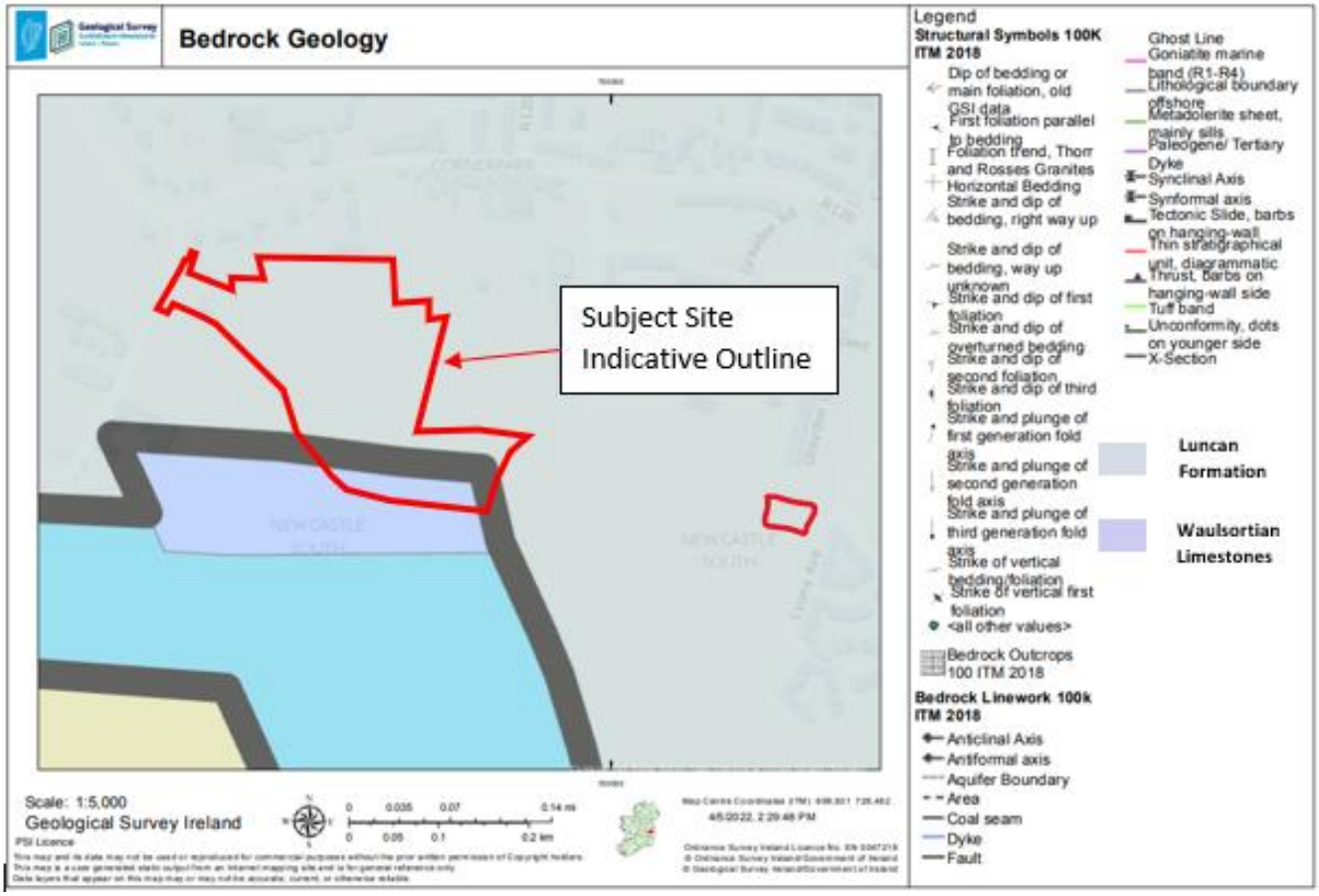
5.3.2 Topsoil

The results of site investigation works (contained in Appendix D1 Volume III of this EIAR) for the site indicate existing soil conditions as generally comprising of topsoil layer to a maximum depth of 400mm over sandy gravelly clays with occasional cobbles and boulders over gravel deposits. No bedrock was discovered in the boreholes undertaken on the subject site.

5.3.3 Bedrock Geology

The rotary core boreholes (contained in Appendix D1 Volume III of this EIAR) recovered 'Medium strong to strong dark grey very fine to fine LIMESTONE with rare to many calcite veins'. The GSI bedrock mapping for the area identifies the bedrock geology underlying the north section of the site and immediate vicinity as the Lucan Formation and described as "*Dark limestone & shale*". The GSI bedrock mapping for the area identifies the bedrock geology underlying the south section of the site and immediate vicinity as the Waulsortian Limestones and described as "*Massive unbedded lime-mudstone*", refer to figure 5.2.

Figure 5.2 – Bedrock Unit (Courtesy of GSI)



5.3.4 Quaternary & Soil

From a review of the GSI interactive mapping (Teagasc soils), the site's soil is described as deep well drained mineral in small and poorly drained peaty in the majority of the site (Figure 5.2).

From a review of the GSI interactive mapping (Quaternary Sediments), the site's subsoil is described as "*till*" derived from limestone (Figure 5.3) overlying limestone bedrock. The site investigation results (contained in Appendix D1 Volume III of this EIAR) indicate the existing ground conditions as generally comprising a 0.4m thick topsoil layer overlying typically as *brown/grey sandy gravelly CLAY with occasional cobbles* overlying a *dark brown/black slightly sandy gravelly CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was stiff below 1.00m BGL in the majority of the exploratory holes. These deposits had occasional or frequent cobble and boulder content where they are noted on the exploratory hole logs.

Granular deposits were encountered within the cohesive deposits and were typically described as *grey fine to coarse angular to sub-angular GRAVEL with occasional cobbles.* The secondary sand/gravel and constituents varied across the site and with depth while occasional cobble content also present where noted on the exploratory hole logs. Based on the SPT N values the deposits are typically medium dense or dense.

Figure 5.3 – Teagasc Soils (Courtesy of GSI)

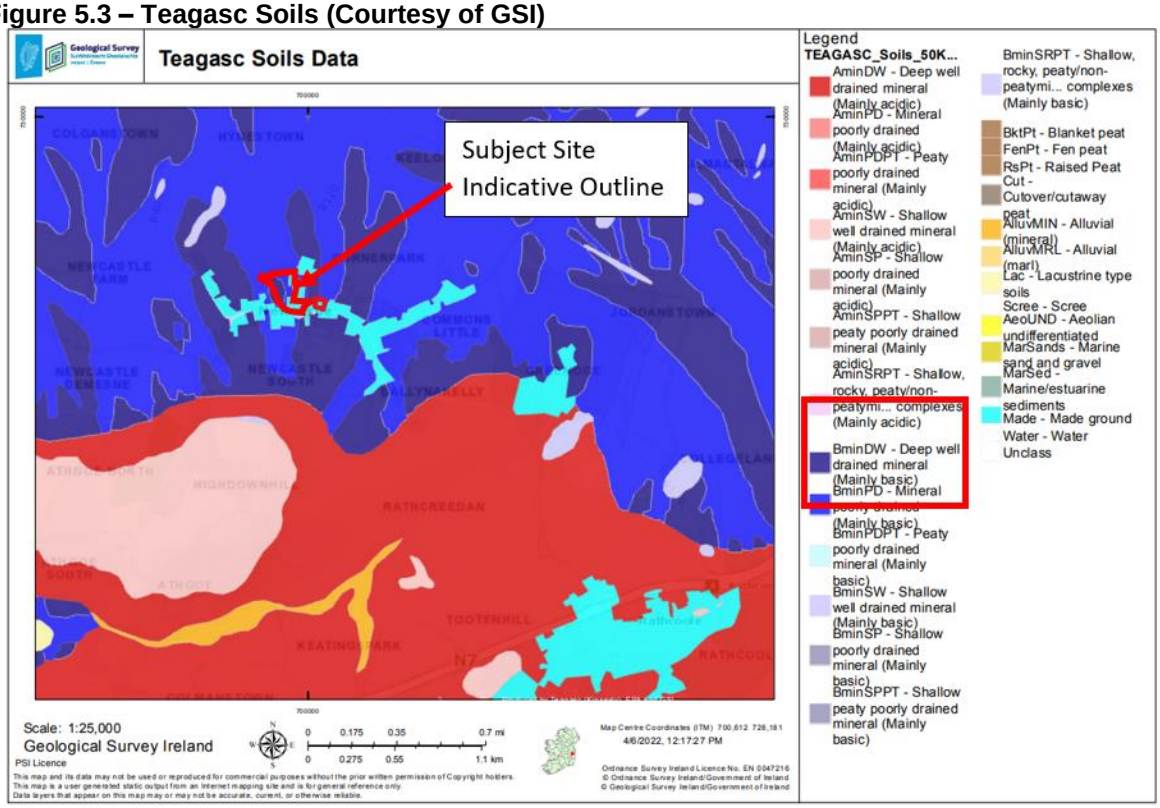
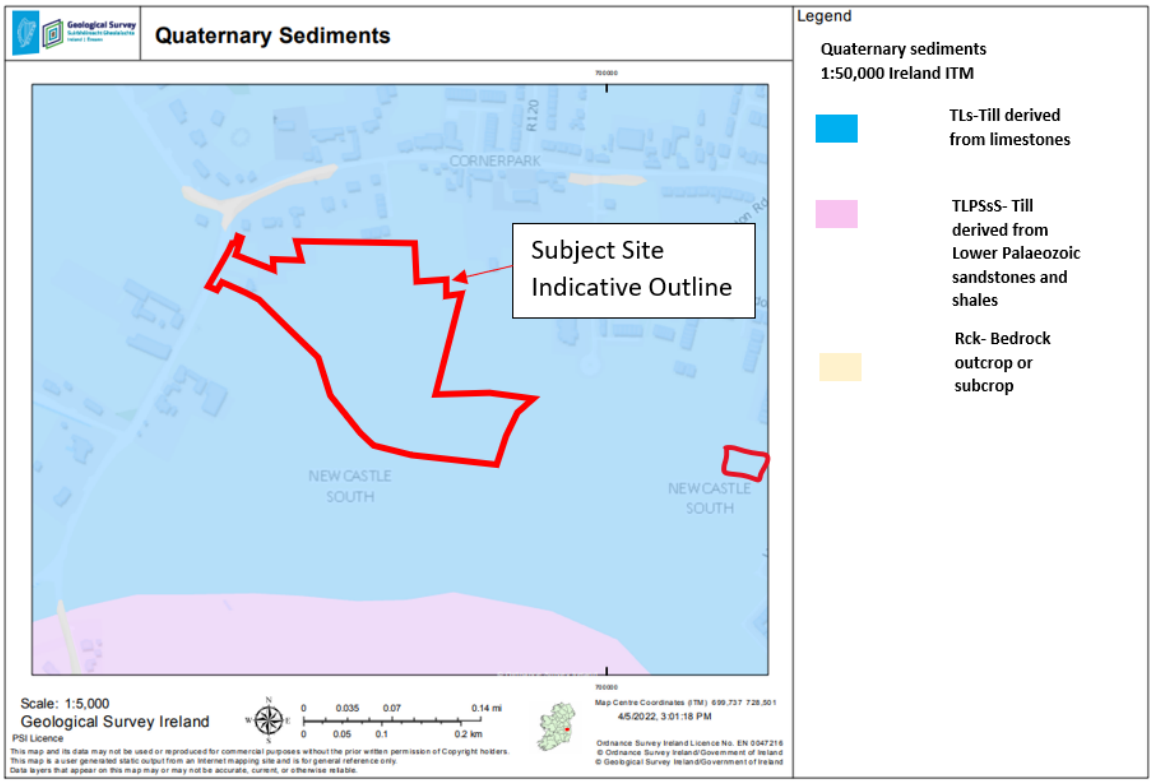


Figure 5.4 – Quaternary Sediments (Courtesy of GSI)

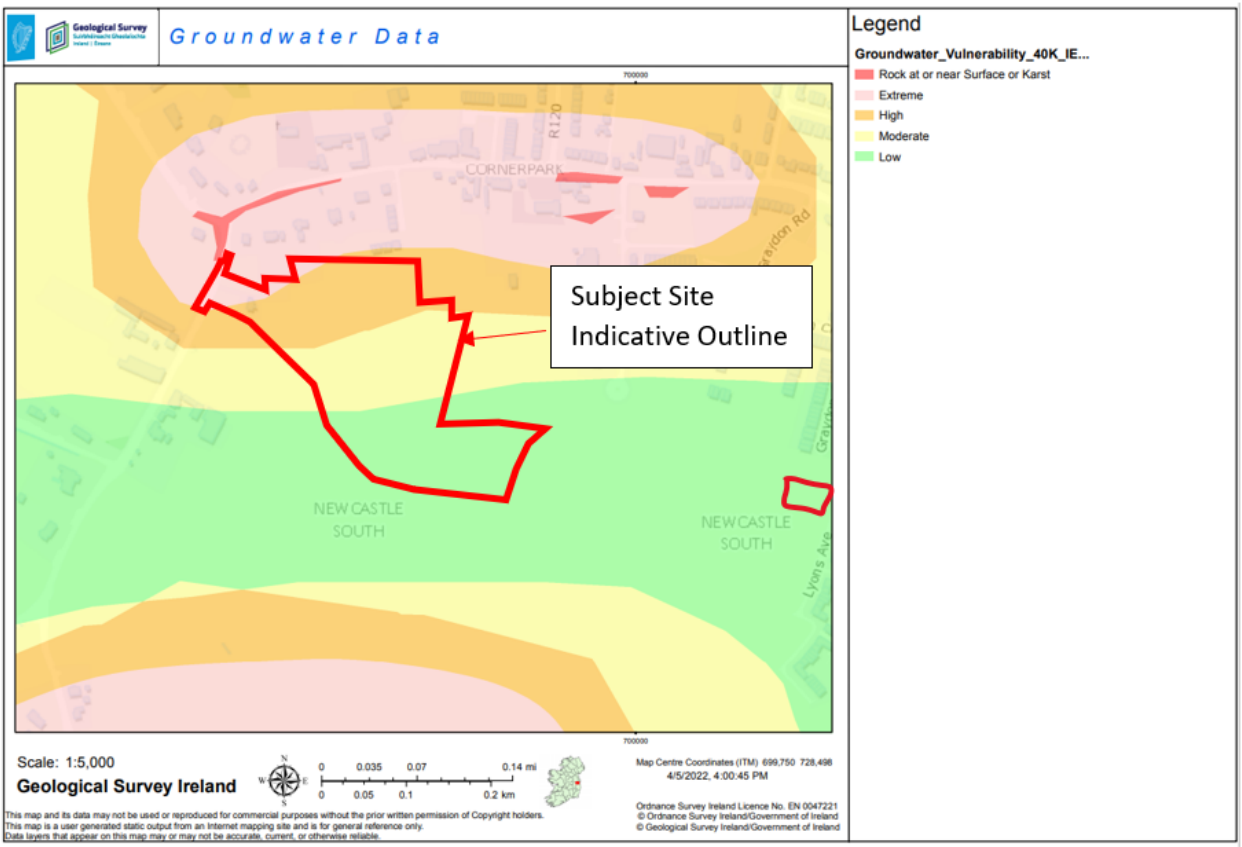


5.3.5 Hydrogeological aspects

A desktop study did not identify any formal designated protection or conservation areas, karst features, geological heritage areas, geo-hazards, or mines / mineral extract in the study area.

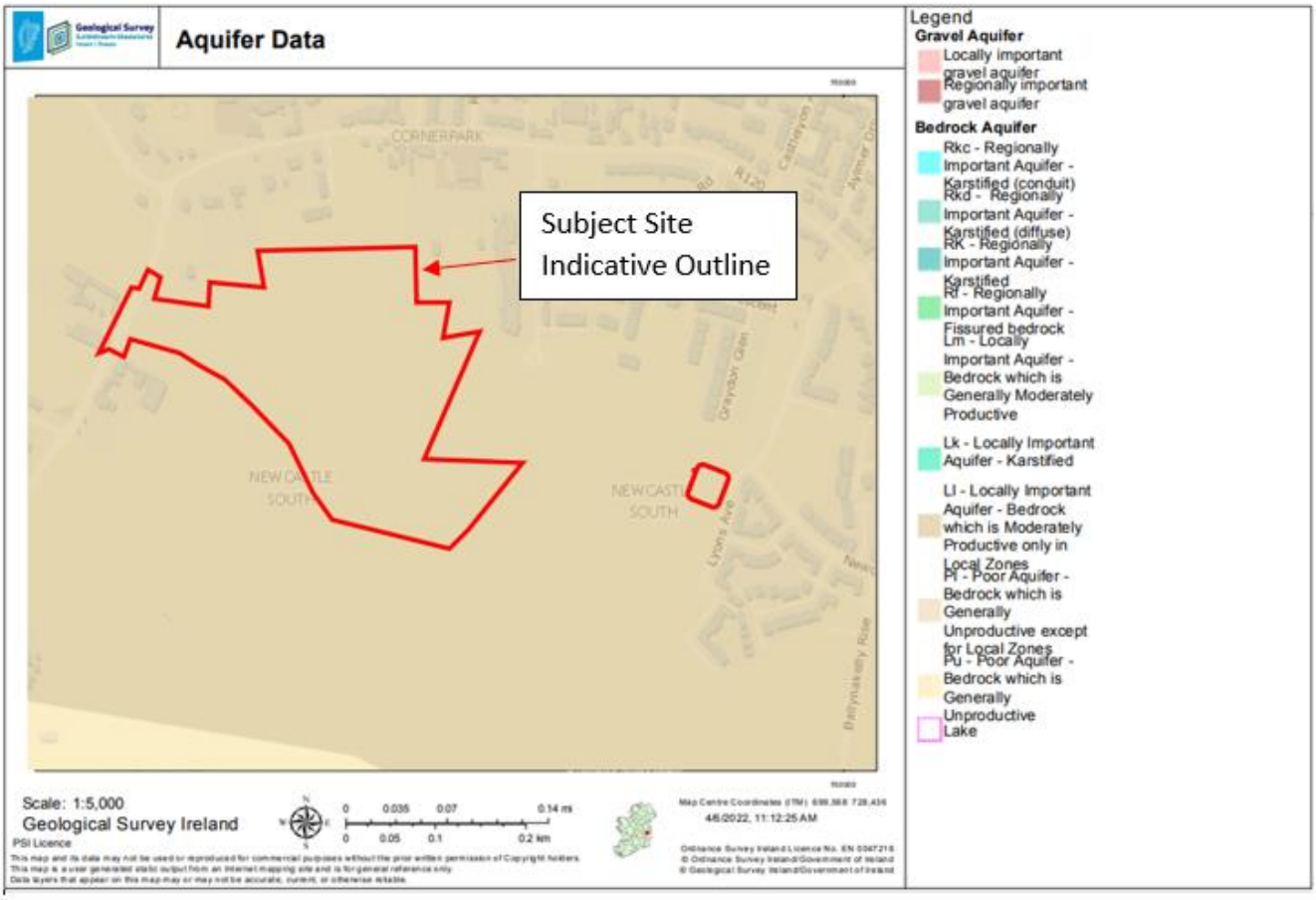
GSI interactive mapping classifies the site's groundwater vulnerability as "*low"* to the south of the site, as moderate to the middle are of the site and as "*high*" to the north of the site near Newcastle main street, refer to figure 5.5. The underlying aquifers are classified as "*Locally important aquifer – Bedrock which is moderately productive only in local zones",* refer to figure 5.6. Refer to EIAR Chapter 6.0 Water: Hydrogeology & Hydrology for further information regarding Hydrogeology. Site investigations (contained in Appendix D1 Volume III of this EIAR) indicate that the vulnerability classification of the aquifer will be lower where substantial overburden is present and provides protection to the bedrock. The depth of overburden decreases to approximately 2m over bedrock to the north of the subject site.

Figure 5.5 – Groundwater Vulnerability (Courtesy of GSI)



Results of surface water soakaway tests undertaken on the site (contained in Appendix D1 Volume III of this EIAR) indicate that the permeability of the ground is very low with little infiltration occurring over the site. As such the groundwater vulnerability is likely to be less vulnerable due to the substantial depths of low permeability overburden on the site than indicated on the GSI interactive mapping.

Figure 5.6 – Aquifer Data (Courtesy of GSI)



5.3.6 Contaminated land

The site investigation (contained in Appendix D1 Volume III of this EIAR) carried out for the subject site indicate that pH results are near neutral and that the water soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1. The results of the Waste Acceptance Criterial Test Suite are presented with the individual parameter limits for "*Inert"* "*Non Hazardous*" and "*Hazardous*" as outlined within European Council Directive 1999 131/EC Article 16 Annex II, *"Criteria and procedures for the acceptance of waste at landfills"*. The intended disposal site will be consulted to ensure compliance with their specific requirements.

The results of the Waste Acceptance Criterial Test Suite indicate that the results are below the inert limits with the exception of TP54 at 1.00mBGL where the results indicate that the total organic carbon is above the inert limits (3.86% vs 3%). Note TP 54 is within the subject site to the north west of the site. All spoil disposed of off-site will be sent to a suitably licensed facility. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present or the previous site use or location indicate a risk of environmental variation. No made ground was encountered on the subject site during the site investigation.

5.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Newcastle South development will consist of the construction of 280 no. dwellings, a creche and associated ancillary infrastructure as well as associated road infrastructure and open space, refer to Chapter 2.0 (Description of Development and Alternatives) for a detailed site and development description.

Further information regarding the proposed infrastructure elements of the proposed development is detailed in the separate "*Infrastructure Design Report*", (IDR) document reference 210026-DBFL-CS-SP-RP-C-1001 IDR by DBFL Consulting Engineers.

It is anticipated that the main development characteristics effecting soils and geology comprise the following:

General construction activities across most of the site.
Excavations to facilitate construction of foundations, road construction, landscaping features and installation of services including drainage, utilities, underground stormwater storage and SUDS features.
Changes to ground levels across the site to facilitate final development levels.
Disposal of excavated soil off-site.
Importation of construction materials to the site including incorporating same below the ground.
Land take of c. 8.47 hectares from agricultural to a residential scheme, including houses, apartments, open space, roads and ancillary infrastructure.

The proposed scheme will have a requirement for imported materials, primarily comprising high standard fill and stone for pipeline construction, hardstanding areas, concrete for foundations, reinforced concrete structures. The fill material will comprise primarily of Cl.808 material. Granular bedding and surrounds to pipes shall consist of free draining hard clean and chemically inert gravel or crushed stone.

The majority of new material brought to site, will be used immediately or will be stored within the site boundary. Other materials such as asphalt or concrete will be brought directly to the construction site when required and immediately placed.

5.5 POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

5.5.1 Construction Phase

This section identifies potential and significant effects to the soil and geology of the subject site caused by the construction of the proposed development.

5.5.2 Stripping of Topsoil

Removal of the existing topsoil layer will be required across the site. It is expected that half of all stripped topsoil will be reused on site (incorporated into landscaping of back gardens and public open spaces).

Stripping of topsoil will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden runoff which will have a temporary negative not significant effect due to the temporary exposure of sub soil layers during.

Table 5.1 – Preliminary Estimated Topsoil Volumes (Approximate)

	Volume (m^3)
Topsoil Strip (0.1 to 0.4m thick layer)	30,000
Topsoil disposal	15,000
Topsoil Reuse	15,000

5.5.3 Excavation of Subsoil Layers

Excavation of existing subsoil layers will be required in order to allow road construction, foundation excavation, drainage and utility installation and provision of surface water attenuation facilities which will have a temporary negative not significant effect due to the temporary exposure of sub soil layers during construction which may result in erosion and generation of sediment laden runoff.

Soil compaction can occur due to movement of construction and maintenance traffic on the site. This is considered to be a *negative slight-moderate short-term impact* on the soil and *in-situ* earth materials.

The ongoing presence of the proposed buildings and associated internal roads, footpaths and hardstanding will result in sealing of the soil. This sealing effect can impact on natural exchanges occurring between soils and the atmosphere which influence the natural function and associated biodiversity of soils. This will have a *negative slight permanent impact* on the soil.

Where feasible, excavated material will be reused as part of the site development works (e.g., use as fill material beneath houses and roads). However, unsuitable excavated subsoil is expected as Waste Acceptance Criterial Test Suite indicate that the results of TP54 are above the inert limits at 1.00mBGL where the results indicate that the total organic carbon is above the inert limits (3.86% vs 3%) and will have to be removed to an approved landfill.

Table 5.2 – Estimated Cut/Fill Volumes (Approximate)

	Volume (m^3)
Services installation & road cut	24,000
Attenuation cut	4,500
Foundations cut	2,500
Total Cut	**31,000**
Fill to trenches	300
Fill to attenuation areas	300
Total Fill (re-use on site)	**600**

5.5.4 Construction Traffic

Approximately 30,000m^3 (approximately 0.3m depth of topsoil across the site) of topsoil will be excavated from the existing ground levels. Topsoil for re-use will be stored in stockpiles for its protection and retained for future use in landscaping works. Excess topsoil at the start of construction activities will be removed off-site by lorries under license. These activities will generate associated construction traffic on the road network.

From previous project experience, assuming a 10 hour working day, this equates to 40 no. two-way HGV movements per day on the local road network. All suitable material will be reused for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site in consultation with the local authority. In addition to the traffic generated by the disposal of surplus subsoil from the site, there will be traffic generated from construction staff and deliveries of construction materials and equipment.

Earthworks plant (e.g. dump trucks) and vehicles delivering construction materials to site (e.g. concrete deliveries, etc) have potential to cause rutting and deterioration of the topsoil layer and any exposed subsoil layers, resulting in erosion and generation of sediment laden runoff. This issue can be particularly noticeable at site access points, resulting in deposition of mud and soil on the surrounding road network. Dust generation can also occur during extended dry weather periods as a result of construction traffic.

Following topsoil stripping there is a risk of rutting and deterioration of the exposed subsoil layers by earthworks plant and construction traffic during the construction period. This may cause erosion; generation of sediment laden run-off and mud being deposited on adjacent roads from construction vehicles. However, it is not envisaged that there would be any adverse effect on the existing natural strength or quality of the remaining subsoil on completion. As such the potential effect is likely to be short term, moderate effect on subsoil surfaces.

It will be necessary to import materials to site, in particular large volumes of imported stone (approximately 40,000m^3 including bituminous and foundation material) for construction of the roads, foundations and services, large quantities of concrete, bricks, steel, tar, windows, fittings, pipes, materials etc. will all be mainly delivered to site by lorry. These activities will generate a large amount of construction vehicle trips (mostly lorries) on the road network and local area during the construction phase of the works.

The construction of the development will require construction workers to travel to and from the site daily which will generate additional traffic on the existing local road network for the construction phase of the project. Refer to Chapter

10 Traffic for further details and information on the traffic impacts. Refer to section 5.5.5 for impact of fuel, oils and lubricants used by construction vehicles.

The potential impact of construction traffic will be a not significant negative effect over the duration of the construction programme. Refer to EIAR Chapter 10 for a table of effects.

5.5.5 Accidental Spills and Leaks

During the construction phase there is a risk of accidental pollution related to the following construction activities;

- storage of oils and fuels on site,
- oils and fuels leaking from construction machinery,
- spillage during refuelling and maintenance of construction machinery,
- use of cement and concrete during construction works.

Potential accidental spills and leaks could cause contamination of the existing topsoil, subsoils or bedrock or groundwater underlying the site.

There is a potential risk of localised contamination of the groundwater due to construction activities i.e. from accidental spillages, leaks etc. resulting in a potential Permanent Negative effect on the groundwater (in the absence of mitigation). The gravelly clay and made ground on the subject site will limit the potential for contamination to infiltrate into the underlying groundwater.

5.5.6 Geological Environment

It is not envisaged that the proposed development will have any discernible negative effect on the geological environment. Excavations associated with development of the site have been designed as shallow as possible and are located mainly above bedrock level. Bedrock is only expected to be encountered at localised points to the north of the site. These potential effects can be characterised as not significant,

5.5.6.1 Human Health

A potential risk to human health due to the development could be the short-term construction activities which may result in direct contact, ingestion or inhalation by construction workers/personnel on site with the soils (e.g., construction workers exposed to dust generated by the construction activities within the site which may expose soils in dry weather to wind). Further risks to human health include accidental spills / leaks of hydrocarbons / oils relating to construction activities. See section 5.5.5 above for more details. These potential effects can be characterised as short-term, imperceptible and negative, in the absence of mitigation. Please refer to Chapter 3 Human Health.

5.5.7 Operational Phase

On completion of the construction phase, it is not envisaged that there would be further direct, or indirect effects on the existing soils or geology on the site. Soft landscaping, planting, road surface and hard landscaping areas within the development will protect the soils from exposure and erosion. Properly designed and constructed hard landscaping, site services and stormwater collection will prevent concentrated run-off from eroding existing soils or banks or causing contamination.

The development when constructed will create additional impermeable surface areas. The type of development (residential) and the proposed layout has a low risk of impacting run-off water quality. Run-off from the development's impermeable areas is designed to be collected via a new stormwater network which incorporates on-line attenuation storage systems and SuDS features such as permeable paving, bio-retention areas, swales and tree pits to improve water quality in accordance with the principles of SuDS design. The day-to-day operational activities of the completed development are therefore unlikely to have any direct or indirect impact on the groundwater environment or water quality.

Since operational run-off is collected into concentrated locations an associated minor impact will be reduction of the stormwater infiltration across the full site area i.e., the "*greenfield*" infiltration potential will be reduced.

Also, the risk of accidental spills or leaks of fuels and oils from vehicles on the site may be collected via run-off and directed into the stormwater network / SUDS features which could lead to risk of impacting existing soils where

infiltration is facilitated. Sustainable Urban Drainage systems, gullies and interceptors will be maintained to ensure they remain in good working order.

The potential effects of accidental spills or leaks will have a negative slight effect.

(EIAR Chapter 6 provides further details regarding the strategy in relation to the development's stormwater management for the subject site.)

5.5.8 "Do-Nothing" Scenario

If the proposed development did not proceed there would be no impact on the existing land, soils or geology of the site. It is envisaged that the land use would remain unchanged apart from the construction compound which would be removed. The large volumes of excess material would not be transferred to other locations for disposal. It is likely the land would return to agricultural use in the do-nothing scenario.

5.6 MITIGATION MEASURES

5.6.1 Incorporated Design Mitigation

Mitigation included in the design of the proposed development include:

- Proposed development levels are designed to minimise cut/fill type earthworks and volume of material to be disposed off-site where possible.
- Landscaping works for the development when incorporated into the scheme are designed to protect the soils again from weathering and erosion.
- Design of site services / drainage works are in accordance with the relevant design guidance such as the GDSDS, The SUDS Manual (CIRIA C753) and the Irish Water Code of Practice (IW-CDS-5030-03 Revision 2).
- Excavated material to be removed off-site is undertaken to the relevant EPA licensing requirements.
- Landscaping works for the development when incorporated into the scheme are designed to protect the soils again from weathering and erosion.
- Appropriately designed site services / drainage / sewers will protect the soils and geology from risk of contamination arising from the development such as light liquids separator or SuDS treatment train approach.

5.6.2 Construction Phase Mitigation

A Construction Environmental Management Plan (PCEMP) is included with the planning application. This plan will be developed further by the contractor into a Construction Environmental Management Plan for the construction phase, which will include the mitigation measures contained in the EIAR. The PCEMP includes a range of site specific measures which will include the following mitigation measures in relation to soils:

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development.
- Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter watercourses.
- Topsoil stockpiles will be located on site so as not to necessitate double handling.
- Topsoil to be re-used throughout the development in landscaping and public open spaces / linear park.
- Disturbed subsoil layers to be stabilised as soon as practicable - backfilling of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping, to be carried out promptly to minimise the duration that subsoil layers are exposed to the effects of weather and construction vehicles.
- Stockpiles of excavated subsoil material to be protected for the duration of the works and located separate to the topsoil stockpiles.
- Construction site mitigation such as wheel wash and dust suppression measures to be implemented.
- Measures to capture and treat sediment laden surface water runoff especially from excavations and stripped land to be implemented (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches).

- Where feasible, excavated subsoil material to be reused as part of the site development works (e.g. for landscaping works and for backfill to trenches under non-trafficked areas).
- Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes on the site and entering the site.
- All oils, fuels, paints and other chemicals to be stored in a secure bunded hardstanding area.
- Refuelling and servicing of construction machinery to take place in a designated hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site).
- Good housekeeping (site clean-ups, use of disposal bins, etc.) on the site project.
- Any material removed from site shall be classified before removal to ensure it is disposed of to an appropriately licensed landfill or recovery facility in accordance with The Waste Management (Hazardous Waste) Regulations 1998. Unsuitable material that cannot be reused on site to be disposed off-site under license.
- Where bedrock / boulders are encountered in excavations, option to crush and reuse to be considered depending on quantity of material excavated. Screened material may be reused as a fill material e.g. in road construction and backfill to service trenches.
- Where feasible, excavated material will be reused as part of the site development works (e.g. use as fill material beneath roads) however, unsuitable excavated subsoil is expected and will have to be removed to an approved landfill.

All fill and aggregate imported for use on the proposed development site will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the project;
- Environmental Management status;
- Regulatory and Legal Compliance status of the Company.

5.6.3 Operational Phase

Mitigation measures envisaged during the operational phase comprise;

- Ensuring regular maintenance of site services, SuDS features and attenuation systems such that they operate as designed.
- Emptying oil separators as per manufacturer's operation and maintenance recommendations to mitigate against risk of spillage / leaks into the soils.

5.7 PREDICTED IMPACT FOLLOWING MITIGATION (RESIDUAL IMPACT)

Topsoil
There is a quantity of topsoil material removed off-site to facilitate the development. Effect will be permanent and not significant as the land changes from a greenfield to a residential development with excess material disposed of at a licensed facility.

Following implementation of mitigation measures included in section 5.6 and the PCEMP (contained in Appendix D2 Volume III of the EIAR, the risk of deterioration or erosion during construction will be temporary and slight.

Land use change from an agricultural area to a residential development during operational phase with associated public open space and landscaped areas will be permanent change to the existing topsoil condition. Effect will be permanent and negligible.

Land use change from agricultural to landscaped open space operational phase will be a permanent change. Effects negligible to the topsoil condition.

Sub-soil
The impact on land, soil, geology and hydrogeology from accidental spillages of fuel and lubricants used during the construction phase of the development is predicted to be minimal when stored and used in a responsible manner. After implementation of the mitigation measures outlined in Section 5.6 and the PCEMP (Appendix D2 Volume III of this EIAR) for the construction phase, the proposed development will not give rise to any significant long-term adverse effects. Slight negative effects during the construction phase will be short term only in duration.

Implementation of the measures outlined in Section 5.6 and the PCEMP will ensure that the potential effects of the development on soils and the geological environment are minimised during the construction phase and that any residual effects will be short term and imperceptible.

Residual effects from earthworks haulage and the risk of contamination of groundwater are deemed to be of minor risk. The residual impacts for a residential development, and open space are deemed to be imperceptible post construction (during the operational phase).

Landscaping for the developments will reduce the initial impact from the construction phase and will protect the soils again from weathering and erosion. The effects on the underlying bedrock geology arising from the construction phase will be imperceptible. The greatest effect will be to the soils from the construction activity as soil levels will be greatly altered throughout. However final landscaping should reduce and address these effects. It is anticipated that the effects on soils arising from the construction phase will be short term and not significant.

The effects on the underlying bedrock geology arising from the construction phase will be imperceptible.

Effects on the soil resulting from the proposed operational phase of the development is anticipated to be imperceptible; once the development is completed, risks to the land and soils will be from pollutants deriving from the use of the residential developments and/or from contaminated surface water run-off.

Refer to Chapter 6 Water further information and details relating to water, hydrogeology and hydrology.

5.8 "*WORST-CASE"* SCENARIO

5.8.1 Construction Phase

Under a *'worst case'* scenario none of the mitigation measures are implemented. This could result in the accidental release of fuel, oil, paints or other hazardous material could occur on site during the construction phase, through the failure of secondary containment or a materials handling accident on the site. If this were to occur over open ground, then these materials could infiltrate through the soil contaminating the soil zone. If the materials were not recovered promptly, then the contaminants may contaminate the down gradient groundwater where overburden is more shallow above bedrock. Refer to Chapter 6 Water further information and details relating to water, hydrogeology and hydrology. However the "worst case" scenario is unlikely to occur due to the mitigation measures outlined in section 5.6 above.

5.8.2 Operational Phase

Under a *'worst case'* scenario none of the mitigation measures are implemented. This could result in the accidental release of fuel, oil to the receiving environment. Refer to Chapter 6 Water further information and details relating to water, hydrogeology and hydrology.

5.9 MONITORING

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above in section 5.6 including the PCEMP contained in Appendix D2 Volume III of this EIAR. Soil removed during the construction phase is to be monitored to maximise potential for re-use on site. Monitoring of any hazardous material stored on-site forms part of the Resource & Waste Management Plan (Appendix E Volume III of the EIAR), and Chapter 11 of this EIAR Material Assets Waste Management . A dust management/monitoring programme is included in Appendix C 7.2 Volume III of the EIAR.

5.9.1 Monitoring measures – construction

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

- Contractors will adhere to the mitigation in this EIAR and PCEMP in Appendix D2 Volume III of this EIAR.
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road sub-formation level in advance of placing capping material, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.)
- Soil removed during the construction phase will be monitored to maximise potential for re-use on site. Any contaminated soil encountered and not identified on site investigations will be analysed and disposed off-site at a suitable licensed facility.
- The quantities of topsoil, subsoil and rock removed off site will be recorded.

5.10 REINSTATEMENT

There is no requirement to assess if these lands can be fully reinstated to green field in the future scenario.

5.10.1 Monitoring measures – operational phase

No ongoing monitoring will be required during the operational phase.

5.11 DIFFICULTIES ENCOUNTERED

No difficulties were encountered in completing this section. It is noted that all volumes calculated are estimated volumes based on similar schemes and review of proposals. Actual volumes / amounts may change slightly based on final detailed design and condition of soils when exposed / excavated.

5.12 CUMULATIVE IMPACTS

Existing and permitted developments were identified through planning records. The cumulative effects include the recently constructed Graydon development scheme under planning reference ABP 305343-19 which compromises of 406 dwellings, a creche and associated site works, along with associated amendments as well as the subject Newcastle South which comprises of the construction of 280 no. dwellings along with open space and associated internal road infrastructure. In addition, there is a supermarket (PRR SD20A/0037) along with associated amendments located at the entrance to Graydon which is currently under construction. In addition, it is noted while the proposed development can be catered for by an underground pumping station (as part of the proposed development), in the event there is an upgrade undertaken to the Newcastle Pumping Station (at Grant's View) to the east of Newcastle by Irish Water the potential cumulative effects to the land, soils, geology and hydrogeology of the local and surrounding area is deemed to be insignificant. As indicated by Irish Water, in the Confirmation of Feasibility, this SHD is not reliant on the Irish Water Newcastle pumping station project by reason of the installation of the on-site pumping station proposed.

The primary potential cumulative impact considered is local increase in hard standing and subsequent decrease in local groundwater recharge as the landscape changes from predominantly greenfield to large impermeable areas.

As part of the proposed development features such as open bottom attenuation, swales, tree pits, green roofs and permeable paving as part of the design which all promote groundwater recharge. Given these features and the geological and hydrogeological environments of the proposed development, i.e. the "local important" bedrock aquifer, the potential cumulative effects to the land, soils, geology and hydrogeology of the local and surrounding areas is deemed to be insignificant.

Each project currently permitted or under construction is subject to EIA and/or planning conditions which include appropriate mitigation measures to minimise effects on the land, geological and hydrogeological environment.

Cumulative impacts, if any, will be limited to the construction stage and will, therefore, be temporary to short-term in duration. As long as mitigation measures for the developments are carried out as permitted, there will be no significant cumulative impacts on the land, geological and hydrogeological environment.

Overall, the cumulative impact of the construction of the proposed development, the Graydon development and the supermarket are predicted to be neutral in terms of quality and of an imperceptible significance (temporary in duration).

Should any future developments be under construction or planned in the vicinity of the site, potential cumulative impacts are not anticipated once similar mitigation measures are implemented.

There cumulative effects arising from the construction and operational phase of the development are short term and not significant.

5.13 INTERACTIONS

Refer to chapter 15 for the anticipated interactions and interdependencies relating to land and soils.

5.14 REFERENCES

- EPA. (2021). EPA Maps, Accessed on 11th May 2022 http://gis.teagasc.ie/soils/map.php,
- Department of Communications, Climate Action and Environment, Geological Survey Ireland, Accessed on 11th May 2022 Geological Survey Ireland Spatial Resources (arcgis.com)

6.0 WATER HYDROGEOLOGY AND HYDROLOGY

6.1 INTRODUCTION

This section of the Environmental Impact Assessment Report (EIAR) document has been prepared by DBFL Consulting Engineers and assesses and evaluates the impact of the proposed development on the Site's Water, Hydrology and Hydrology during the demolition, construction and operational phases. All natural water bodies including surface freshwater (streams, bogs, ponds, rivers and lakes), hydrogeological / groundwater (shallow and deep) impacted by the proposed development are assessed. Interaction between the water bodies and the surface water drainage, foul water drainage, and water supply proposals are assessed.

A Site Specific Flood Risk Assessment (SSFRA) has been completed by DBFL Consulting Engineers and is included as a standalone report with this application. In addition, a Hydrological Risk Assessment has been prepared by AWN Consulting. These report has contributed to the contents of the EIAR, and the assessment below.

This chapter was prepared by Noel Gorman and John Moloney of DBFL Consulting Engineers.

Noel Gorman is a Chartered Civil Engineer with 9 years post graduate experience in the design and construction of residential and commercial development. Noel graduated from National University of Ireland, Galway in 2012 with a Level 8 degree in Civil Engineering. Noel's relevant project experience includes the Newbridge South Orbital Relief Road project, Dublin Port Multipurpose Storage Yards, Dublin Airport South Apron and the Clonburris Infrastructure Development.

John is a Civil Engineer with 7 years' experience. 3 years' experience in the design and planning of civil engineering deliverables of residential and infrastructure projects including the generation of drawings, specifications, Design Reports, Preliminary Construction and Environmental Management Plans, Site Specific Flood Risk Assessments and compiling Water and Hydrology Chapters for Environmental Impact Assessment Reports.

6.2 METHODOLOGY

6.2.1 Guidelines

Key guidance documents considered as part of EIAR preparation are listed below.

Table 6.1 – Guidance Documents

Body	Guidance
Transport Infrastructure Ireland (TII)	Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA , 2009)
	Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2008)
	Guidelines for The Crossing of Watercourses During the Construction of National Road Schemes (NRA, 2008)
	Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (NRA 2007)
	Road Drainage and the Water Environment (DN-DNG-03065)
	Design of Earthworks Drainage, Network Drainage, Attenuation & Pollution Control (DN-DNG-03066)
	Drainage Design For National Road Schemes - Sustainable Drainage Options (RE-CPI-07001)
	Drainage Systems For National Roads [DN-DNG--03022]
Office of Public Works (OPW)	The Planning System and Flood Risk Management (OPW, 2009)
	OPW Flood Maps (http://www.floodinfo.ie/)

Environmental Protection Agency (EPA)	Guidelines On the Information to Be Contained In Environmental Impact Assessment Reports (EPA, May 2022)
	EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (EPA, Sept. 2003)
	Geo Portal (https://gis.epa.ie/EPAMaps/)
Department of Housing Planning and Local Government	River Basin Management Plan for Ireland 2018 – 2021
Inland Fisheries Ireland (IFI)	Guidelines on protection of fisheries during construction works in and adjacent to waters (Inland Fisheries Ireland 2016)
Construction Industry Research and Information Association (CIRIA)	The SUDS Manual (CIRIA C753)
	Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (CIRIA C532)
	Control of Water Pollution from Linear Construction Sites (CIRIA C648)
	Development and Flood Risk – Guidance for the Construction Industry (CIRIA 624)
	The Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (2001)
	Environmental Good Practice on Site Guide (C741) (2015)
Dublin City Council (DCC)	The Greater Dublin Strategic Drainage Study [GDSDS] (Dublin City Council et al., 2005)
South Dublin County Council (SDCC)	South Dublin County Council (https://www.sdcc.ie/en/services/planning/)
South Dublin County Council (SDCC)	South Dublin Sustainable Drainage Guide (sdcc-sustainable-drainage-explanatory-design-and-evaluation-guide.pdf)
Institute of Geologists Ireland (IGI)	Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements (2013)
Environment Agency (UK) EA	PPG1: General Guide to the Prevention of Pollution (UK Guidance Note)

6.2.2 Consultation

Baseline information was gathered from relevant statutory bodies as per **Error! Reference source not found.**

6.2.3 Desktop Study/Site Visits

This chapter encompasses knowledge obtained from site visits, drainage and water services record information received from Irish Water and the Local Authority. Additionally, information from the EPA and GSI websites has been utilised. DBFL met with the South Dublin County Council Planners and Drainage personnel for pre-planning meetings and this has informed their approach to the proposed design. Relevant content from the response to the An Bord Pleanála Opinion has also been incorporated.

6.2.4 Assessment Methodology

The assessment of the potential impact of the proposed development on the water bodies was carried out in accordance with the methodology and the specific criteria set out in the following documents:

- EPA Guidelines on Information to be Contained in an Environmental Impact Statement (May 2022),

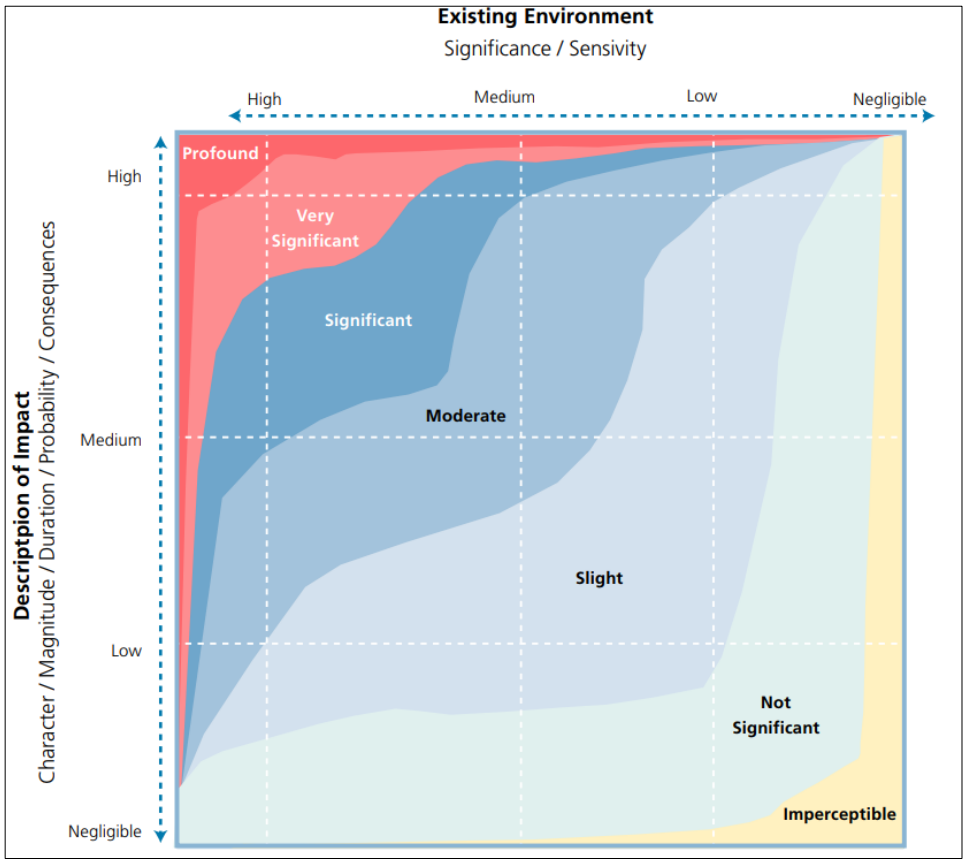
- EIA Directive 2014/EU/52, Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003),
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003), Development Management Guidelines (DoEHLG, 2007) and
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessments (DoECLG, March 2013).

. Effects are characterised using Table 3.3 of the EPA Guidelines on Information to be Contained in an Environmental Impact Statement (May 2022).

6.2.5 Application of Methodology

Application of methodology was carried out as per the guidelines referenced above.

Figure 6.1 – Significant Effect Matrix



Source: Figure 3.4 of Guidelines on the information to be contained in Environmental Impact Assessment Reports

6.2.6 Study Area

The subject site, of approximately 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche on a site of c. 0.07 ha), is located to the south of the R120/Main Street at Newcastle Village. The site is bounded by Graydon residential development to the east, the Athgoe Road to the west, by single dwellings to the north and existing agricultural lands to the south. The St Finian's National School and Church is located to the north of the site.

6.3 RECEIVING ENVIRONMENT (BASELINE SCENARIO)

6.3.1 Topography & Land Use

The subject site, of approximately 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche on a site of c. 0.07 ha), is located to the south of the R120/Main Street at Newcastle Village. The site is bounded by Graydon residential development to the east, the Athgoe Road to the west, by single dwellings to the north and existing agricultural lands to the south. The St Finian's National School and Church is located to the north of the site. The development lands form part of the South Dublin County Council Development Plan (2016-2022) and Draft South Dublin County Development Plan 2022-2028). The application site is zoned for residential development and agriculture under the Development Plan as well as the Newcastle Local Area Plan 2012-2022.

The existing site is predominantly "*greenfield*" and a temporary construction compound has been constructed on the eastern area adjacent to the Graydon residential development. Construction access also traverses the site from the Athgoe Road to the Graydon residential development. Existing boundaries within the site are predominantly hedgerows and fencing with some drainage ditches. The overall topography of the site falls from south to north toward Newcastle Village.

Figure 6.2 – Site Topography

6.3.2 Existing Surface Water Features & Hydrology

The Newcastle Local Area Plan 2012 describes Newcastle Village as predominantly within the Shinkeen Stream catchment with the eastern part of the Village being within the Griffeen River catchment. Both water-bodies are tributaries of the River Liffey. The Shinkeen Stream and its tributaries form just to the north and north-west of Newcastle Village within the townlands of The Glebe and Cornerpark. The stream flows in a north-westerly direction before joining the River Liffey to the east of Celbridge Town. The route of surface water drainage from lands around Newcastle Village to the Shinkeen Stream follows the sloping topography and directs water, from the higher lands in the south, northwards.

There is a retention area just east of the Athgoe Road that is indicated on early OS maps. A small culvert under Main Street feeds a large formal pond in the grounds of The Old Glebe House. A natural swale exists to the north of the village, just outside of the Plan Lands, which leads to the origins of part of the Shinkeen Stream system and crosses the Peamount Road approximately 1 kilometre from the centre of the Village. There are a number of existing drainage ditches on the subject site which drain towards the Main Street and enter the above-mentioned culvert.

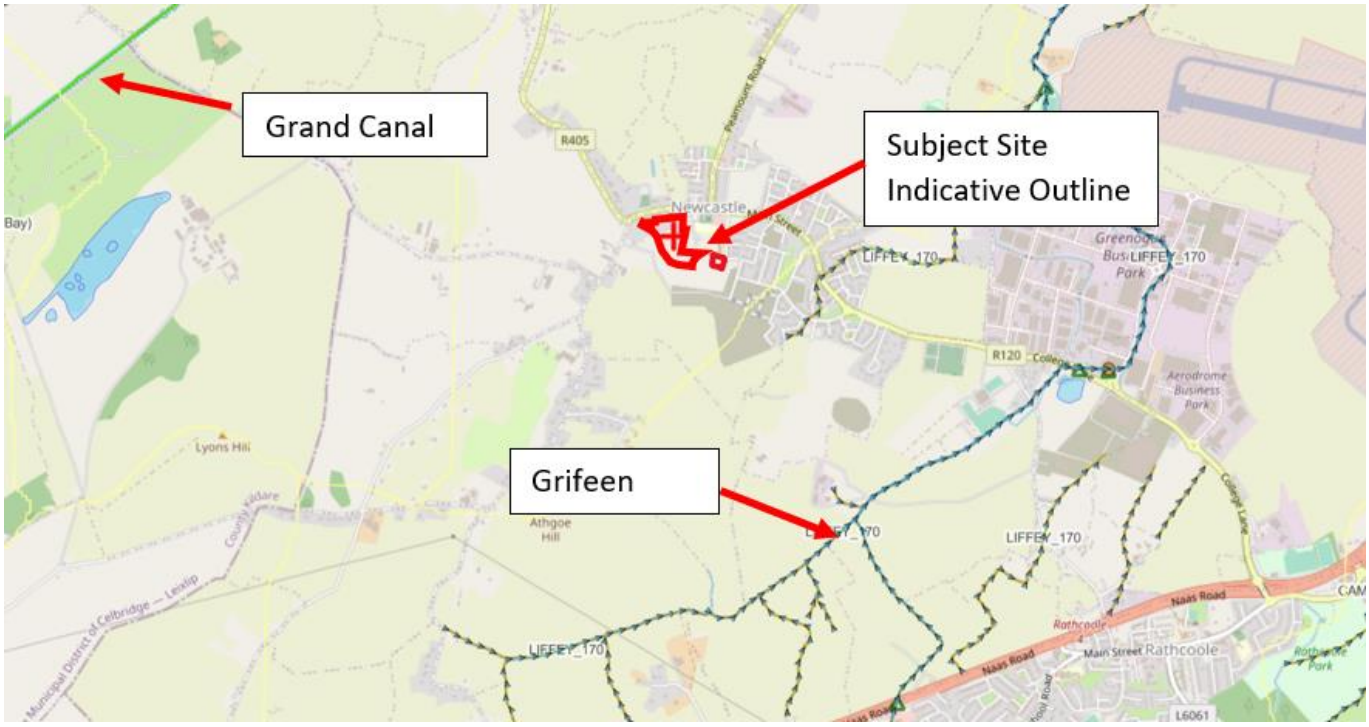
The River Griffeen, which runs by the eastern fringe of Newcastle Village, rises in Saggart Hill at 395 metres above sea level circa 5 kilometres to the south of Newcastle Village. The river is fed by nearby streams that rise near Lyons Hill and Athgoe Hill just southwest of Newcastle before flowing northwards through comparatively flat lands to the west of Baldonnel Aerodrome and onwards through Griffeen Valley Park before meeting the River Liffey on the northern side of Lucan Village.

The Eastern River Basin District - River Basin Management Plan 2009- 2015, which has been prepared in accordance with the European Communities Water Framework Directive, has found the overall status of the Griffeen Lower to be '*bad*'. It is an overall objective of the River Management Plan to restore the status of the river to '*good'* by 2027. The overall status of the Liffey Lower has been found to be '*moderate'* and it is an objective to restore the status of the river to *'good'* by 2027.

The existing site is predominantly greenfield, and the topography of the site generally falls to the north towards the R405 road. A network of existing drainage ditches currently drains the site. Drainage infrastructure has been constructed as part of Graydon residential development (under planning reference ABP 305343-19) to the east of the subject site in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). Apart from the proposed creche, the subject sites surface water network will not connect to any surface water infrastructure constructed under the Graydon residential development to the east. The creche connects to the permitted Graydon infrastructure. There are existing 225mm surface water sewers located in Athgoe road to the west of the subject site.

An existing "*pond*" is identified on the Newcastle LAP, 2012 in the south western area of the subject site. DBFL have reviewed this area on site and no pond was present but it appears there is a depression in this area of the site based on the topography. Some evidence of an overland flow route is present on historic aerial mapping.

Figure 6.3 – EPA Watercourses



6.3.3 Regional Hydrogeology

The Newcastle Local Area Plan 2012 describes the groundwater vulnerability within the Plan Lands. It indicates that the groundwater vulnerability varies greatly and is illustrated on the Aquifer Vulnerability Map located below. Lands that straddle the western section of Main Street and extend beyond the north-west boundary of the Plan Lands are identified as having a high to extreme vulnerability. The high/extreme groundwater vulnerability area is also located on a locally important aquifer. The south-eastern quadrant of the Plan Lands has been identified as having a moderate vulnerability.

Figure 6.4 – Extract from Newcastle LAP 2012 – Aquifer Vulnerability Map

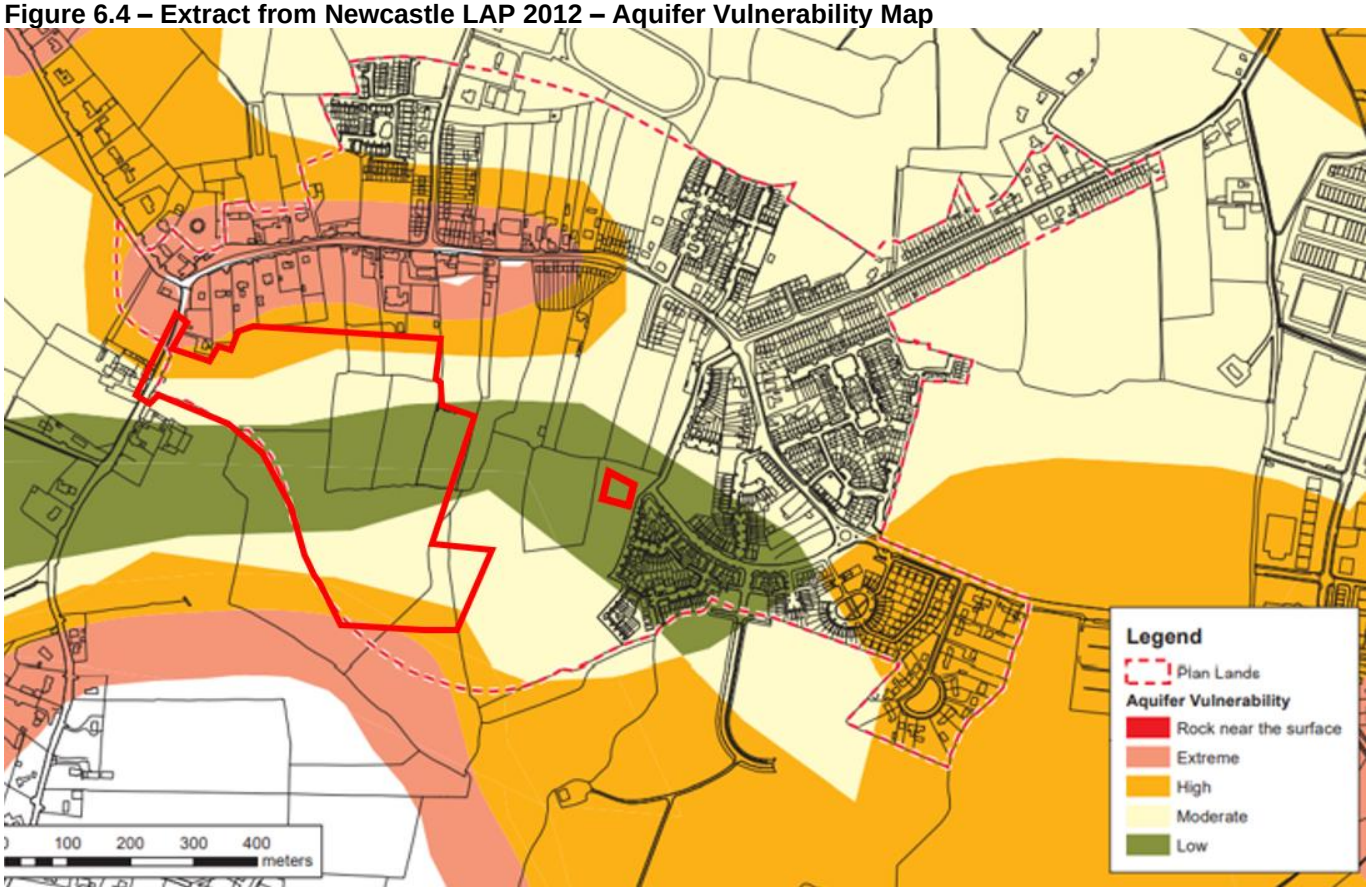
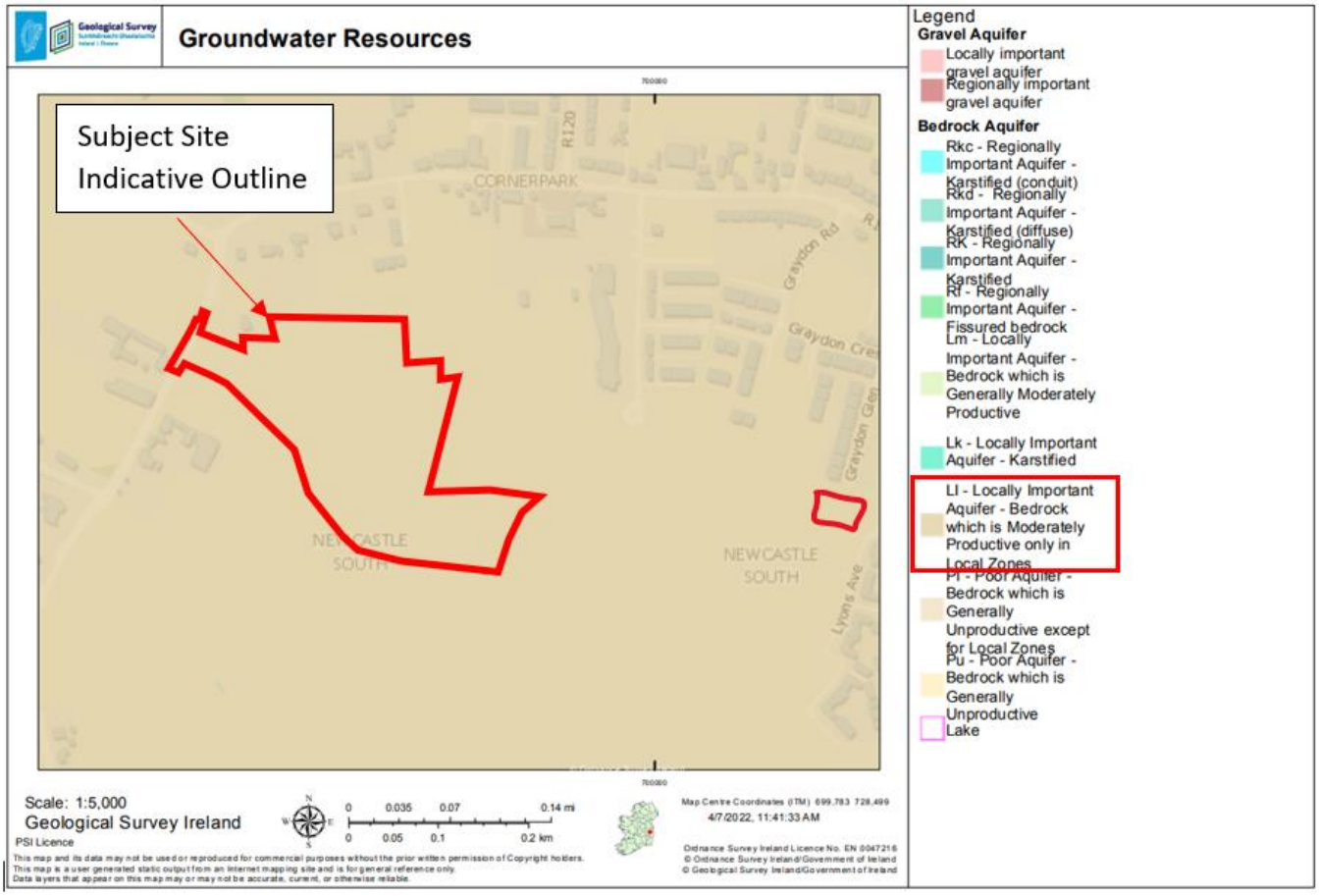


Figure 6.5 – Extract from GSI Online Mapping Service (Groundwater Resources)

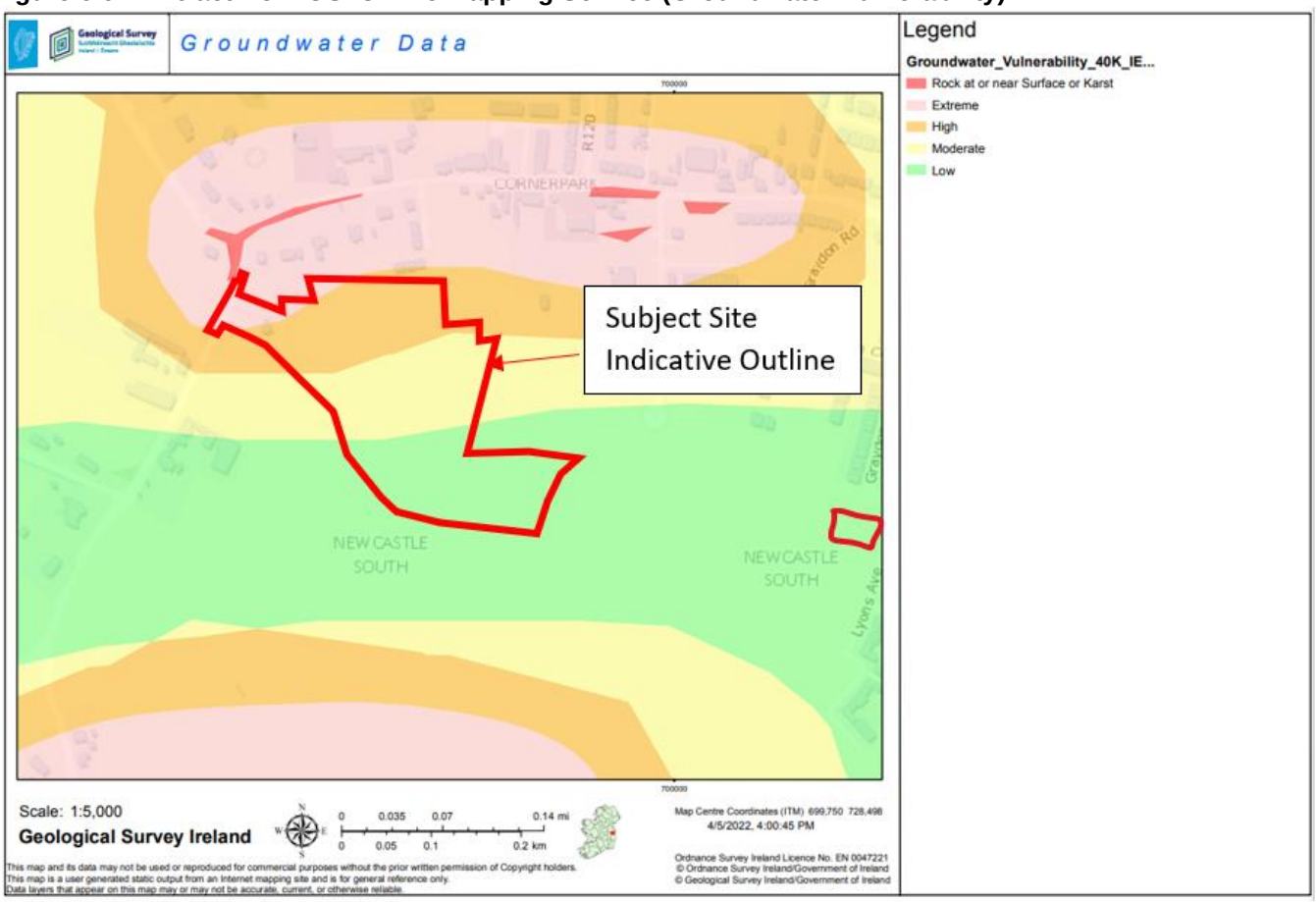


6.3.4 Site Hydrology and Groundwater

A network of existing drainage ditches currently drains the site. Drainage infrastructure has been constructed as part of Graydon residential (under planning reference ABP 305343-19) to the east of the subject site in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). Apart from the proposed creche, the subject sites surface water network will not connect to any surface water infrastructure constructed under the Graydon residential development to the east. The creche connects to the permitted Graydon infrastructure. There are existing 225mm surface water sewers located in Athgoe road to the west of the subject site. An existing *"pond*" is identified on the Newcastle LAP, 2012 in the south western area of the subject site. DBFL have reviewed this area on site and no pond was present but it appears there is a depression in this area of the site based on the topography. Some evidence of an overland flow route is present on historic aerial mapping.

GSI interactive mapping classifies the site's groundwater vulnerability as *"low*" to the south of the site, as moderate to the middle are of the site and as *"high*" to the north of the site near Newcastle main street, refer to figure 6.8. The underlying aquifers are classified *as "Locally important aquifer – Bedrock which is moderately productive only in local zones"* refer to figure 6.7.

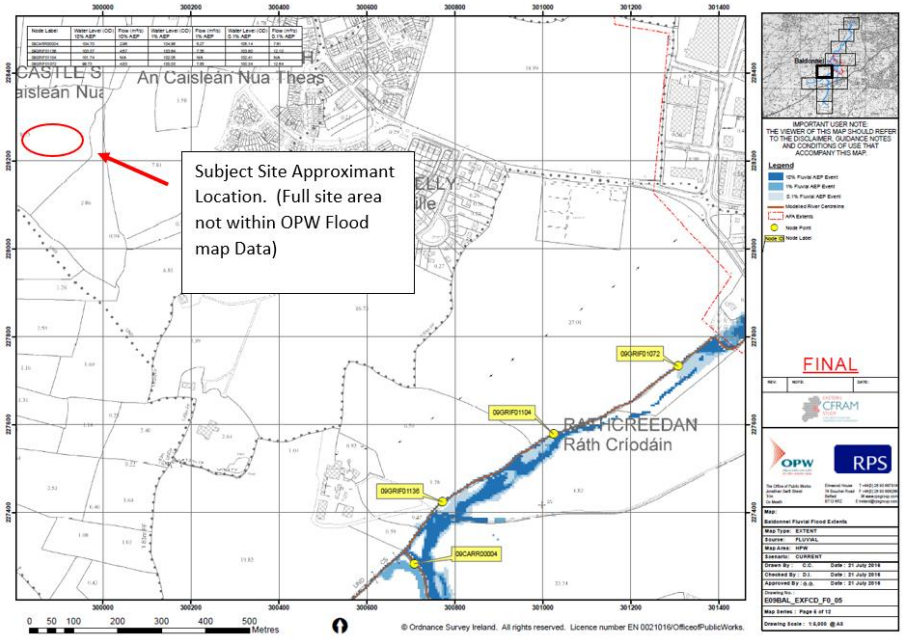
Figure 6.6 – Extract from GSI Online Mapping Service (Groundwater Vulnerability)



6.3.5 Flooding and Flood Risk

The Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022 and the Draft South Dublin County Council Development Plan 2022-2028 indicates that the subject site is located outside the extents of Flood Zone A and Flood Zone B and is therefore in Flood Zone C.

Figure 6.7 – Extract of CFRAMS Data from OPW FloodInfo.ie



6.3.6 Water Quality

The proposed development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and River Liffey sub-catchment (WFD name: Liffey_SC_090, Id 09_15) (EPA, 2022

The Environmental Protection Agency (EPA, 2022) on-line mapping presents the available water quality status information for water bodies in Ireland. The Cornerpark Stream belongs to the Liffey_170 WFD surface waterbody which has a 'Moderate' Status (EPA, 2022) and its WFD risk score is 'At risk of not achieving good status'. The Coastal Waterbody Dublin Bay has a WFD status (2013 – 2018) of 'Good' and a WFD risk score of 'Not at risk'. The ecological status (which comprises biological and chemical status) of transitional and coastal water bodies during 2013-2018 for Dublin Bay is classed as 'Good'. The most recent surface water quality data for the Dublin Bay on trophic status of estuarine and coastal waters indicate that they are 'Unpolluted' (based on Water Quality in 2020, EPA, 2021)'. Under the 2015 'Trophic Status Assessment Scheme' classification of the EPA, 'Unpolluted' means there have been no breaches of the EPA's threshold values for nutrient enrichment, accelerated plant growth, or disturbance of the level of dissolved oxygen normally present.

With regard to local bathing areas, Dublin Bay hosts a number of swimming locations protected by the bathing water directive 2006/7. However, it should be noted that the bathing status has no direct relevance to the water quality status of the Natura 2000 sites due to rapid mixing and dilution resulting in no measurable change in water quality within the overall water body. Refer to Hydrological Risk Assessment prepared by AWN Consulting for details.

6.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Newcastle South development will consist of the construction of 280 no. dwellings, a creche, open space and associated ancillary infrastructure as well as associated road infrastructure and open space, refer to Chapter 2.0 (Description of Development and Alternatives) for a detailed site and development description.

Further information regarding the proposed infrastructure elements of the proposed development are detailed in the separate "Infrastructure Design Report", (IDR) document reference 210026-DBFL-CS-SP-RP-C-1001 IDR by DBFL Consulting Engineers.

It is anticipated that the main development characteristics impacting water, hydrogeology and hydrology comprise the following:

- General construction activities across most of the site.
- Installation of sub surface utilities.
- Installation of stormwater storage.
- Installation of SUDS features.

- Installation of foul water storage.
- Changes to ground levels across the site to facilitate final development levels.

6.4.1 Topography & Land Use

The proposed development is designed to follow the existing ground profile where possible. The proposed dwellings finished floor levels are designed with existing levels in mind and relationships with boundaries existing boundaries. Finished floor levels to properties are set over and above minimum freeboard requirements.

6.4.2 Regional Hydrogeology

The integration of SUDs features with traditional drainage methods, is a strategy of both the LAP and the County Development Plan. SUDs features encourage groundwater recharge where possible and replicate natural drainage systems. SUDs features proposed for the subject site include swales, tree pits, permeable paving, above ground attenuation areas as well as green roofs.

6.4.3 Site Hydrology and Groundwater

The proposed development is designed to limit surface water runoff from the site to the greenfield runoff rate and to store flows exceeding this in a combination of underground attenuation and detention basins and swales. For storms exceeding a 100-year event, the development has been designed to provide overland flood routes along streets and roads to direct flood water away from residential units and to open space areas.

The total allowable surface water runoff for the subject site and future residential developments has been calculated as 24.51l/s and the storage volume required to accommodate runoff from a 1%AEP (Annual Event Probability) is calculated using Microdrainage software as 2043m3. Refer to DBFL report number 210026-DBFL-CS-SP-RP-C-1001 IDR, “Infrastructure Design Report”, for detailed calculations of the allowable outflow from the site and the storage requirements.

The proposed surface water drainage network, attenuation storage and site levels are designed to accommodate a 100- year storm event (including an allowance for climate change comprising a 20% increase in rainfall figures, as required in the GDSDS (Greater Dublin Strategic Drainage Study)). Proposed finished floor levels of all dwellings are set over and above 500mm above the estimated 1 in 100-year return period storage level, as required in the GDSDS.

6.4.4 Flooding and Flood Risk

The SSFRA carried out by DBFL Consultant Engineers, document no 210026-DBFL-XX-XX-RP-C-0003 SSFRA, assesses the proposed development in the context of the ‘Planning System and Flood Risk Management Guidelines’. This report is included as a standalone report.

Following the Site Specific Flood Risk Assessment, it has been determined that the site (280 dwellings open space and creche) is within Flood Zone C as defined by the Guidelines.

6.5 POTENTIAL LIKELY SIGNIFICANT EFFECTS OF THE PROPOSED DEVELOPMENT

The following provides an assessment of the potential effects on the water environment of the proposed development without mitigation measures being incorporated into the detailed design and construction phase. The mitigation measures and predicted effect of the proposed development are set out below in Section 6.6 and 6.7.

6.5.1 Construction Phase

Construction of the proposed development will require the removal of a large part of the topsoil and extensive earthworks to facilitate the construction of the residential buildings, infrastructure service provision, road construction, surface water storage systems etc. Given the extent of disturbance, there is potential for weathering and erosion of the surface soils from precipitation and run-off.

Surface water runoff from the construction phase may also contain increased silt levels or result in pollution from the construction processes. The discharge of these contaminants, such as concrete and cement, which are alkaline and corrosive, has the potential to cause pollution in drainage ditches within the site and nearby watercourses. Accidental oil or fuel spillages or leaks from construction activities also have the potential to find their way into the adjacent

drainage ditches and nearby water courses. Both increased silt and contaminant levels have the risk of reducing water quality in the adjoining water courses.

Excavation of soil and sub-soil layers may reduce the ability of the lands to recharge groundwater. The surface water runoff will be collected and positively discharged from the development to drainage ditches with the subject site. It is likely that this activity would have a negative, not significant effect on groundwater.

Surface water runoff during the construction phase may contain increased silt levels (e.g. runoff across areas stripped of topsoil) or become polluted by construction activities. This has the potential to result in increased silt and pollutant levels into existing nearby watercourses. In the absence of mitigation, it is likely that this activity would have a negative, temporary, moderate effect on the watercourses.

Heavy rain fall or a high level of ground water could produce ponding in open trenches. Discharge of this rain water pumped from excavations to existing drainage ditches could compromise the capacity of upstream networks and as such cause flooding. It is likely this effect would have a negative, temporary, moderate effect. The consequence of this will increase the flow within the existing drainage network and hence potentially cause flooding.

Discharge of wash water from concrete trucks and discharge of vehicle wheel wash water has the potential to contaminate the groundwater. This effect may be characterised as a temporary, short term, moderate effect. It is likely that this activity would have a temporary, adverse, slight, adverse, impact on groundwater and local watercourses within the area.

6.5.2 Operational Phase

Potential operational phase effects are noted below:

- Increased impermeable surface area will reduce local groundwater recharge and potentially increase surface water runoff and flooding downstream. It is likely that this activity would have a slight, permanent, adverse, effect on groundwater and the local watercourses.
- Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas). The likely effect may be characterised as imperceptible, temporary and adverse.
- Contamination risks arising from development use / leaking pipes / contaminated surface water runoff. The likely adverse effect arising from this activity may be characterised as adverse, imperceptible and temporary.
- Contamination risks arising from the Foul Pumping Station contaminating local groundwater and/or infiltrating into the surface water drainage network. The likely effect may be characterised as moderate, temporary and adverse.
- The Proposed Development will have no additional stormwater run-off, when compared with the current situation, during a stormwater event, the development will, therefore, have no measurable effect on the water quality in any overflow situation at Ringsend WWTP apart from a minor contribution from foul sewage. As explained in Section 3.4 of the Hydrological Risk Assessment prepared by AWN Consulting, the maximum contribution of foul sewage (peak flow of 8.58 l/s) from the Proposed Development is 0.08% of the peak hydraulic capacity at Ringsend WWTP. The proposed stormwater and foul water networks within the site will be entirely independent systems and rainfall will have no impact on foul flows to the Ringsend WWTP.

6.5.3 Risks to Human Health

A potential risk to human health from water, hydrology and hydrogeology can be linked to the potential for contamination of the potable water supply. The ground water and supply network would present possible pathways. The risk is considered below.

<u>Groundwater Supply</u>
As noted above the underlying receiving groundwater is a locally important aquifer which has high/extreme groundwater vulnerability in local zones. The risk to the contamination of this water supply source from surface water run-off from the development during construction and operation is considered to be low given infiltration results obtained as part of the preliminary site investigation undertaken by Ground Investigations Ireland (contained in Appendix D1 Volume III of this EIAR).

Network Supply
As noted above surface water outflow from the site ultimately discharges to an existing drainage ditch and an existing surface water network on Athgoe Road. If surface water is not adequately treated and managed in accordance with the GDSDS it has the potential to impact upon human health.

6.5.4 "Do-Nothing" Scenario

In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely effects upon the receiving environment should the proposed development not take place.

If the proposed development does not proceed there would be no additional impact on the local water systems. The current rate of surface water run-off would continue to operate in its current state.

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

6.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

6.6.1 Incorporated Design Mitigation

- Excavated material to be contained to ensure excavated material (from earthworks) does not enter a drainage ditch or watercourse.
- Any in-situ concrete work to be lined and areas bunded (where possible) to stop any accidental spillage entering the watercourse.
- Design of site services / drainage works are in accordance with the relevant design guidance.
- Appropriately designed site services / drainage / sewers will protect the water, hydrogeology and hydrology from risk of contamination arising from the development such as light liquids separator or SuDS treatment train. Features such as green roofs, permeable paving, swales, tree pits and above ground and open-bottom attenuation are proposed to intercept pollutants and promote groundwater recharge where possible. A bypass separator is proposed prior to any surface water discharging to drainage ditches.
- Design and layout of the scheme is aimed at maximising SuDS features and protect watercourses in accordance with guidance from Inland Fisheries Ireland on the Planning for Watercourses in the Urban Environment.
- Surface water drainage for the development has been designed in accordance with the GDSDS and the SUDS Manual to avoid risk to human health.

6.6.2 Construction Phase Mitigation

To minimise the impact of the construction phase on the water environment mitigation measures included in section 6.6.2 and the PCEMP (contained in Appendix D2 Volume II of this EIAR) will be implemented.

General site works

- A Site Specific Construction and Environment Management Plan be developed and implemented during the construction phase. Site inductions to include reference to the procedures and best practice as outlined in the PCEMP, prepared by DBFL Consulting Engineers, submitted with the SHD application and will include mitigation measures contained in the EIAR.
- Measures will be implemented to capture and treat sediment laden surface water runoff from excavated trenches and stripped land (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches).

- Weather conditions and seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations, with an objective of minimizing soil erosion.
- The extent of sub-soil and topsoil stripping will be minimised to reduce the rate and volume of the run-off during construction until the topsoil and vegetation are replaced.
- Concrete batching will take place off site or in a designed area with an impermeable surface.
- Concrete wash down and wash out of concrete trucks will take place on-site into an appropriate washout facility.
- Discharge from any vehicle wheel wash areas will be directed to on-site settlement tanks/ponds.
- Oil and fuel stored on site for construction will be stored in designated areas. These areas will be bunded and should be located away from surface water drainage and features.
- Refuelling and servicing of construction machinery to take place in a designated hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site).
- Any hazardous materials to be stored within secondary containment designed to retain at least 110% of the storage contents - to prevent the accidental release (fuels, paints, cleaning agents, etc.) with bunds for oil/diesel storage tanks.
- Spill kits will be kept in designated areas for re-fuelling of construction machinery.
- Dewatering measures will only be employed where necessary.

6.6.3 Operational Phase

Operational phase mitigation measures are noted below:

- The design of proposed site levels (roads, FFL etc.) has been carried out to replicate existing surface contours, break lines etc. and therefore replicating existing overland flow paths, and not concentrating additional surface water flow in a particular location.
- Surface water runoff from the site will be attenuated to the greenfield runoff rate as recommended in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled by a Hydrobrake flow control device, with a combination of above detention basins, low flow channels and underground attenuation tanks, swales provided to store runoff from a 1 in 100-year return period event. SUDs features are implemented in the surface water drainage network to reduce the rate of runoff form hard standing area sand to improve the quality of surface water runoff. For detailed information refer to DBFL Report number 210026-DBFL-CS-SP-RP-C-1001, “Infrastructure Design Report”.
- Surface water runoff from the development will be collected by an appropriately designed system with contaminants removed prior to discharge i.e. petrol interceptor.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies, petrol interceptor and foul pumping station will be required during the Operational Phase to ensure the proper working of the development’s networks and discharges.
- Waste generated by the everyday operation of the development should be securely stored within designated collection areas with positive drainage collection systems to collect potential runoff.
- Operational waste will be removed from site using licensed waste management contractors.

6.7 PREDICTED EFFECTS FOLLOWING MITIGATION (RESIDUAL IMPACT)

The predicted residual effects of the construction and operation activities following implementation of the mitigation measures above is provided below.

- As surface water drainage design has been carried out in accordance with the GDSDS, and SUDS methodologies are being implemented as part of a water quality treatment train approach (run-off from the development’s impermeable areas is designed to be collected via a new stormwater network which incorporates on-line attenuation storage systems and SuDS features such as permeable paving, bio-retention areas, swales and tree pits to improve water quality in accordance with the principles of SuDS design. Which are all designed

to improve water quality), with imperceptible effects on the water and hydrogeological environment arising from the operational phase.

- Implementation of the measures outlined in Section 6.6 will ensure that the potential effects of the development on soils and the geological environment are minimised during the construction phase and that any residual effects will be short term and imperceptible.
- Residual effects from earthworks haulage and the risk of contamination of groundwater are deemed to be of minor risk following implementation of the measures outlined in Section 6.6. The residual effects for a residential development, and open space are deemed to be imperceptible post construction (during the operational phase).

6.7.1 Impact on Climate

The surface water drainage network, attenuation storage and site levels are designed to accommodate a 100-year storm event (provision for 20% climate change included). Floor levels of houses are set above the 100-year flood levels by a minimum of 0.5m. For storms in excess of 100 years, the development has been designed to provide overland flood routes along the various development roads towards the surface water drainage outfalls and existing roads. This overland flood route also reduces the development's vulnerability to climate change.

6.7.2 Impact on Human Health

Risks to human health include the accidental spills/ leaks of hydrocarbons/ oils entering the groundwater/surface water or potable water system. This impact following mitigation measures outlined in section 6.6 will result in an imperceptible impact to human health.

6.8 WORST CASE SCENARIO

Worst case scenarios envisioned are extreme occurrences of the potential effects identified above in conjunction with failure of mitigation measures including:

- Significant contamination event.
- Flooding due to extreme event or unsuitable drainage measures.

Given the scale of the site, low risk flood zoning and relatively standard nature of the works involved the likelihood of a "worst case" event is extremely low.

6.8.1 Construction Phase

Implementation of the measures outlined in Section 6.6.2 will ensure that the potential effects of the proposed development on water and the hydrogeological environment do not occur during the construction phase and that any residual effects will be short term.

6.8.2 Operational Phase

As surface water drainage design has been carried out in accordance with the GDSDS, and SuDS methodologies are being implemented as part of a treatment train approach, there are no predicted residual effects on the water and hydrogeological environment arising from the operational phase.

6.9 MONITORING

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above in section 6.6 including the Preliminary Construction Environmental Management Plan (PCEMP) (see Appendix D2 Volume III of the EIAR). It is recommended that any monitoring of any hazardous material stored on-site be carried out in accordance with the CEMP.

6.9.1 Construction Phase

- Contractors will adhere to the PCEMP and Mitigation Measures contained in this EIAR.

- Construction monitoring of the works (e.g. inspection of services and SUDS installation and backfill, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site)
- Monitoring sediment control measures (sediment retention tanks, surface water inlet protection etc.)

6.9.2 Operational Phase

Proposed monitoring during the operational phase in relation to the water and hydrogeological environment are as follows:

- The taking in charge of the water infrastructure will ensure the system is regularly inspected and maintained.
- The performance of all SuDS features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed hydrobrake, interceptor and gullies and all other SUDs features will be carried out to prevent contamination and increased runoff from the site.
- Monitoring of installed Foul

6.10 CUMULATIVE IMPACTS

The cumulative impacts include the recently constructed Graydon development scheme under planning reference ABP 305343-19 which compromises of 406 dwellings, a creche and associated site works, along with associated amendments as well as the subject Newcastle South which comprises of the construction of 280 no. dwellings along with open space and associated internal road infrastructure. In addition, there is a supermarket (PRR SD20A/0037) **along with associated amendments** located at the entrance to Graydon which is currently under construction. In addition, it is noted while the proposed development will be catered for by an underground pumping station as part of the proposed development, in the event there is an upgrade undertaken to the Newcastle Pumping Station (at Grant's View) to the east of Newcastle by Irish Water the potential cumulative effects to the water, hydrology, and hydrogeology of the local and surrounding area is deemed to be insignificant. As indicated by Irish Water, in the Confirmation of Feasibility, this SHD is not reliant on the Irish Water Newcastle pumping station project by reason of the installation of the on-site pumping station proposed.

The proposed surface water drainage infrastructure for both the Graydon residential development, the supermarket and the Newcastle South development has been designed in accordance with the GDSDS. Surface water run-off is designed to discharge at green-field run-off rates to mimic the current scenario.

Any other future development in the vicinity of the site would have to be similarly designed in relation to permitted surface water discharge, surface water attenuation and SuDS, therefore, no potential cumulative effects are anticipated in relation to surface water and flooding.

Overall, the impact on the hydrological and hydrogeological environment as a result of the wider developments in the area are considered to be long-term and imperceptible. Each project currently permitted or under construction is subject to EIA and/or planning conditions which include appropriate mitigation measures to minimise effects. Provided mitigation measures are in place at each of the developments, the overall effect is expected to be neutral.

6.11 DIFFICULTIES ENCOUNTERED

No difficulties were encountered in completing this section.

6.12 REFERENCES

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7.0 AIR QUALITY AND CLIMATE

7.1 INTRODUCTION

This chapter assesses the likely air quality and climate impacts associated with the proposed development for Cairn Homes Properties Ltd at Newcastle South. A full description of the development can be found in Chapter 2.

The development will consist of the construction of 280 no. dwellings, creche, open space and associated ancillary infrastructure on lands of c. 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to permitted creche c. 0.07 ha. in 'Graydon').

This chapter was completed by Dr. Avril Challoner, a Senior Environmental Consultant in the Air Quality section of AWN Consulting. She holds a BEng (Hons) in Environmental Engineering from the National University of Ireland Galway, HDip in Statistics from Trinity College Dublin and has completed a PhD in Environmental Engineering (Air Quality) in Trinity College Dublin. She is a Chartered Scientist (CSci), Member of the Institute of Air Quality Management and specialises in the fields of air quality, EIA and air dispersion modelling and has 10+ years' experience in the field of air quality.

7.2 LEGISLATION AND GUIDELINES

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

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – (EPA, 2022)
- Advice Note on Preparing Environmental Impact Statements – Draft (EPA, 2015)
- Advice Notes On Current Practice (In The Preparation Of Environmental Impact Statements) (EPA, 2003)
- Guidelines On Information To Be Contained in Environmental Impact Statements (EPA, 2002)
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013)
- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (Institute of Air Quality Management (IAQM), 2014)
- UK Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality (UK Highways Agency, 2019a)
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency, 2019b)
- Assessing Greenhouse Gas Emissions and Evaluating their Significance' (IEMA, 2022) and
- The Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011

7.2.1 Criteria for Rating of Impacts Air

7.2.1.1 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 7.1 and Appendix C 7.1 Volume III of the EIAR).

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 give effect to EU Directive 2008/50/EC, which has set limit values for a number of pollutants. The limit values for NO_2, PM_{10} and $PM_{2.5}$, are relevant to this assessment as these are traffic related pollutants (see Table 7.1). 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 C 7.1 Volume III of the EIAR).

Table 7.1 – Air Quality Standards Regulations

Pollutant	Regulation [Note 1]	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
		Critical level for protection of vegetation	30 µg/m^3 NO + NO_2
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3

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

7.2.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused 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 7.1 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, Heritage & Local Government (DEHLG, 2004) apply the dust deposition limit of 350 mg/(m^2*day) to the site boundary of quarries. This limit value will also be implemented with regard to dust impacts from construction of the proposed development.

7.2.1.3 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global Green House Gas ("GHG") emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the 2015 Act). The purpose of the Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*' (Section 3(1) of the 2015 Act. This is referred to in the Act as the '*national transition objective*'. The Act made provision for, *inter alia*, a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations. The 2015 Act was amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2015 Act as amended).

The key duty imposed on planning authorities by section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended) is:

1) A relevant body [eg, a planning authority] shall, in so far as practicable, perform its functions in a manner consistent with—
(a) the most recent approved climate action plan,

(b) the most recent approved national long term climate action strategy,

(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,

(d) the furtherance of the national climate objective, and

(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

The 2019 Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019a). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the next Climate Action Plan in November 2021 (Government of Ireland, 2021a). The plan contains similar elements as the 2019 CAP and aims to set out how Ireland can reduce our greenhouse gas emissions by 51% by 2030 (compared to 2018 levels) which is in line with the EU ambitions, and a longer-term goal of to achieving net-zero emissions no later than 2050. The 2021 CAP outlines that emissions from the Built Environment sector must be reduced to 4 -5 $MtCO_2e$ by 2030 in order to meet our climate targets. This will require further measures in addition to those committed to in the 2019 CAP. This will include phasing out the use of fossil fuels for the space and water heating of buildings, improving the fabric and energy of our buildings, and promoting the use of lower carbon alternatives in construction.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019 (Government of Ireland 2019b) followed by the passing of the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (hereafter referred to as the 2021 Climate Act) in July 2021 (Government of Ireland, 2021b). The 2021 Climate Act was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'*. The 2021 Climate Act will also '*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy*'. The 2021 Climate Act defines the carbon budget as '*the total amount of greenhouse gas emissions that are permitted during the budget period*'. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a '*local authority climate action plan'* lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

The South Dublin County Council (SDCC) Climate Action Plan (SDCC and Codema 2017) outlines SDCC's goals to mitigate GHG emissions and plans to prepare for and adapt to climate change. Appendix II of the SDCC Climate Action Plan states that transport accounted for 38.9% of SDCC total GHG emissions in 2016. Public transport accounted for 14.6% whilst private and commercial transport accounted for 24.2% of SDCC total GHG emissions in 2016. The SDCC Climate Action Plan states that SDCC aims to reduce car dependency by encouraging modal shifts from car to more sustainable modes, including public transport and cycling. Similar to DCC, SDCC states that it wishes to work with the relevant transportation bodies to introduce measures to achieve modal shifts and promote interchange between modes.

The SDCC Climate Action Plan highlights the risks that climate change poses to the transportation network, with risks mainly associated with extreme weather events. The SDCC Climate Action Plan notes that cold snaps and fluvial flooding have the greatest future risk when both the likelihood and consequence are accounted for. Increases in fluvial and pluvial flooding will cause road damage, which can lead to disruption of transport services.

7.2.2 Construction Phase Methodology

7.2.2.1 Air Quality

The assessment focuses on identifying the existing baseline levels (Section 7.3.2) of PM_{10} and $PM_{2.5}$ in the region of the proposed development by an assessment of EPA monitoring data. Thereafter, the impact of the construction phase of the development on air quality was determined by a qualitative assessment of the nature and scale of dust generating construction activities associated with the proposed development.

Construction phase traffic also has the potential to impact air quality and climate. The UK DMRB guidance (UK Highways Agency, 2019), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The use of the UK guidance is recommended by the TII (2011) in the absence of specific Irish guidance, this approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The construction stage traffic will not increase by 1,000 AADT or 200 HDV AADT as advised by the traffic consultants for the proposed project and therefore does not meet the above scoping criteria. As a result a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

7.2.2.2 Climate

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments LA 114 Climate (UK Highways Agency 2019b).

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency, 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. During the operational phase, if any of the road links impacted by the proposed development meet the below criteria then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy-duty vehicles annually; and
- A change in daily average speed of more than 20 km/hr.

The scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the construction stages based on a potential >1% change in emissions from the baseline scenario. The construction stage traffic will not increase by greater than the scoping criteria as advised by the traffic consultants for the proposed project. As a result a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to climate.

7.2.3 Operational Phase Methodology

7.2.3.1 Air Quality

The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2017) and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). Transport Infrastructure Ireland (TII) reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

In 2019 the UK Highways Agency DMRB air quality guidance was revised with *LA 105 Air Quality* replacing a number of key pieces of guidance (HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13, part of IAN 185/15). This revised document outlines a number of changes for air quality assessments in relation to road schemes, but can be applied to any development that causes a change in traffic. Previously the DMRB air quality spreadsheet was used for the majority of assessments in Ireland with detailed modelling only required if this screening tool indicated compliance issues with the EU air quality standards. Guidance from Transport Infrastructure Ireland (TII, 2011) recommends the use of the UK Highways Agency DMRB spreadsheet tool for assessing the air quality impacts from road schemes. However, the DMRB spreadsheet tool was last revised in 2007 and accounts for modelled years up to 2025. Vehicle emission standards up to Euro V are included but since 2017, Euro 6d standards are applicable for the new fleet. In addition, the model does not account for electric or hybrid vehicle use. Therefore, this a somewhat outdated assessment tool. The LA 105 guidance document states that the DMRB spreadsheet tool may still be used for simple air quality assessments where there is unlikely to be a breach of the air quality standards. Due to its use of a “dirtier” fleet, vehicle emissions would be considered to be higher than more modern models and therefore any results will be conservative in nature and will provide a worst-case assessment.

The 2019 UK Highways Agency DMRB air quality revised guidance *LA 105 Air Quality* states that modelling should be conducted for NO_2 for the base, opening and design years for both the do minimum (do nothing) and do something scenarios. Modelling of PM_{10} is only required for the base year to demonstrate that the air quality limit values in relation to PM_{10} are not breached. Where the air quality modelling indicates exceedances of the PM_{10} air quality limits in the base year then PM_{10} should be included in the air quality model in the do minimum and do something scenarios. Modelling of $PM_{2.5}$ is not required as there are currently no issues with compliance with regard to this pollutant as per EPA data discussed in Section 7.3.2. The modelling of PM_{10} can be used to show that the project does not impact on the $PM_{2.5}$ limit value as if compliance with the PM_{10} limit is achieved then compliance with the $PM_{2.5}$ limit will also be achieved. Historically modelling of carbon monoxide (CO) and benzene was required, however this is no longer

needed as concentrations of these pollutants have been monitored to be significantly below their air quality limit values in recent years, even in urban centres (EPA, 2021a). The key pollutant reviewed in this assessment is NO_2 as detailed in LA 105 (UKHA 2019)Concentrations of PM_{10} have been modelled for the base year (2022) to indicate that there are no potential compliance issues. Modelling of operational NO_2 concentrations has been conducted for the do nothing and do something scenarios for the opening year (2024) and design year (2039).

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 scoping criteria outlined in Section 7.2.2.1 has been used in the current assessment to determine the road links required for inclusion in the modelling assessment. Sensitive receptors within 200m of impacted road links are included within the modelling assessment. Pollutant concentrations are calculated at these sensitive receptor locations to determine the impact of the proposed development in terms of air quality. The guidance states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling (UK Highways Agency, 2019a). The TII guidance (2011) defines sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. A total of five high sensitivity residential receptors (R1 – R5) were included in the modelling assessment and are detailed in Figure 7.1

The following model inputs are required to complete the assessment using the DMRB spreadsheet tool: road layouts, receptor locations, annual average daily traffic movements (AADT), percentage heavy goods vehicles (%HGV), annual average traffic speeds and background concentrations. 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 document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. The TII significance criteria are outlined in Appendix 10 of the TII guidance and have been adopted for the proposed development. The significance criteria are based on NO_2 and PM_{10} as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3) as per EPA monitoring data and reporting (see Section 7.3.2).

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 NO_X 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 NOx 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 NOx to NO_2 calculator (2020) which was originally published in 2009 and is currently on version 8.1. This calculator (which can be downloaded in the form of an excel spreadsheet) accounts for the predicted availability of O_3 and proportion of NOx 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 Armagh, Banbridge and Craigavon' provides the most suitable relationship between NO_2 and NO_x for Ireland. The "All Non-Urban UK Traffic" traffic mix option was used.

Update to NO_2 Projections using DMRB

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 published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years. The IAN 170/12 methodology has been used in the current assessment to predict future concentrations of NO_2 as a result of the proposed development.

Traffic Data Used in Modelling Assessment

Traffic flow information was obtained from Atkins for the purposes of this assessment. Data for the Do Nothing and Do Something scenarios for the base year 2022, opening year 2024 and design year 2039 were provided. The traffic data is detailed in Table 7.2 with the %HGV shown in parenthesis below the AADT. Only road links that met the DMRB scoping criteria outlined in Section 7.2.2.1 and that were within 200m of receptors were included in the modelling assessment. Background concentrations have been included as per Section 7.3.2 of this chapter based on available EPA background monitoring data (EPA, 2021a).

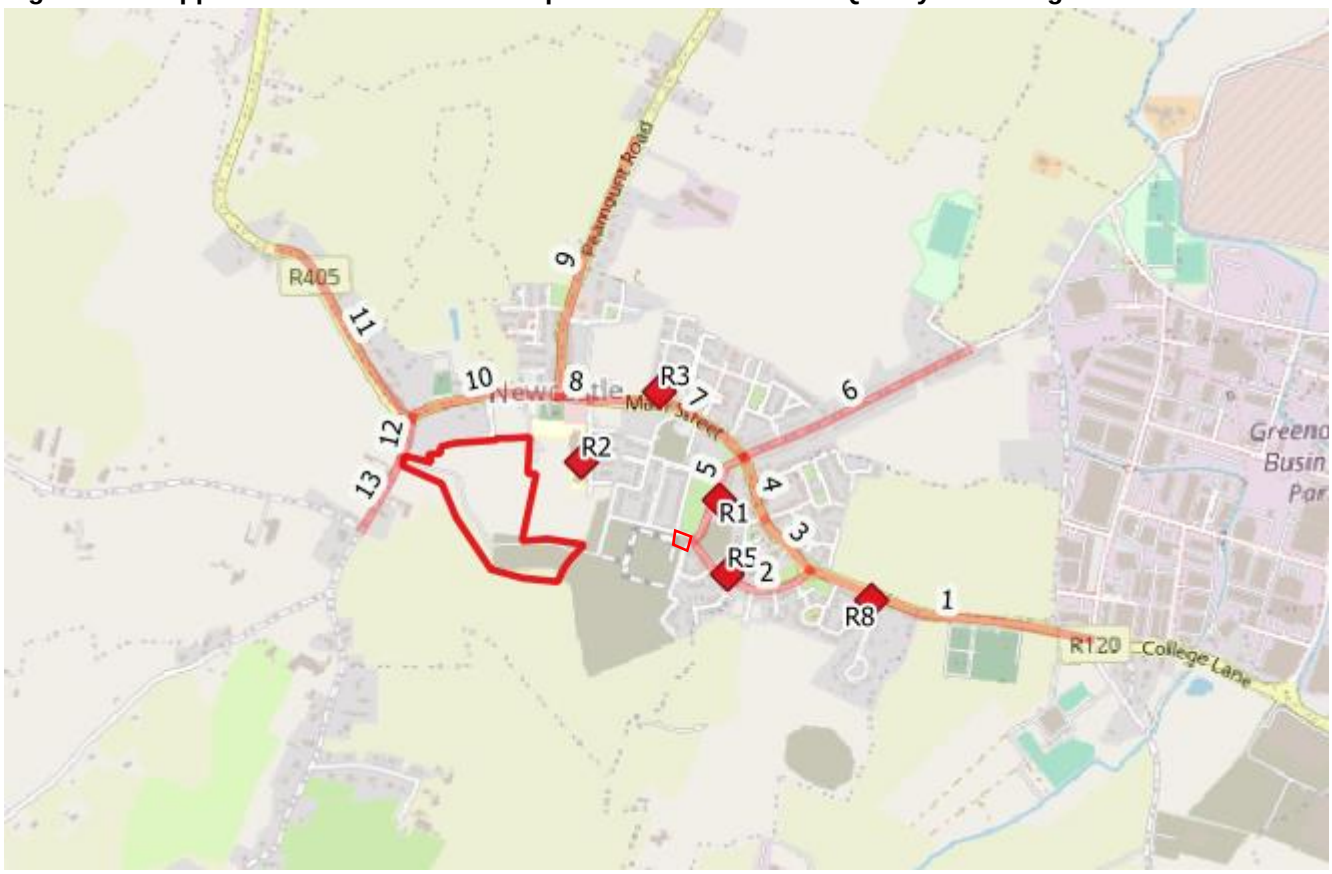
This traffic data has also been used in the operational stage climate impact assessment.

Table 7.2 – Traffic Data Used in Air & Climate Modelling Assessments

Link Number	*Speed (kph)*	*AADT Base Year*	*AADT Do-Nothing*		*AADT Do-Something*	
		2022	*2024*	*2039*	*2024*	*2039*
1	50	10145 (1.4%)	11543 (1.3%)	13012 (1.6%)	11605 (1.3%)	13239 (1.5%)
2	50	1744 (0%)	2179 (0%)	2552 (0%)	3813 (0%)	4250 (0%)
3	50	10378 (1.4%)	11410 (1.3%)	12912 (1.6%)	10216 (1.5%)	11741 (1.7%)
4	50	10073 (1.4%)	11102 (1.3%)	12560 (1.6%)	9883 (1.5%)	11364 (1.7%)
5	50	2626 (0.4%)	3190 (0.4%)	3571 (0.4%)	3340 (0.4%)	3810 (0.4%)
6	50	594 (0%)	763 (0%)	849 (0%)	857 (0%)	1010 (0%)
7	50	10250 (1.5%)	11614 (1.4%)	13098 (1.6%)	10452 (1.5%)	11981 (1.8%)
8	50	9817 (1.6%)	10897 (1.5%)	12319 (1.8%)	9623 (1.7%)	11045 (2%)
9	50	4320 (0.8%)	4906 (0.7%)	5598 (0.8%)	5089 (0.7%)	5805 (0.8%)
10	50	8668 (1.5%)	9588 (1.5%)	10889 (1.7%)	8297 (1.7%)	9574 (2%)
11	50	6069 (0.7%)	6523 (0.7%)	7402 (0.8%)	6581 (0.7%)	7505 (0.8%)
12	50	5408 (1.7%)	5687 (1.8%)	6471 (2%)	5991 (1.7%)	6842 (1.9%)
13	50	5170 (1.3%)	5412 (1.3%)	6157 (1.5%)	5437 (1.3%)	6199 (1.5%)

Note: HGV percentage in brackets

Figure 7.1 – Approximate Location of Receptors used in Local Air Quality Modelling Assessment



7.2.3.2 Climate

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* which has set a target of a 30% reduction in non-emission trading scheme (ETS) sector emissions by 2030 relative to 2005 levels.

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 7.3.4). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency, 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. During the operational phase, if any of the road links impacted by the proposed development meet the below criteria then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy-duty vehicles annually; and
- A change in daily average speed of more than 20 km/hr.

There are a number of road links that will experience an increase of 10% or more in the AADT. These road links have been included in the detailed climate assessment (see Table 7.2). 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 D in the UK Design Manual for Roads and Bridges (UK Highways Agency, 2007). The assessment focused on determining the resulting change in emissions of 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 project that causes a change in traffic. The inputs to the air dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds (see Table 7.2).

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. In addition to the EU guidance, the Institute of Environmental Management and Assessment (IEMA) guidance note on 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (IEMA, 2022) states that "the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". Mitigation has taken a leading role within the guidance compared to the previous edition published in 2017. Early stakeholder engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings.

7.3 RECEIVING ENVIRONMENT (BASELINE SCENARIO)

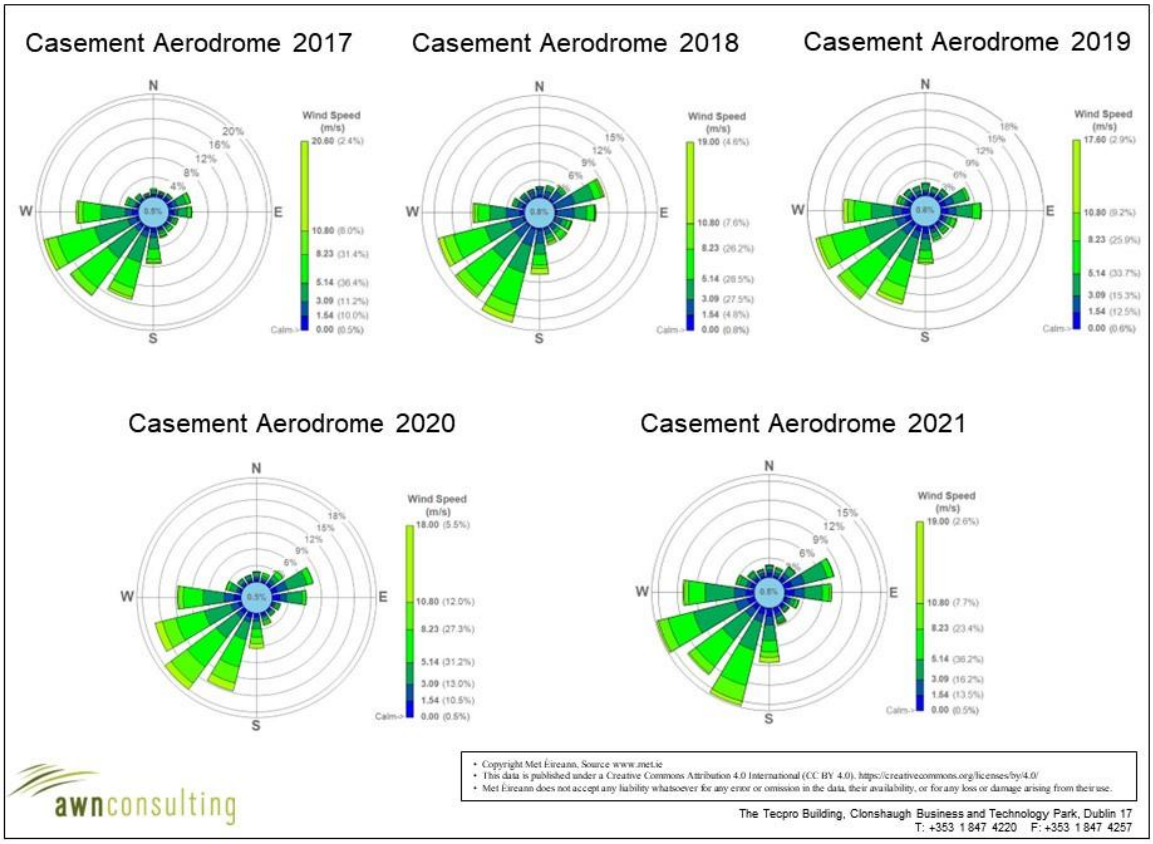
7.3.1 Meteorological Data

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 Casement Aerodrome meteorological station, which is located approximately 3.5 km west of the site. Casement Aerodrome met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 7.2). For data collated during five representative years (2017 – 2021), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.5 m/s over the 30-year period 1990 - 2010 (Met Eireann, 2022).

Figure 7.2 – Casement Aerodrome Windrose 2017 – 2021



7.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2020*" (EPA, 2021a). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2022).

As part of the implementation of the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2021b). 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 majority proposed greenway is within Zone A, with the section of the scheme to the west being in Zone C (EPA, 2022). With respect to background, as the majority of the scheme is within Zone A and this zone is worst case with respect to background concentrations, this zone will be reviewed as representative.

The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

In 2020 the EPA reported (EPA, 2021a) that Ireland was compliant with EU legal air quality limits at all locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA Air Quality in Ireland 2021 report details the effect that the Covid-19 restrictions had on air monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that CSO figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. For this reason, they have not been included in the baseline section and previous long-term data has been used to determine baseline levels of pollutants in the vicinity of the proposed development.

Long-term NO_2 monitoring was carried out at the Zone A urban background locations of Rathmines, Dún Laoghaire, Blanchardstown, Swords and Ballyfermot for the period 2015 - 2019 (EPA, 2021a). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3, average results range from 13 – 31 µg/m^3 for the suburban background locations. The NO_2 annual average for this five-year period suggests an upper average limit of no more than 19 µg/m^3 (Table 7.3) for the urban background locations. The monitoring site in Ballyfermot is considered more representative given its Zone A background location. Concentrations of NO_2 at the Ballyfermot site ranged from 16 – 20 µg/m^3 over the period 2015 – 2019. Based on the above information, a conservative estimate of the current background NO_2 concentration for the region of the proposed development is 20 µg/m^3.

Table 7.3 – Trends In Zone A Air Quality - Nitrogen Dioxide (NO_2)

Station	Averaging Period Note 1	Year				
		2015	2016	2017	2018	2019
Blanchardstown	Annual Mean NO_2 (µg/m^3)	25	30.2	26	25	31
	Max 1-hr NO_2 (µg/m^3)	141	128	147	131	143
Rathmines	Annual Mean NO_2 (µg/m^3)	18	20	17	20	22
	Max 1-hr NO_2 (µg/m^3)	106	102	116	138	183
Dun Laoghaire	Annual Mean NO_2 (µg/m^3)	16	19	17	19	15
	Max 1-hr NO_2 (µg/m^3)	103	142	153	135	104
Swords	Annual Mean NO_2 (µg/m^3)	13	16	14	16	15
	Max 1-hr NO_2 (µg/m^3)	170	206	107	112	108
Ballyfermot	Annual Mean NO_2 (µg/m^3)	16	17	17	17	20
	Max 1-hr NO_2 (µg/m^3)	142	127	148	217	124

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).
1-hour limit value - 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Continuous PM_{10} monitoring was carried out at five Zone A locations from 2015 - 2019, Ballyfermot, Rathmines, Blanchardstown, Dún Laoghaire, Tallaght and Phoenix Park. These showed an upper average limit of no more than 16 µg/m^3 (Table 7.4). Levels range from 9 - 19 µg/m^3 over the five-year period with at most 9 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m^3 in 2019 (35 exceedances are permitted per year) (EPA, 2021a). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 16 µg/m^3.

Table 7.4 – Trends In Zone A Air Quality - PM_{10}

Station	Averaging Period [Note 1]	Year				
		2015	2016	2017	2018	2019
Blanchardstown	Annual Mean PM_{10} (µg/m^3)	17	18	15	17	19
	24-hr Mean > 50 µg/m^3 (days)	36	33	36	32	31
Ballyfermot	Annual Mean PM_{10} (µg/m^3)	12	11	12	16	14
	24-hr Mean > 50 µg/m^3 (days)	3	0	1	0	7
Dún Laoghaire	Annual Mean PM_{10} (µg/m^3)	13	13	12	13	12
	24-hr Mean > 50 µg/m^3 (days)	3	0	2	0	2
Tallaght	Annual Mean PM_{10} (µg/m^3)	14	14	12	15	12
	24-hr Mean > 50 µg/m^3 (days)	4	0	2	1	3
Rathmines	Annual Mean PM_{10} (µg/m^3)	15	15	13	15	15
	24-hr Mean > 50 µg/m^3 (days)	5	3	5	2	9
Phoenix Park	Annual Mean PM_{10} (µg/m^3)	12	11	9	11	11
	24-hr Mean > 50 µg/m^3 (days)	2	0	1	0	2

Note1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).
Daily limit value - 50 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Average $PM_{2.5}$ levels in Rathmines over the period 2015 - 2019 ranged from 8 - 10 µg/m^3, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.53 – 0.68 (EPA, 2021a). Based on this information, a conservative ratio of 0.7 was used to generate an existing $PM_{2.5}$ concentration in the region of the development of 11.2 µg/m^3.

7.3.3 Dust Sensitivity Baseline

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) prior to assessing the impact of dust from a proposed development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time.

In terms of receptor sensitivity to dust soiling, there are between 10 and 100 high sensitivity residential properties which are less than 20 m of the proposed development boundary. Therefore, the overall sensitivity of the area to dust soiling impacts is considered high based on the IAQM criteria outlined in Table 7.5.

Table 7.5 – Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	**High**	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 16 µg/m^3 and there are between 10 and 100 high sensitivity residential properties which are less than 20 m of the proposed development site boundary. Based on the IAQM criteria outlined in Table 7.6, the worst-case sensitivity of the area to human health is considered to be low.

Table 7.6 – Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	< 24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	**Low**	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low	Low

Consideration has also been given to the IAQM document 'A guide to the assessment of air quality on designated conservation sites 2020' (IAQM 2020) with respect to ecologically sensitive receptors.

Dust deposition impacts on ecology can occur due to chemical or physical effects. This includes reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as acidity to soils. Often impacts will be reversible once the works are completed, and dust deposition ceases. Designated sites within 50m of the boundary of the site or within 50m of the route used by construction vehicles on public highways up to a distance of 500m from a construction site entrance can be affected according to the IAQM guidance (IAQM 2016). Based on the IAQM criteria outlined in **Error! Reference source not found.**, the worst-case sensitivity of the area to ecological impacts is considered not applicable due to the lack of designated sites within 50m.

Table 7.7 – Sensitivity of the Area to Ecology Impacts

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

7.3.4 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details provisional emissions up to 2020 (EPA, 2021b). The data published in 2021 states that Ireland will exceed its 2020 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.73 Mt. For 2021, total national greenhouse gas emissions are estimated to be 57.70 million tonnes carbon dioxide equivalent (Mt CO2eq) with 44.38 MtCO2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2021 at 37.1% of the total, with the transport sector accounting for 17.9% of emissions of CO2.

GHG emissions for 2020 are estimated to be 3.6% lower than those recorded in 2019. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for five years in a row. Emissions from 2016 – 2020 exceeded the annual EU targets by 0.29 $MtCO_2eq$, 2.94 $MtCO_2eq$, 5.57 $MtCO_2eq$,6.85 $MtCO_2eq$ and 6.73 $MtCO_2eq$ respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2020 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021c) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2 $MtCO_2eq$ under the "With Existing Measures" scenario and under the "With Additional Measures" scenario. The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the Climate Action Plan and the use of the flexibilities available (EPA, 2021c).

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

7.4.1 Potential Impacts – Construction Phases

7.4.1.1 Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m as per IAQM Guidance (IAQM 2014). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 7.3.3). The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

There is no demolition associated with the proposed development.

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes;
- **Small:** Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

The dust emission magnitude for the proposed earthwork activities can be classified as large as the total site area is greater than 10,000m^2. There are 40,000 m^3 of import material required and 60,000 m^3 to be excavated. Considering the sensitivity of the area (Section 7.3.3), there is a high risk of dust soiling and a low risk of human impacts from the proposed earthworks activities prior to mitigation according to the IAQM guidance (**Error! Reference source not found.**).

Table 7.8 – Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total building volume > 100,000 m^3, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small:** Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be conservatively classified as medium as the total construction volume will be between 25,000 m^3 and 100,000 m^3, though there will be no batching on site.

The sensitivity of the area (Section 7.3.3) is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. The total construction area is 25,660 m^2 residential and 293 m^2 non-residential. Given a standard ceiling height of 2.4 m, the construction volume is considered medium. As outlined in **Error! Reference source not found.** and considering the sensitivity of the area (Section 7.3.3), there is a medium risk of dust soiling and a low risk to human health from the proposed construction activities prior to mitigation according to the IAQM guidance.

Table 7.9 – Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium:** 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;
- **Small:** < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as large, as at worst-case peak periods there will be more than 100 m of unpaved roads. Considering the sensitivity of the area (Section 3.1.3), there is a high risk of dust soiling and a low risk to human health from the proposed trackout activities prior to mitigation according to the IAQM guidance. As outlined in **Error! Reference source not found.**, this results in an overall low risk of dust soiling impacts and human health impacts as a result of the proposed trackout activities.

Table 7.10 – Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Dust Emission Risk (In the absence of Mitigation)

The risk of dust impacts as a result of the proposed development are summarised in **Error! Reference source not found.** for each activity. The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity in order to prevent significant impacts occurring.

There is a high risk of dust soiling and ecology impacts associated with the proposed works and a low risk of human health impacts, best practice dust mitigation measures (see Section 7.5) will be implemented to ensure there are no impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be short-term, negative and imperceptible.

Table 7.11 – Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Emission Magnitude	N/A	Large	Medium	Large
Dust Soiling Risk	N/A	High Risk	Medium Risk	High Risk
Human Health Risk	N/A	Low Risk	Low Risk	Low Risk
Ecology Risk	N/A	N/A	N/A	N/A

7.4.1.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate.

Embodied carbon is carbon dioxide emitted during the manufacture, transport and construction of building materials, together with end-of-life emissions. Given the scale of the development these are not considered to be significant compared to Irelands 2030 GHG emission commitments.

Therefore, the impact on climate is considered to be imperceptible, neutral and short-term.

7.4.2 Operational Phase Impacts

7.4.2.1 Air Quality

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The traffic data includes the Do Something scenario (see Traffic Impact Assessment for further details) which includes the traffic associated with the proposed development, the permitted development to the north of the site and the redistribution of traffic as a result of the construction of the proposed development. This scenario is considered the worst-case scenario in terms of traffic emissions and allows for the most conservative assessment. The impact of NO_2 emissions for the 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 impacts, to be determined.

Transport Infrastructure Ireland's document Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (2011) detail a methodology for determining air quality impact significance criteria for road schemes and this can be applied to any development that causes a change in traffic. 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.

The results of the assessment of the impact of the proposed development on NO_2 in the opening year 2024 are shown in Table 7.12 and for design year 2039 are shown in **Error! Reference source not found.**. The annual average concentration is in compliance with the limit value at all worst-case receptors in 2024 and 2039. Concentrations of NO_2 are at most 56% of the annual limit value in 2024 and at most 57% in 2039. In addition, 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 in any modelled year).

The addition of the proposed development redistributes traffic on the surrounding road network leading to decreases in traffic volumes on some roads as shown in Table 7.2. The impact of the proposed development on annual mean NO_2 concentrations can be assessed relative to "Do Nothing (DN)" levels. Relative to baseline levels, there are predicted to be some imperceptible changes in NO_2 concentrations at all receptors. Concentrations at worst-case receptor R5 will increase by at most 0.35 µg/m^3 in 2024 and 0.36 µg/m^3 in 2039.

Using the assessment criteria outlined in Appendix 10 of the TII guidance (TII, 2011) the impact of the proposed development in terms of NO_2 is considered negligible. Therefore, the overall impact of NO_2 concentrations as a result of the proposed development is long-term, neutral and imperceptible all receptors assessed.

Concentrations of PM_{10} were modelled for the baseline year of 2022. The modelling showed that concentrations were in compliance with the annual limit value of 40 µg/m^3 at all receptors assessed, therefore, further modelling for the opening and design years was not required in accordance with LA 105 (UKHA 2019) as there is no chance of an exceedance of the limit value. Concentrations reached at most 0.5 µg/m^3. When a background concentration of 16 µg/m^3 is included the overall impact is 41% of the annual limit value at the worst case receptor.

The impact of the proposed development on ambient air quality in the operational stage is considered long-term, localised, neutral and imperceptible and therefore no mitigation is required.

Table 7.12 – Predicted Annual Mean NO_2 Concentrations – Opening Year 2024 (µg/m^3)

Receptor	Opening Year 2024				
	DN	DS	DS-DN	Magnitude	Description
R1	20.2	20.2	-0.01	Imperceptible	Negligible
R2	20.1	20.1	-0.04	Imperceptible	Negligible
R3	22.1	21.8	-0.21	Imperceptible	Negligible
R4	22.2	22.2	0.02	Imperceptible	Negligible
R5	20.3	20.6	0.35	Imperceptible	Negligible

Table 7.13 – Predicted Annual Mean NO_2 Concentrations – Design Year 2039 (µg/m^3)

Receptor	Design Year 2039				
	DN	DS	DS-DN	Magnitude	Description
R1	20.5	20.5	0.01	Imperceptible	Negligible
R2	20.5	20.4	-0.04	Imperceptible	Negligible
R3	22.7	22.5	-0.19	Imperceptible	Negligible
R4	22.8	22.8	0.04	Imperceptible	Negligible
R5	20.6	21.0	0.36	Imperceptible	Negligible

Table 7.14 – Predicted 99.8th percentile of Daily Maximum 1-hour NO_2 Concentrations (µg/m^3)

Receptor	Opening Year 2024		Design Year 2039	
	DN	DS	DN	DS
R1	70.6	70.6	67.6	67.6
R2	70.3	70.2	67.3	67.2
R3	77.2	76.5	74.7	74.1
R4	77.6	77.6	75.2	75.3
R5	70.9	72.1	67.9	69.1

7.4.2.2 Climate

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years, see Chapter 6 (Water and Hydrology). The site's flood zone category is Zone C, as per the Flood Risk Assessment prepared by DBFL. The Pluvial flood risk has been considered by designing the drainage system, swale, the culvert and attenuation storage design allow for a 20% increase in rainfall intensities due to future climate change on top of the 1:100 year flow.

However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years as part of the design of this development. Therefore, the operational phase impact on climate will be long-term, localised, neutral and imperceptible.

There is also the potential for increased traffic volumes to impact climate. The predicted concentrations of CO_2 for the future years of 2024 and 2039 are detailed in Table 7.15 These are significantly less than the 2024 and 2030 targets set out under EU legislation (targets beyond 2030 are not available). It is predicted that in 2024 the proposed development will decrease CO_2 emissions by 0.000138% of the EU 2024 target. Similarly low increases in CO_2 emissions are predicted to occur in 2039 with emissions decreasing by 0.000156% of the EU 2030 target. Therefore, the potential climate impact of the proposed development is considered negative, long-term and imperceptible.

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. These are outlined fully within the Energy Statement prepared by Waterman Moylan Consulting Engineers and are summarised below.

The development will be a Nearly Zero Energy Building (NZEB) in accordance with the Part L2021 requirements. Each building will have a Building Energy Rating (BER) that will comply with the Part L requirements. The following measures, or similar will be incorporated into the proposed development to achieve a more energy efficient (i.e. less carbon intensive) design. All measures will be reviewed at the detailed design stage and the most appropriate options will be implemented.

- High performance U-values;
- Improved air tightness;
- Improved thermal transmittance and thermal bridging;
- Use of renewable technologies to ensure energy consumption is in line with the Part L 2021 requirements

The development will incorporate bicycle parking spaces within the proposed development to promote the use of sustainable transport. In addition, to the development will include electric vehicle (EV) charging spaces and infrastructure for additional charging spaces. Overall these measures will aid in reducing the impact to climate during the operational phase of the proposed development.

Table 7.15 – Climate Impact Assessment

Year	Scenario	CO_2 (tonnes/annum)
2024	Do Nothing	910
	Do Something	855
2039	Do Nothing	1039
	Do Something	988
Increment in 2024		-55.3 Tonnes
Increment in 2039		-51.5 Tonnes
Emission Ceiling (kilo Tonnes) 2024		**40,113** Note 1
Emission Ceiling (kilo Tonnes) 2030		**33,381** Note 1
Impact in 2024 (%)		-0.000138%
Impact in 2039 (%)		-0.000156%

Note 1 Target under *Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013*

7.4.3 'Do Nothing' Impact

Under the Do-Nothing Scenario no construction works will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. The 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 new developments in the surrounding industrial estates, changes in road traffic, etc.). Therefore, this scenario can be considered neutral in terms of both air quality and climate.

7.4.4 Risk to 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.

As the operational phase air dispersion modelling has shown that emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are long-term, neutral and imperceptible.

7.5 AVOIDANCE, REMEDIAL AND MITIGATION MEASURES

7.5.1 Construction Phase

The proactive control of fugitive dust will ensure the prevention of significant emissions. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix C 7.2 Volume III of the EIAR. These measures have been incorporated into the overall Construction Environmental Management Plan (CEMP) prepared in respect of the proposed development.

In summary the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed by a suitable person appointed by the successful construction contractor. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Impacts to climate during the construction stage are predicted to be imperceptible however, good practice measures will be incorporated to ensure potential impacts are lessened. These include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

7.5.2 Operational Phase

The impact of the operational traffic associated with proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required other than those set out in Section 0 in relation to operational phase energy usage.

7.6 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

7.6.1 Construction Phase

7.6.1.1 Air Quality

Once the dust minimisation measures outlined in Section 7.5.1 and the Dust Management Plan (Appendix C 7.2 Volume III of the EIAR) are implemented, the impact of the proposed development in terms of dust soiling will be short-term, negative, localised and imperceptible at nearby receptors.

7.6.1.2 Climate

According to the IAQM guidance (2014) site traffic, plant and machinery are unlikely to have a significant impact on climate. Therefore the predicted impact is short-term, neutral and imperceptible.

7.6.1.3 Human Health

Best practice mitigation measures (see Section 7.5.1) 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.

7.6.2 Operational Phase

7.6.2.1 Air Quality

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the UK DMRB model. The modelling assessment determined that the change in emissions of NO_2 at nearby sensitive receptors as a result of the proposed development will be imperceptible. Therefore, the operational phase impact to air quality is long-term, localised, neutral and imperceptible.

7.6.2.2 Climate

Modelling of operational phase CO_2 emissions as a result of the traffic associated with the proposed development was carried out to determine the impact to climate. It was found that emissions of CO_2 will increase by an imperceptible amount as a result of the proposed development and are significantly below the EU 2024 and 2030 GHG targets. The operational phase impact to climate is long-term, negative and imperceptible. In addition, the proposed development has been designed to reduce the impact to climate where possible during operation.

7.6.2.3 Human Health

As the air dispersion modelling has shown that emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are long-term, neutral and imperceptible.

7.7 CUMULATIVE IMPACTS

7.7.1 Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction of any other permitted developments within 350m of the site then there is the potential for cumulative dust impacts to the nearby sensitive receptors. There is the potential for cumulative construction dust impacts should the construction phases overlap with that of the proposed development. The follow developments are considered for the potential for cumulative impacts:

- SD20A/0192 (Ballynakelly, Newcastle, Co. Dublin);
- SD20A/0186 (Newcastle South & Ballynakelly, Newcastle, Co. Dublin);
- SD20A/0178 (Newcastle South, Newcastle, Co. Dublin);
- SD20A/0037 (Main Street, Newcastle, Co. Dublin);
- SHD3ABP-305343-19 (Newcastle South & Ballynakelly, Newcastle, Co. Dublin);
- SD19A/0040 (Cornerpark, Peamount Road, Newcastle, Co. Dublin);
- SD18A/0363 (Main Street, Newcastle, Co. Dublin);
- SD17A/0010 (Drumlonagher, Main Street, Newcastle, Co. Dublin.);
- SD17A/0378 (Newcastle, Co. Dublin) and
- SD14A/0021/EP (Ballynakelly & Rathcreedon, Newcastle, Co. Dublin).
- Future Irish Water Newcastle Pump Station Upgrade

However, the dust mitigation measures outlined in Appendix C 7.2 Volume III of the EIAR will be applied throughout the construction phase of the proposed development which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development are deemed short-term, negative and imperceptible.

According to the IAQM guidance (2014) site traffic, plant and machinery are unlikely to have a significant impact on climate. Therefore, cumulative impacts are not predicted.

7.7.2 Operational Phase

Cumulative impacts have been incorporated into the traffic data supplied for the operational stage air and climate modelling assessments where such information was available. The results of the modelling assessment (section 7.6.2) show that there is a long-term, neutral and imperceptible impact to air quality and climate during the operational stage.

7.8 MONITORING

7.8.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development will be completed 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 2 m above ground level. The TA Luft limit value is 350 mg/(m^2*day) during the monitoring period between 28 - 32 days.

7.8.2 Operational Phase

There is no required monitoring during the operational phase as there are no significant potential impacts.

7.9 REINSTATEMENT

Not applicable to air quality and climate.

7.10 INTERACTIONS

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the demolition, construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is short-term, negative and imperceptible with respect to the construction phase and long-term, neutral and imperceptible with respect to the operational phase.

Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality have been identified.

7.11 RESIDUAL IMPACTS

7.11.1 Construction Phase

With the implementation of the dust mitigation measures, associated with a high level of dust control, outlined in Section 7.5.1 and Appendix C 7.2 Volume III of the EIAR dust likely effect from the construction phase will be localised, imperceptible, negative and short-term but will not pose a nuisance at nearby receptors.

7.11.2 Operational Phase

The air modelling assessment conducted in Section 7.8 found no significant impacts as a result of traffic related to the proposed development. It was determined that the likely effect to air quality as a result of increased traffic volumes during the operational phase of the proposed development is localised, negative, imperceptible and long-term.

The climate modelling assessment found that the increased traffic associated with the proposed development will cause an imperceptible increase in CO_2 emissions. Overall, the likely effect to climate is considered long-term, negative and imperceptible.

7.12 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

There were no difficulties encountered when compiling this assessment.

7.13 REFERENCES

BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites

Department of the Environment, Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities

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Fingal County Council & Codema (2019) Fingal County Council Climate Change Action Plan 2019 -2024

German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft

Government of Ireland (2015) Climate Action and Low Carbon Development Act

Government of Ireland (2019a) Climate Action Plan 2019

Government of Ireland (2019b) Draft General Scheme of the Climate Action (Amendment) Bill 2019

Government of Ireland (2021a) Climate Action Plan 2021

Government of Ireland (2021b) Climate Action and Low Carbon Development (Amendment) Act 2021

Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1

Institute of Environmental Management and Assessment (IEMA) (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance

Met Éireann (2022) Met Eireann website: https://www.met.ie/

The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings

SDCC and Codema (2019). South Dublin Council Climate Change Action Plan 2019 - 2024

Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes

UK DEFRA (2016) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM. PG(16)

UK DEFRA (2018) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG(16)

UK DEFRA (2020) NO_x to NO_2 Conversion Spreadsheet (Version 8.1)

UK Highways Agency (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 - HA207/07 (Document & Calculation Spreadsheet)

UK Highways Agency (2019a) UK Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality

UK Highways Agency (2019b) UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate

UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance

USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures

World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)

8.0 NOISE AND VIBRATION

8.1 INTRODUCTION

This section of the EIAR has been prepared by AWN Consulting Limited to assess the noise and vibration impact of the proposed development in the context of current relevant standards and guidance. This assessment has been prepared by Leo Williams BAI MAI PgDip AMIOA, Acoustic Consultant at AWN who has over 5 years' experience as an environmental consultant specialising in Acoustics and Environmental Impact Assessment.

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 impact associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment. 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 control the noise and vibration emissions associated with both the construction and operational phases of the proposed development.

8.2 STUDY METHODOLOGY

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out in the following sections. In addition to specific noise and vibration guidance documents, the following Environmental Protection Agency (EPA) guidelines were considered and consulted in the preparation of this Chapter:

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022); and
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018).

The study has been undertaken using the following methodology:

- 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, this is summarised in the following sections;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the project at the nearest sensitive locations (NSLs) to the site;
- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at the most sensitive locations surrounding the development site;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development; and,
- A summary of post-mitigation effects is provided, i.e. residual effects on surrounding environment and sensitive receptors

8.2.1 Construction Phase Impact Assessment Criteria

8.2.1.1 Noise Criteria

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local Authorities typically control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion based on guidance contained in British Standards.

British Standard BS 5228 – 1: 2009+A1:2014

Reference is made to British Standard *BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise* (hereinafter referred to as BS 5228) as appropriate criteria relating to permissible construction noise threshold levels for a development of this scale may be found in BS 5228.

Potential noise impacts during the construction stage of a project are assessed in accordance with BS 5228. Various mechanisms are presented as examples of determining if an impact is occurring, these are discussed in the following paragraphs.

ABC Method

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing 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, depending on context.

BS 5228 sets out guidance on permissible noise levels relative to the existing noise environment. Table 9.1 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Table 8.1 – Example Threshold of Significant Effect at Dwellings

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

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

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

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

D. 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5 dB. If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur. It should be noted that this assessment method is only valid for residential properties and if applied to commercial premises without consideration of other factors may result in an excessively onerous thresholds being set.

The closest neighbouring noise sensitive properties to the proposed development, which are described in later sections, are existing dwellings within the site, to the west of both the northern and southern sectors of the proposed development.

Fixed Limits

Review of the proposed development surroundings identified St Finian's National School located 110m to the east of the subject site.

When considering non-residential receptors, reference is made to BS 5228, which gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. For example, paragraph E.2 states:

"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."

Paragraph E.2 goes on to state:

"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;
75 decibels (dBA) in urban areas near main roads in heavy industrial areas".

Proposed Threshold Noise Levels

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see Section 8.3), BS 5228 has been used to inform the assessment approach for construction noise.

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development:

- For residential NSLs it is considered appropriate to adopt 65 dB(A) CNT depending on existing noise level. Given the baseline monitoring carried out, it would indicate that Category A values are appropriate using the ABC method.
- For non-residential NSLs it is considered appropriate to adopt the 70 dB(A) CNT, given the urban environment in which the community centre resides, in line with BS 5228.

Interpretation of the CNT

In order to assist with interpretation of CNTs, reference is made to *DMRB Noise and Vibration* (UKHA 2020) which includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of the DMRB document and adapted to include the relevant significance effects from the *EPA Guidelines* (EPA 2022).

Table 8.2 – Construction Noise Significance Ratings

Guidelines for Noise Impact Assessment Significance (DMRB)	CNT per Period	EPA EIAR Significance Effects	Determination
Negligible	Below or equal to baseline noise level	Not Significant	Depending on CNT, duration & baseline noise level
Minor	Above baseline noise level and below or equal to CNT	Slight to Moderate	
Moderate	Above CNT and below or equal to CNT +5 dB	Moderate to Significant	
Major	Above CNT +5 to +15 dB	Significant, to Very Significant	

The adopted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

Construction Traffic

In order to assist with the interpretation of construction traffic noise, Table 8.3**Error! Reference source not found.** includes guidance as to the likely magnitude of impact associated with changes in traffic noise levels along an existing road. This is taken from Table 3.17 of the DMRB document.

Table 8.3 – Likely Effect Associated with Change in Traffic Noise Level – Construction Phase

Magnitude of Impact	Increase in Traffic Noise Level (dB)
Negligible	Less than 1.0
Minor	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major	Greater than or equal to 5.0

In accordance with the *DMRB Noise and Vibration*, construction noise and construction traffic noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights;
- A total number of days exceeding 40 in any six consecutive months.

8.2.1.2 Vibration Criteria

Vibration standards address two aspects: those dealing with cosmetic or structural damage to buildings and those with human comfort. For the purpose of this scheme, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

Building Damage

With respect to 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 8.4 are recommended.

There are several protected structures (including Tower House – a protected structure) located to the west of the subject site, approximately 20m from areas of major construction. Therefore, on a precautionary basis, the guidance values for structurally sound buildings are reduced by 50% in line with the guidance documents referred to above. The following vibration limits are to be adhered to in order to prevent damage to all structures in proximity to works and is included Construction and Environmental Management Plan for the proposed development.

Table 8.4 – Recommended Vibration Criteria During Construction Phase

Building Category	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
Structurally sound and non-protected buildings	12 mm/s	20 mm/s	50 mm/s
Protected and /or potentially vulnerable buildings	6 mm/s	10 mm/s	25 mm/s

Expected vibration levels from the construction works will be discussed further in Section 8.5.1.2.

Human Perception

People are sensitive to vibration stimuli at levels orders of magnitude below those which have the potential to cause any cosmetic damage to buildings. There are no current standards which provide guidance on typical ranges of human response to vibration in terms of PPV for continuous or intermittent vibration sources.

BS5228-2, provides a useful guide relating to the assessment of human response to vibration in terms of the PPV. Whilst the guide values are used to compare typical human response to construction works, they tend to relate closely to general levels of vibration perception from other general sources.

Table 8.5 below summarises the range of vibration values and the associated potential effects on humans.

Table 8.5 – Guidance on Effects of Human Response to PPV Magnitudes

Vibration Level, PPV	Effect
0.140mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3mm/s	Vibration might be just perceptible in residential environments.
1mm/s	It is likely that a vibration level of this magnitude in residential environments will cause complaint.

Vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin and or the duration of vibration is known. For example, ground breaking can typically be tolerated at vibration levels up to 2.5 mm/s if adequate public relations are in place and timeframes are known. These values refer to the day-time periods only.

During surface construction works (ground breaking etc.) the vibration limits set within would be perceptible to building occupants and have the potential to cause subjective effects. The level of effect is, however, greatly reduced when the origin and time frame of the works are known and limit values relating to structural integrity are adequately communicated. In this regard, the use of clear communication and information circulars relating to planned works, their duration and vibration monitoring can significantly reduce vibration effects to the neighbouring properties.

Interpretation of Human Response to Vibration

In order to assist with interpretation of vibration thresholds, Table 8.6 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2.

Table 8.6 – Human Response Vibration Significance Ratings

Criteria	Impact Magnitude	Significance Rating
≥10 mm/s PPV	Very High	Very Significant
≥1 mm/s PPV	High	Moderate to Significant
≥0.3 mm/s PPV	Medium	Slight to Moderate
≥0.14 mm/s PPV	Low	Not significant to Slight
Less than 0.14 mm/s PPV	Very Low	Imperceptible to Not significant

8.2.2 Operational Phase Impact Assessment Criteria

8.2.2.1 Mechanical Plant

The most appropriate standard used to assess the impact of a new continuous source (i.e. plant items) to a residential environment is BS 4142 *Methods for rating and assessing industrial and commercial sound* (2014). This standard describes a method for assessing the impact of a specific noise source at a specific location with respect to the increase in "background" noise level that the specific noise source generates. The standard provides the following definitions that are pertinent to this application:

- "*Specific sound level,* $L_{Aeq,\ Tr}$" is equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *T*. This level has been determined with reference to manufacturers information for specific plant items.

- "*Rating level*" $L_{Ar,Tr}$ is the specific noise level plus adjustments for the character features of the sound (if any), and;

- *"Background noise level"* is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T.* This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

The assessment procedure in BS4142: 2014 is outlined as follows:

1. determine the specific noise level;
2. determine the rating level as appropriate;
3. determine the background noise level, and;
4. subtract the background noise level from the specific noise level in order to calculate the assessment level.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. A difference of +10 dB or more is likely to be an indication of a significant adverse impact. A difference of around +5 dB is likely to be an indication of an adverse impact, dependent on the context. Where the rated plant noise level is equivalent to the background noise level, noise impacts are typically considered to be neutral.

8.2.2.2 Additional Vehicular Traffic on Surrounding Roads

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the development will make use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with the development. In order to assist with the interpretation of the noise associated with additional vehicular traffic on public roads, Table 8.7 is taken from DMRB Design Manual for Roads and Bridges (DMRB), Highways England Company Limited, Transport Scotland, The Welsh Government and The Department for Regional Development Northern Ireland, (2020).

Table 8.7 – Significance in Change of Noise Level

Change in Sound Level (dB)	Subjective Reaction	Magnitude of Impact	EPA Glossary of Effects[14]
10+	Over a doubling of loudness	Major	Significant
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate
3 – 4.9	Perceptible	Minor	Slight
0.1 – 2.9	Imperceptible	Negligible	Imperceptible
0	None	No Change	Neutral

The guidance outlined in Table 8.7 will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely long-term impacts during the operational phase.

8.2.2.3 Vibration

The development is residential in nature, therefore it is not anticipated that there will be any impact associated with vibration during the operational phase.

8.3 RECEIVING ENVIRONMENT

8.3.1 Baseline Noise Environment

Baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site.

The subject site is located within Newcastle Co. Dublin. The site is bounded to the north by the R405 road and residential properties, open agricultural fields to the south and to the east and west, are residential developments

[14] EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (May 2022)

and local roads. The existing noise environment is dictated by road traffic, intermittent air traffic movements and construction noise.

8.3.2 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.

8.3.2.1 Choice of Measurement Locations

The measurement locations are described below and shown in Figure 8.1.

AN1 Selected to capture the daytime noise environment at the properties to the west of the site. 3 rounds of attended measurements were carried out at this location.

AN2 Selected to capture the daytime noise environment at the properties to the north of the site. 3 rounds of attended measurements were carries out at this location.

AN3 Selected to capture the daytime noise environment at the properties to the east of the proposed site. 3 rounds of attended measurements were carried out at this location.

Figure 8.1 – Noise Monitoring Locations

(Image Source: Google Earth, annotated by AWN 2022)

8.3.2.2 Survey Periods

Table 8.8 – Survey Periods

Aspect	Survey Position	Survey Period
Noise	AN1	13:31hrs to 16:49hrs on 27 April 2022
	AN2	
	AN3	

The survey was carried out during a daytime period, representative of the prevailing noise environment at the proposed development site.

8.3.2.3 Instrumentation

The noise measurements were carried out using the equipment listed below. The instrument was calibrated before and after the survey with no significant drift noted.

Table 8.9 – Noise Monitoring Equipment Details

Measurement	Manufacturer	Equipment Model	Serial Number	Calibration date
Sound Level Meter	Rion	NL-52	01076328	21 August 2020
Calibrator	Brüel & Kjær	Type 4231	2022651	01 February 2022

8.3.2.4 Measurement Parameters

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

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

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

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

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

8.3.2.5 Survey Results and Discussion

The results of the noise survey at the two monitoring locations are summarised below.

Location AN1

Table 8.10 – Measured Noise Levels at AN1

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
27 April 2022	13:31	66	87	45
	14:36	65	85	52
	15:55	66	95	51

The primary noise contributors at location AN1 were road traffic noise. The dominating noise sources were vehicles slowing to pass over speed control measures close to the measurement position. Other noise sources included birdsong and occasional air traffic movements.

The average noise levels at this location were in the range of 64 to 66 dB $L_{Aeq,15mins.}$ The background noise levels measured were measured at 45 to 47 dB $L_{A90,15mins.}$

Location AN2

Table 8.11 – Measured Noise Levels at AN2

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
27 April 2022	13:52	48	61	45
	15:14	52	66	47
	16:14	54	72	44

The noise contributors at location AN2 were distant site works from the field adjacent to the measurement position and the occasional movement of aircraft overhead. Other contributing factors included birdsong and distant road traffic noise from the R405.

The average noise levels at this location were in the range of 48 to 54 dB $L_{Aeq,15mins.}$ The background noise levels measured were measured at 44 to 47 dB $L_{A90,15mins.}$

Location AN3

Table 8.12 – Measured Noise Levels at AN3

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
27 April 2022	14:16	53	73	46
	15:34	52	72	46
	16:34	47	69	43

The noise contributors at AN3 were construction works including power tools, vehicle movements and vehicle reversing alarms. Both birdsong and distant road traffic were also noted contributors to the noise environment at this measurement location.

The average noise levels at this location were in the range of 47 to 53 dB $L_{Aeq,15mins.}$ The background noise levels measured were measured at 43 to 46 dB $L_{A90,15mins.}$

8.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will consist of the construction of 280 dwellings, 778 sqm creche, open space areas, a below ground level pumping station and all ancillary site development works.

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

- Construction and demolition phase; and,
- Operational phase.

The construction phase will involve excavation over the development site, construction of foundations and buildings, landscaping, and vehicle movements to site using the local road network. This phase will generate the highest potential noise impact due to the works involved, however the time frame is short term in nature.

The primary sources of outward noise in the operational context are link to the operation of the proposed development and therefore are permanent in duration and will comprise traffic movements to the development site using the existing road network and plant noise emissions from the completed buildings. These issues are discussed in detail in the following sections.

A full description of the proposed development is set out in Chapter 2 – Description of the Proposed Development.

8.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The potential noise and vibration impacts associated with the construction and operational phases of the proposed development are discussed in the following sections.

8.5.1 Construction Impacts

8.5.1.1 Noise

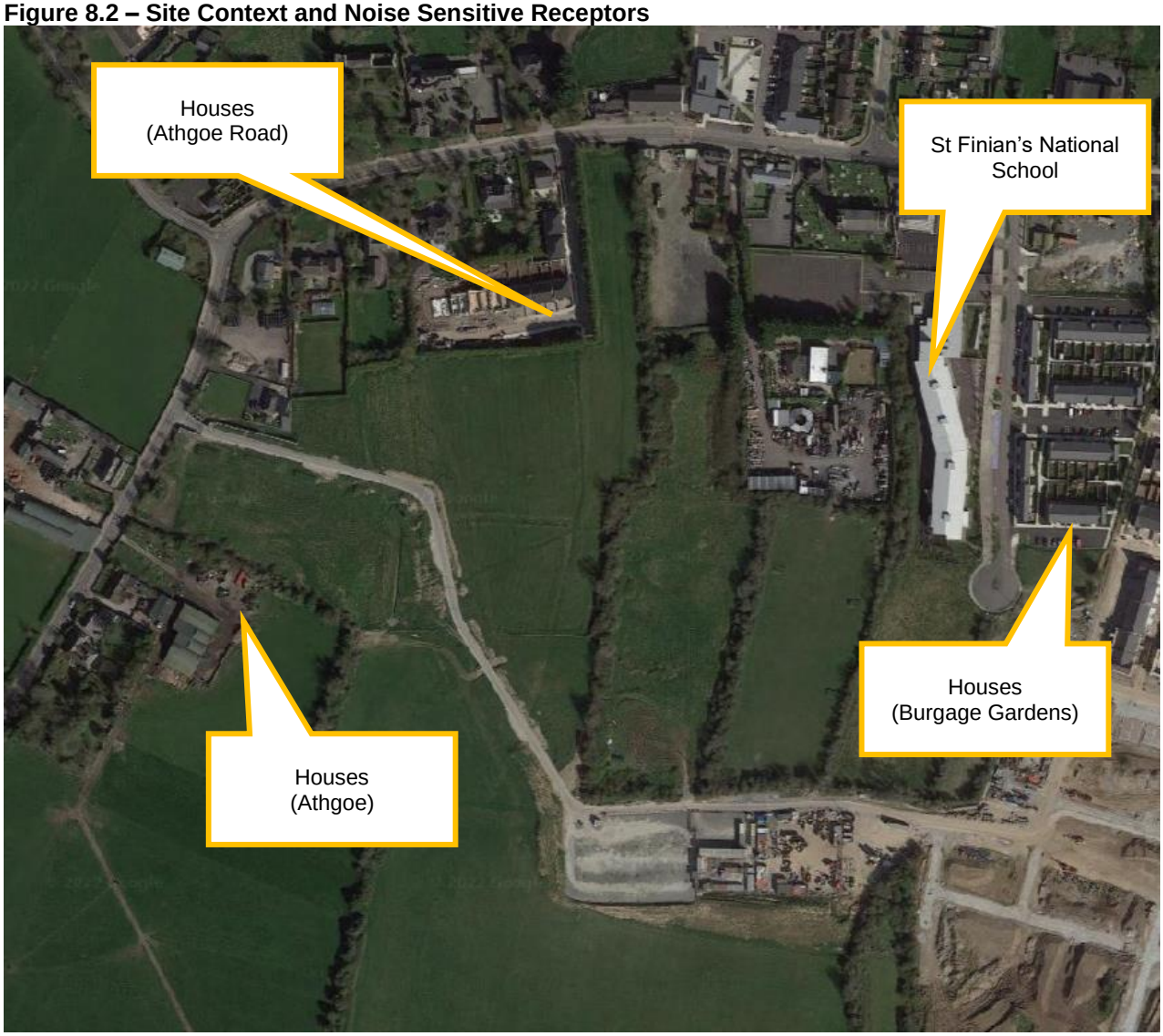
During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, piling equipment, dumper trucks, compressors and generators. Due to the nature of daytime activities undertaken on a construction site such as this, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels.

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to site clearance, ground excavation and loading lorries (dozers, tracked excavators and wheeled loaders) reach a maximum of 81 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a worst-case scenario is assumed of 3 no. such items with a sound pressure level (SPL) of 81 dB at 10 m operating simultaneously along the closest works boundary. This would result in a total noise level of 86 dB at 10 m and an equivalent combined sound power level of 114 dB L_{WA}. This worst-case scenario is the typical assumption made for developments of this size, on the basis that it is unlikely that more than 3 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other.

Guidance on the approximate attenuation achieved by standard construction hoarding surrounding construction sites is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when the noise screen completely hides the sources from the receiver.

This scenario can be assumed in this case due to the proximity of the noise-sensitive locations, i.e. a hoarding height will be chosen so as to completely hide the source. Table 8.13 shows the potential noise levels calculated at various distances based on the assumed sound power level and attenuation provided by the barrier of 10 dB.

Figure 8.2 – Site Context and Noise Sensitive Receptors



The closest noise sensitive locations have been identified as shown in Figure 8.2 and described below. There are several residential receptors located surrounding the proposed development to the south and northeast. Houses are set back some 90m to 160m from areas of significant construction works.

The proposed development site is surrounded by existing commercial and industrial receptors. For the most part these buildings are warehouses with low noise sensitivity. The closest offices, showrooms and cafés are located between 25m and 40m from areas of significant works.

Review of the baseline noise survey, available noise mapping and the threshold values detailed in Table 4.3 indicates that the appropriate daytime noise criteria for construction noise are as follows:

- Residential receptors 65 dB $L_{Aeq,T}$
- School receptors 70 dB $L_{Aeq,T}$
- Commercial/industrial receptors 75 dB $L_{Aeq,T}$

A night-time threshold is not included as construction work will not be taking place at night.

Table 8.13 – Potential Construction Noise Levels at Varying Distances Assuming Attenuation of 10 dB from Site Hoarding

Description of Noise Source	Sound Power Level (dB $L_{W(A)}$)	Calculated noise levels at varying distances (dB $L_{Aeq,T}$)				
		10m	20m	30m	40m	50m
3 no. items each with SPL of 81 dB at 10 m operating simultaneously.	114	76	70	66	62	56

Review of NSLs indicates that the majority of receptors are located at least 30m from areas of major construction works. There is one house along the Athgoe Road that is some 25m from areas of works, located outside the western site boundary.

The calculated noise levels in Table 8.13 show that the criteria for residential receptors will be exceeded at the limited number of locations that are up to 35m from areas of construction works. In this instance the nearest houses are located some 20 - 30m from the site boundary and therefore the contribution of construction noise is predicted to be in the range of +5 dB above the recommended criteria, therefore a negative, moderate to significant and short-term impact is expected at these nearest residential locations during the construction phase.

The predicted construction noise levels at residential NSLs at 35m from works is predicted to be below the recommended noise criteria and therefore a negative, moderate and short-term impact is predicted during the construction phase. The majority of residential receptors are set back at distances of 35m or more from areas of major works.

The predicted construction noise levels are within the recommended criteria for school receptors at distances greater than 10 m from construction works. Specifically, St Finian's National School is set back some 50m from the works. Therefore, it is expected that a moderate impact is associated with construction works at this receptor.

In order to minimise the impact of construction activity good practice measures are detailed in Section 8.7.

Construction Traffic

During the construction phase of the proposed development there will be additional construction traffic on local roads. The proposed route for construction traffic to and from the proposed development will be along the Athgoe Road. Considering that mathematically, in order to increase traffic noise levels by 1 dB, traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the construction phase will not result in a significant noise impact.

8.5.1.2 Vibration

Potential for vibration impacts during the construction phase programme are associated with the ground breaking and excavations required.

During ground-breaking in the excavation phase, there is potential for vibration to propagate through the ground. Empirical data for this activity is not provided in the BS 5228- 2 standard, however the likely levels of vibration from this activity is expected to be below the vibration threshold for building damage based on experience from other sites.

AWN have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator
- 6 tonne hydraulic breaker on large Liebherr tracked excavator

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

The range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the proposed site. This range of vibration magnitudes indicate vibration levels at the closest neighbouring buildings are likely to be below the limits set out in Table 8.4 to avoid any cosmetic damage to non-protected, soundly constructed buildings.

In terms of disturbance to building occupants, works undertaken within close proximity to the residential receptors on the northern site perimeter have the potential to emit perceptible vibration levels.

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 8.4 to avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants, as set out in Table 8.5. The potential vibration impact during the construction phase if of neutral, imperceptible and short-term impact.

Recommended maximum vibration limits for protected structures (including the tower) are set out in Table 8.4 however, where works producing high levels of vibration in close proximity to protected structures are required, this should be carried out in consultation with the relevant engineer/conservation expert.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration threshold set out in Table 8.4 during all activities.

It is anticipated that excavations will be made using standard excavation machinery, which typically do not generate appreciable levels of vibration close to the source. Taking this into account and considering the distance that these properties are from the works and the attenuation of vibration levels over distance, the resultant vibration levels are expected to be well below a level that would cause disturbance to building occupants or even be perceptible.

8.5.2 Operational Phase

8.5.2.1 Mechanical Services Plant

It is expected that the principal items of building and mechanical services plant will be associated with ventilation and heating of development buildings. These items will be selected at a later stage, however, they will be designed and located so that there is no negative impact on sensitive receivers in proximity to the proposed development. The services plant will be designed/attenuated to meet the relevant plant noise criteria for day and night-time periods at nearby sensitive receivers as set out in Section 8.2.2.1.

The effect associated with building services plant, once designed to achieve the relevant noise criteria, is categorised as negative, imperceptible and permanent.

8.5.2.2 Additional Traffic on Surrounding Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site on some surrounding roads. A traffic impact assessment relating to the proposed development has been prepared by DBFL consulting engineers, as part of this EIAR. Using this information, the related noise impacts along the relevant road links has been assessed.

Table 8.14 and Table 8.15 below presents the predicted change in noise level at different road links around the site for the year of opening and the design year using the Annual Average Daily Traffic (AADT) flows along the road links under consideration.

Figure 8.3 – Road Link Locations

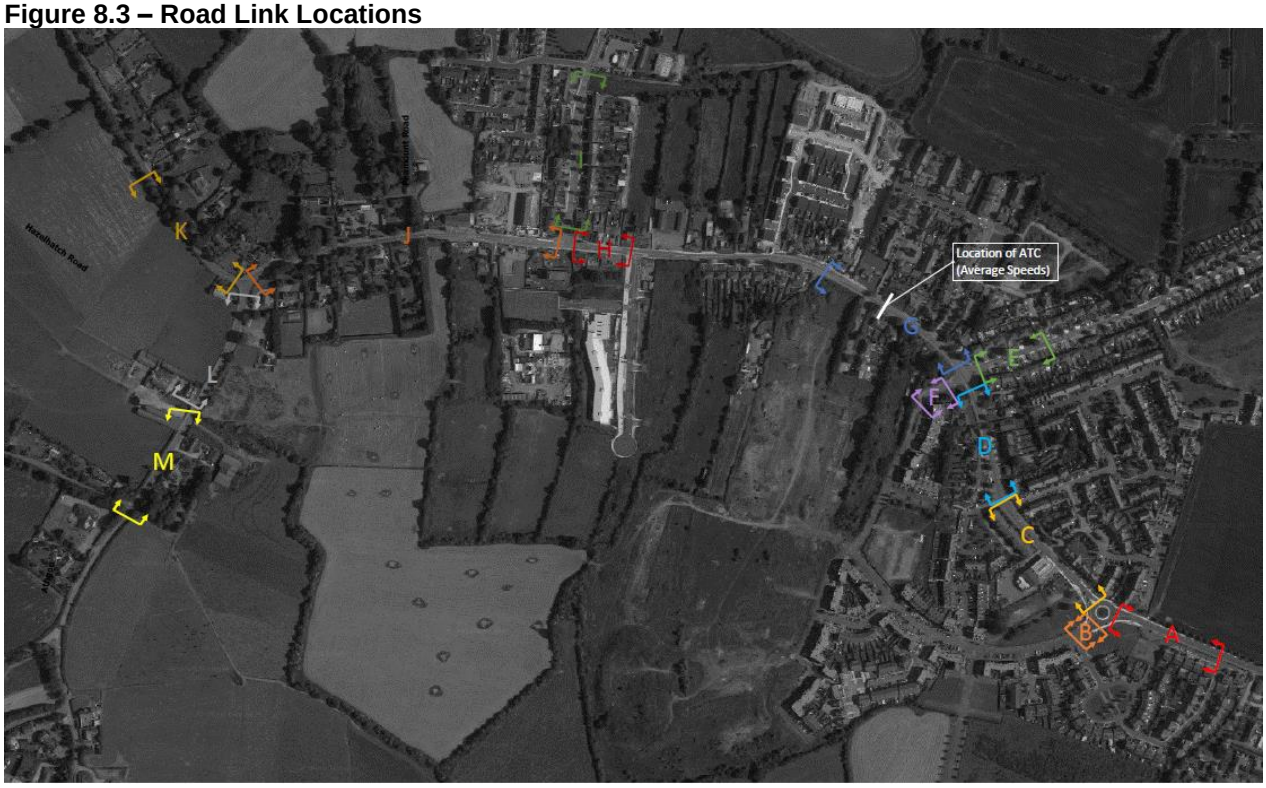


Table 8.14 – Predicted Change in Noise Level associated with Vehicular Traffic – 2024

Road Link	Opening Year (2024)		
	Do Nothing - AADT Without Development	Do Something - AADT With Development	Change in Noise Level (dB)
A	11,543	11,605	0.0
B	2,179	3,813	+2.4
C	11,410	10,216	-0.5
D	11,102	9,883	-0.5
E	3,190	3,340	+0.2
F	763	857	+0.5
G	11,614	10,452	-0.5
H	10,897	9,623	-0.5
I	4,906	5,089	+0.2
J	9,588	8,297	-0.6
K	6,523	6,581	+0.0
L	5,687	5,991	+0.2
M	5,412	5,437	0.0

With reference to Table 8.7, for the Opening Year 2024 the predicted change in noise level associated with additional traffic on the surrounding existing road network has a negligible effect. The impact is therefore neutral, imperceptible and permanent.

Table 8.15 – Predicted Change in Noise Level associated with Vehicular Traffic – 2039

Road Link	Opening Year (2024)		
	Do Nothing - AADT Without Development	Do Something - AADT With Development	Change in Noise Level (dB)
A	11,543	11,605	0.0
B	2,179	3,813	+2.4
C	11,410	10,216	-0.5
D	11,102	9,883	-0.5
E	3,190	3,340	+0.2
F	763	857	+0.5
G	11,614	10,452	-0.5
H	10,897	9,623	-0.5
I	4,906	5,089	+0.2
J	9,588	8,297	-0.6
K	6,523	6,581	+0.0
L	5,687	5,991	+0.2
M	5,412	5,437	0.0

With reference to Table 8.7, for the Design Year 2039 the predicted change in noise level associated with additional traffic on the surrounding existing road network has a negligible effect. The impact is therefore neutral, imperceptible and permanent.

8.5.3 'Do Nothing' Scenario

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations will remain largely unchanged. The noise and vibration levels measured/noted during the baseline studies are considered representative of the Do-Nothing scenario. The Do-Nothing scenario is therefore considered to have neutral impact.

That said, if the proposed development were not to proceed, then a different development, similar in nature may be constructed as the land is zoned for development in keeping with national policy.

8.6 CUMULATIVE NOISE IMPACTS

During the construction phase of the proposed development, construction noise on site will be localised and will therefore likely be the primary noise source at the nearest noise sensitive receivers.

Should another construction site become active in proximity to the proposed development, there is the possibility that cumulative noise impacts could occur at sensitive receptors that are equidistant to both sites. In this scenario, it is recommended that liaison between construction sites is on-going throughout the duration of the construction phase. Contractors should schedule work in a co-operative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors.

In addition, in the event there is an upgrade undertaken to the Newcastle Pumping Station (at Grant's View) to the east of Newcastle by Irish Water the potential cumulative effects to Noise and Vibration of the local and surrounding area is deemed to be insignificant. As indicated by Irish Water, in the Confirmation of Feasibility, this SHD is not reliant on the Irish Water Newcastle pumping station project by reason of the installation of the on-site pumping station proposed. These works would be subject to Irish Water standards in respect of noise and there are no additional significant impacts will occur.

In the context of the operational phase, permitted developments are included in the traffic impact assessment and therefore the potential for a cumulative impact has been assessed.

Any large scale future projects that are not yet proposed or permitted would also need to be the subject of EIA in turn, to ensure that no significant impacts resulting from noise and vibration will occur as a result of those developments.

8.7 MITIGATION MEASURES

8.7.1 Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2*. Whilst construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

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

Detailed comment is offered below on these items. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

8.7.1.1 Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

8.7.1.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant should be switched off when not in use and not left idling.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.

- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

8.7.1.3 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound attenuation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

8.7.1.4 Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

8.7.1.5 Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During periods when high noise generating works such as demolition are in progress at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

8.7.1.6 Vibration

The vibration from construction activities will be limited to the values set out in Section 8.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties and will be adhered to as follows:

Table 8.16 – Recommended Vibration Criteria During Construction Phase

Building Category	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
Structurally sound and non-protected buildings	12 mm/s	20 mm/s	50 mm/s
Protected and /or potentially vulnerable buildings	6 mm/s	10 mm/s	25 mm/s

Limits have been recommended above for protected structures. Where vibration-heavy works are proposed near protected structures the relevant engineer or conservation expert should be consulted in advance of works adjacent.

8.7.2 Operational Phase – Noise

8.7.2.1 Mechanical Services Plant

Plant items will be designed and selected so that cumulative noise emissions are within the recommended noise criteria. Therefore no mitigation is required.

8.7.2.2 Additional Traffic on Surrounding Roads

During the operational phase of the development the change in noise level associated with development traffic is predicted to be negligible and therefore, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary.

Internal Underground Waste Water Pumping Station

The development will include a waste water pumping station located at the northern site boundary. To ensure that this item of site infrastructure does not have an adverse noise impact on the receiving environment, noise generated by its operation shall be non-tonal, non-impulsive and be no greater than 60dB(A) when measured at a reference distance of 1m. The commissioning phase of the station will include the measurement of operational noise levels by an experienced acoustic consultant to verify that the operational noise achieves its acoustic performance design criteria and will not be audible at the closest residential receptors at St. Finian's Way.

8.8 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

8.8.1 Construction Phase

8.8.1.1 Noise

Construction noise levels are predicted to be above the Construction Noise Threshold to varying degrees at the limited number of residential noise sensitive receivers located at distances less than 35m from construction works. Construction noise levels are predicted to be below the Construction Noise Threshold at the offsite residential noise sensitive receivers located at distances greater than 35m from construction works, which represents the majority of nearby NSLs. Good practice noise control measures have been presented to reduce the impact of construction works. The impact of construction works at distances of 20-30m is predicted to be negative, moderate to significant and short-term. At distances of 35m and greater, the impact is predicted to be negative, slight to moderate and short-term.

Noise levels associated with construction traffic have been predicted to represent an increase of less than 1 dB and therefore predicted to be of negative, not significant and short-term impact.

The above effects should be considered in the context that the effect is variable, and that this assessment considers the locations of the greatest potential impact.

8.8.1.2 Vibration

Due to the distances between construction works and the nearest offsite receptors it is predicted that for the receptors (including the protected structures) the impact of construction vibration will be neutral, imperceptible and short-term.

8.8.2 Operational Phase

8.8.2.1 Noise

Mechanical Services Plant

Plant items will be located and selected so that cumulative plant noise emissions from the development achieve the appropriate noise criteria, the noise impact is predicted to be neutral, imperceptible and long-term.

Additional Traffic on Surrounding Roads
Based on the traffic flows associated with the operation of the proposed development the impacts are predicted to be neutral, imperceptible and permanent.

8.8.2.2 Vibration

There are no appreciable sources of vibration associated with the operation of the proposed development. The vibration impact is predicted to be neutral, imperceptible and long-term.

8.9 MONITORING

8.9.1 Construction Phase

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

Vibration monitoring should be conducted in accordance with BS 6472:2008 Guide to evaluation of human exposure to vibration in buildings - Vibration sources other than blasting (human disturbance) and BS ISO 4866:2010 Mechanical vibration and shock - Vibration of fixed structures- Guidelines for the measurement of vibrations and evaluation of their effects on structures (building damage).

8.10 REINSTATEMENT

Not applicable to noise and vibration.

8.11 INTERACTIONS

8.11.1 General

In compiling this environmental impact assessment, reference has been made to the project description provided by the project co-ordinators, project drawings provided by the project architects and information relating to construction activities provided by the engineers. Noise emission sources from the proposed development during the construction and operational phases will be from construction plant and activity, building services and traffic accessing the development. The noise impact assessment has been prepared in consultation with the design team and traffic engineers. Reference can be made to the relevant chapters for additional information.

8.11.2 Human Health

The potential impacts on human beings in relation to the generation of noise and vibration during the construction phases are that high levels of noise and vibration could cause a degree of nuisance to people in nearby sensitive locations. Implementation of the mitigation measures set out and adherence to good practice noise reducing measures will ensure that the residual impact on human health will be lessened.

Similarly, during the operational phase, plant selections designed to achieve the relevant noise criteria will result in a residual impact that is imperceptible to people in nearby noise sensitive locations.

8.11.3 Cultural Heritage

Information regarding the location of protected structures in proximity to the proposed development has been provided so that construction activity does not result in negative impacts at these structures. Further information is provided in Chapter 13 and 14 – Cultural Heritage.

8.12 DIFFICULTIES ENCOUNTERED IN COMPILING

No difficulties were encountered in the preparation of this chapter.

8.13 REFERENCES

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- BSI (1993). BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration;

- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound;
- BSI (2014). BS 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise;
- BSI (2014). BS 5228-2:2009+A:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration;
- EPA (2015). Advice Notes for Preparing Environmental Impact Statements. Draft. September 2015;
- ISO (2016). ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures;
- UK Department of Transport (1998). Calculation of Road Traffic Noise;
- UKHA (2020). Design Manual for Roads and Bridges Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2; and

9.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

9.1 INTRODUCTION

Murray and Associates were engaged to complete a Landscape and Visual Impact Assessment for the proposed residential developments, and associated infrastructural works, on lands located to the south of Main Street at Newcastle South, County Dublin. The report was completed by Jim Bloxam (MLArch, MILI), a Senior Associate Landscape Architect. He holds a master's degree in Landscape Architecture from University College Dublin and is a full corporate member of The Irish Landscape Institute. Jim has over 8 years of experience in completing LVIAs as part of the EIAR process.

The landscape and visual impact assessment of the proposed development is a means of appraising the likely significant direct and indirect effects the proposed development would have on the receiving environment in terms of quality of landscape – both physically and visually. The assessment aims to indicate the layout and design of the proposed development which would present the least overall landscape and visual impact.

9.2 STUDY METHODOLOGY

9.2.1 Legislation, Policy and Guidance

The following sources were used to inform and structure this chapter:

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive);
- The National Landscape Strategy (NLS) for Ireland 2015-2025;
- South Dublin County Council Development Plan 2016-2022;
- South Dublin County Council Draft Development Plan 2022-2028 Including draft 2021 Landscape Character Assessment
- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency (2022 (EPA Guidelines 2022));
- Draft Advice Notes For Preparing Environmental Impact Statements (EPA, 2015)
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA), published by the Landscape Institute;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018, published by the Department of Housing, Planning and Local Government;
- Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute;
- Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19, published by the Landscape Institute.
- Transport Infrastructure Ireland Publication no. PE-ENV-01101, published December 2020: Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document

9.2.2 Study Methodology

Landscape impacts are defined as changes in the fabric, character and quality of the landscape as a result of the development (*Guidelines for Landscape and Visual Impact Assessment* - 3rd Edition, by The Landscape Institute / Institute of Environmental Assessment published by E&FN Spon, 2013). This includes direct impacts to landscape receptors and greater effects that can alter the wider distinctiveness of the landscape. Landscape receptors are the physical or natural resource, special interest or viewer group that will experience an impact. The sensitivity (of a landscape receptor) is the vulnerability to change. The extent of the landscape impacts have been assessed by professional evaluation using the terminology defined as per Tables 9.1, 9.3, 9.4, 9.5 and 9.6.

The terminology in the following tables is based on the criteria set down in the Guidelines for Landscape and Visual Impact Assessment (3rd Edition, by The Landscape Institute / Institute of Environmental Assessment published by E&FN Spon, 2013). Landscape impacts are assumed to be permanent. This chapter also has regard to the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018), and Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).

Table 9.1 – The Significance of Landscape Impact (based on ratings from the EPA Guidelines, 2022)

Extent	Description
Level 1 Imperceptible Effects	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.
Level 2 Not significant	An effect which causes noticeable changes in the character of the landscape but without noticeable consequences. There are no appreciable changes to landscape context, character or features.
Level 3 Slight Effects	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.
Level 4 Moderate Effects	An effect that alters the character of the landscape in a manner that is consistent with existing and emerging trends. There are minor changes over some of the area (up to 30%) or moderate changes in a localised area.
Level 5 Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area (30-50%) or an intensive change over a more limited area
Level 6 Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment. There are notable changes in landscape characteristics over a substantial area (50-70%) or a very intensive change over a more limited area
Level 7 Profound Effects	An effect which obliterates sensitive characteristics. There are notable changes in landscape characteristics over an extensive area (70-100%) or a very intensive change over a more limited area

Visual impacts relate solely to changes in available views of the landscape and the effects of those changes on people viewing the landscape, or “the change in the appearance or view of the built or natural landscape and urban areas” as stated in Recital 16 of the EIA Directive. They include the direct impact of the development on views, the potential reaction of viewers, their location and number and the impact on visual amenity. The intensity of the visual impacts is assessed by professional evaluation using the terminology defined as per Tables 9.2, 9.3, 9.4, 9.5 and 9.6.

Table 9.2 – Significance of Visual Effect (based on ratings from the EPA Guidelines, 2022)

Extent	Description
Level 1 Imperceptible Effects	There are no noticeable changes to views in the visual landscape.
Level 2 Not significant	An effect which causes noticeable changes in the character of the visual environment but without noticeable consequences. The proposal is adequately screened due to the existing landform, vegetation or constructed features.
Level 3 Slight Effects	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities.

Extent	Description
	The affected view forms only a small element in the overall visual composition, or changes the view in a marginal manner.
Level 4 Moderate Effects	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
Level 5 Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Level 6 Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the visual environment. The proposal affects the majority of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Level 7 Profound Effects	An effect which obliterates sensitive characteristics. The view is entirely altered, obscured or affected.

Table 9.3 – Quality of the Landscape and Visual Impact (EPA Guidelines 2022)

Extent	Description
Neutral Effect	Neither detracts from nor enhances the landscape of the receiving environment or view
Positive Effect	Improves or enhances the landscape of the receiving environment or a particular view
Negative Effect	Detracts from the quality of the landscape or view

Table 9.4 – The Duration of Landscape and Visual Effects (EPA Guidelines 2022)

Extent	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years.
Reversible Effects	Effects that can be undone, for example through remediation or restoration.

Please note: "Momentary" and "Brief" Effects as defined in the EPA Guidelines (2022) are not considered relevant to landscape & visual assessment as effects of such short duration are extremely unlikely to generate appreciable effects.

Table 9.5 – The Extent and Context of Effects (EPA Guidelines 2022)

Extent	Describes the size of the area, the number of sites and the proportion of a population affected by an effect
Context	Describes whether the extent, duration or frequency conforms or contrasts with established conditions

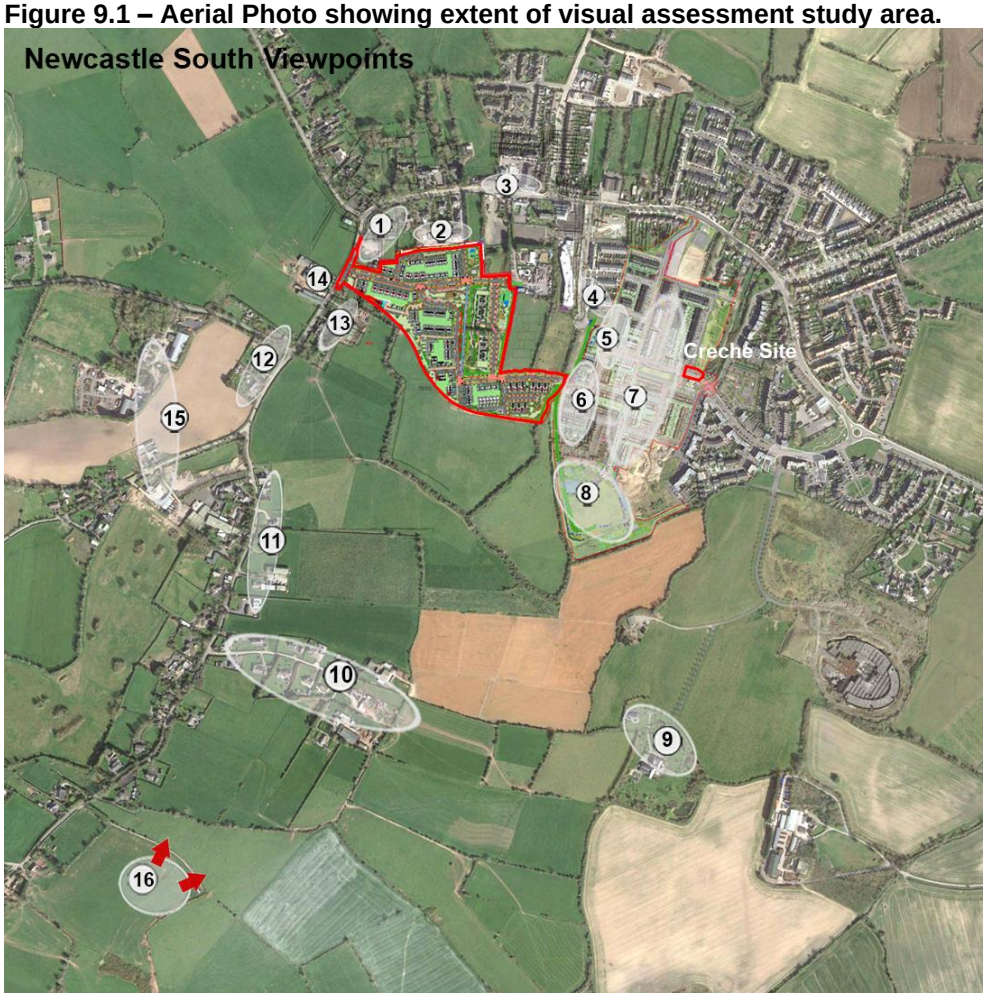
Table 9.6 – The Probability of Effects (EPA Guidelines 2022)

Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

The landscape and visual assessment methodology will be utilised in conjunction with a professional evaluation of the proposed development to determine the degree of impact.

The term 'study area' as used in this report refers to the site itself (i.e. the extent of the planning application) and its wider landscape context in the study of the context, physical landscape and landscape character. This may extend for approximately 1km or more in all directions from the site in order to achieve an understanding of the overall landscape. In terms of the visual assessment, the study of visual amenity may extend outside the study area, from areas where views of the site are available, but the majority of visual impacts for a development of this nature would be most likely within the local context, as this landscape is relatively flat and enclosed. Please see Figure 1 for a map indicating the study area with reference to identified receptors.

Figure 9.1 – Aerial Photo showing extent of visual assessment study area.



The methodology employed in the landscape and visual impact assessment is as follows:

1. Identifying Baseline Conditions: Desktop survey of detailed maps, aerial photography and other information relevant to the study area, including the South Dublin Development Plan 2016 – 2022, the Draft South Dublin Development Plan 2022 and the Newcastle Local Area Plan 2012.
2. Characterising the Landscape & Identifying Sensitive Receptors: Site survey and photographic survey to determine landscape character of the general study area and specific landscape of the site and to identify the sensitivity of receptors that have potential to be affected by changes in the baseline conditions.

3. Predicting the Magnitude of Likely Changes to the Baseline Landscape & Visual Environment: In determining visibility, the views to and from the proposed development areas are considered based on the heights, finishes, design and other visual characteristics of the proposed structures and setting. Verified Photomontages have been prepared by a specialist 3-D Visualisations company to represent selected views which are typical of the views within the area and are intended to demonstrate the scale of the buildings in the wider landscape. The extent of visual effects of the proposed development on the built environment is demonstrated through a selection of representative view locations around the proposed development. The photomontages on which the following assessments is based are provided in Appendix 9.1.
4. Assessing the Significance of Effect Taking into Account Sensitivity of Receptors and Magnitude of Effect: Assessment of the potential significant impacts of the proposed scheme utilising the plan and elevation drawings of the scheme, and Verified Views to determine the main impacting features and the degree to which these elements would be visible in relation to the baseline environment.
5. Identifying and assessing appropriate mitigation measures, including alternatives: A scheme of mitigation measures is proposed, where relevant. These will be defined as measures which will be generally implemented and specific landscape measures which would be site-specific and address particular landscape or visual issues identified.
5. Assessing the significance of residual effects, taking account of any mitigation measures: For the purposes of assessment the predicted visual effects of the scheme are assumed at 10 years following the completion of the proposed development.

Specific Considerations from the EPA Guidance 2022

The EPA Guidance 2022 suggests that the following should be considered in Landscape and Visual Assessment, and these are considered in the assessment where relevant:

Visual Effects:

- Context
- Character
- Significance
- Sensitivity
- Views & Prospects

Landscape Amenity:

- -Public access
- -Public amenities
- -Recreation
- -Tourism

The Landscape:

- Landscape Appearance and Character
- Landscape Context
- Historical Landscapes

9.3 EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

9.3.1 Landscape Appearance and Character

Newcastle itself sits in the Newcastle Lowlands Landscape Character Area, as defined by the Draft 2021 Landscape Character Assessment of South Dublin County Development Plan (Draft South Dublin County Development Plan 2022-28) and also the current County Development Plan (2016 – 2022). The Landscape Character Assessment will be referred to as LCA throughout the chapter.

Figure 9.2 – Landscape Character Areas, (Fig 21, pg 56, Landscape Character Assessment, 2021).

The LCA continues further, and calls Newcastle a 'Historic Urban' character area - towns and villages that have developed historically, surrounded by primarily 20th Century residential development, and with significant recent development in the past two decades. The bulk of Newcastle is designated as an area of Archaeological Potential due to the large range of recorded archaeological sites within the environs of the village.

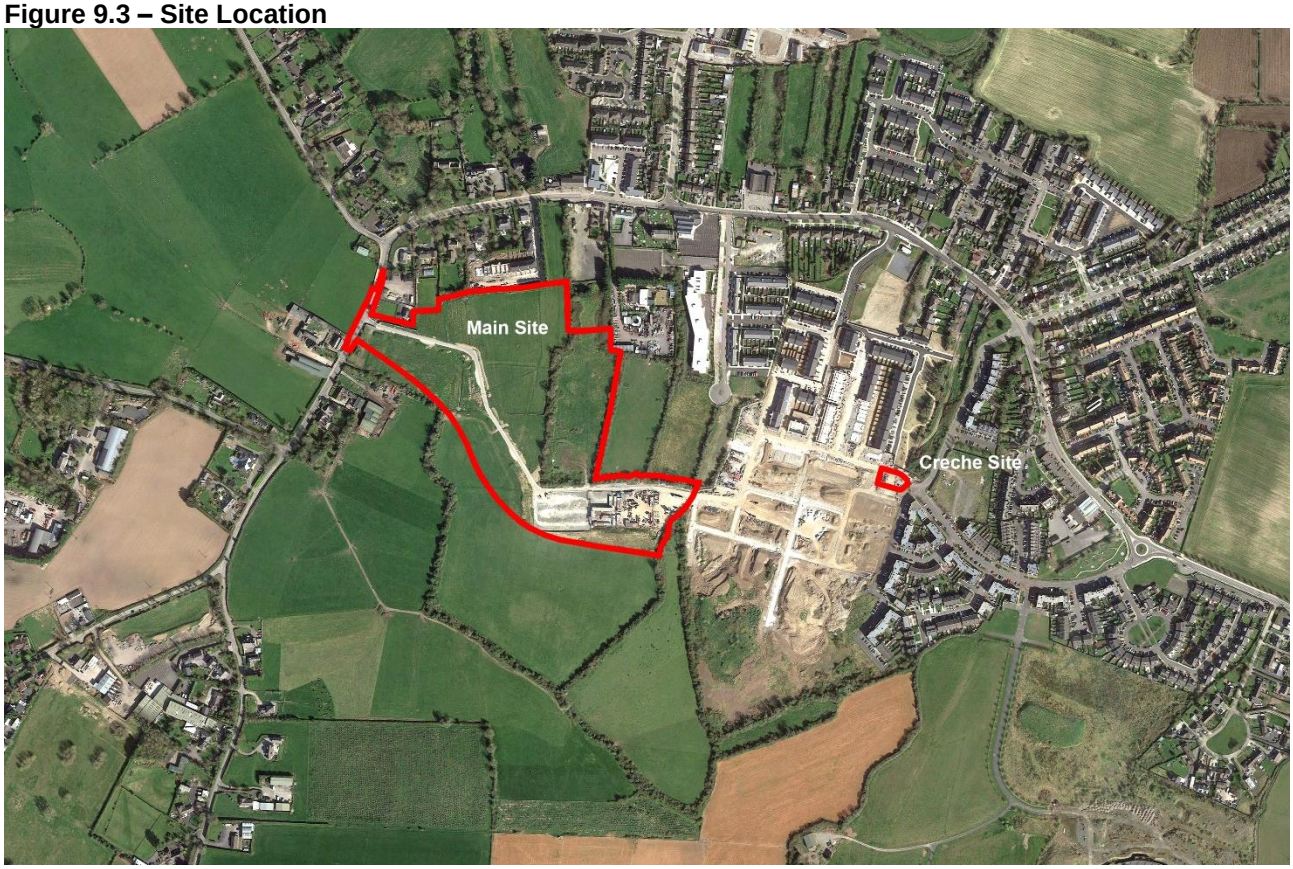
The village of Newcastle underwent significant change with extensive new development over the early 2000's and particularly to the east of the village. In this respect, the Newcastle Local Area Plan (2012) notes that Newcastle has transformed the area from a rural village to a development village with suburban characteristics. Residential development to the west of the village is predominantly low density, one-off dwellings centered on Main Street while development to the east is characterised by residential housing with suburban type housing estates to the north and south of main street. The newly constructed Graydon residential development is directly adjacent to the east of the current application site.

The application lands generally comprise of greenfield backlands, mainly disused fallow agricultural fields, located to the south of Main Street, west of the Graydon residential development residential. The application lands comprise of approximately 8.47 Hectares and are zoned RES-N (*'To provide for new residential communities in accordance with approved area plans'.*).

Previous development works associated with the Graydon development are visible within the site. This is mainly the current access road for the Graydon site compound. The remaining site comprises of fallow fields giving the site a rural character, with the boundaries reinforced by the existing hedgerow network to the north, providing a rural backdrop and a sense of enclosure, with views extending to the south.

As such, the site will extend the suburban character of the Graydon development to the west of the site, further east into the backlands of Newcastle village, where development is solely located along Main Street.

Figure 9.3 – Site Location



9.3.2 Planning Context

There are no protected views or prospects and no Tree Preservation Orders within the site. Furthermore, the site is zoned for development within the current Development Plan and the Draft 2022-2028 Development Plan.
There are no Natura 2000 Protected Areas within the site.

Adjacent to the eastern boundary there is a protected structure (ref DU020-003006), a Tower House. This is within the lands zoned as residential within the Development Plan.
Further structures are situated to the north of Main Street, though these have been scoped out of this assessment due to the distance from the site and interceding development that has already restricted the views.

The northern portion of the site is within the Newcastle Architectural Conservation Area. In this site's context, this would refer to the burgage hedgerow system present.

Within the 2016-2022 County Development Plan Policy 6 (New Development in Urban Areas) has specific objectives with regards to hedgerows and associated ecological features (G6 Objective 1). Also included are objectives dealing

with connections to wider green infrastructure network (G6 Objective 2) and open space provision within new developments (G6 Objective 3). Within the Draft Development Plan (2022-2028) there are further objectives in relation to Green Infrastructure (Overarching Policy GI1) and Biodiversity (Policy GI2).

The Draft Development Plan (2022-2028) has further aims regarding the provision of Sustainable Urban Drainage Systems (Policy GI4 and associated objectives) and regard is had to South Dublin County Council's Sustainable Drainage Systems (SuDS) Explanatory, Design and Evaluation Guide (2022).

Within the Newcastle Local Area Plan of 2012 (as amended) a substantial part is devoted to the implementation of Green Infrastructure within Newcastle. Of particular note are the Planning Objectives for the retention, incorporation and reinstatement of the burgage plot field system. (Objectives GI7, GI8, GI9, GI10 and GI11).

9.3.3 Existing Visual Context and Views

Although the centre of the main site has an open character, visibility is limited by the built edge of Newcastle Main Street to the north. This allows partial and glimpsed views from a few locations, as well as from the rear, mainly upper windows of residential properties. There are open views into the site from the newer developments along the eastern boundary. The pattern of agricultural hedgerows forms a visual boundary from the agricultural lands to the west. Partial and glimpsed, elevated views into the site (mainly the northern portion) are available from properties on the northern slope of Athgoe Hill due to the interceding hedgerows and the topography of the slope.

9.3.4 Historic Landscape

Most of Newcastle is designated as an area of Archaeological Potential due to the large range of recorded archaeological sites within the environs of the village. The overriding feature within this landscape are the existing elements of the original burgage plot field system, dating from the Anglo-Norman manorial system. These are long rectangular field boundaries extending perpendicularly from properties fronting onto Main Street. This landholding system and pattern has been identified as being of importance in the LAP.

The portions of hedgerows that remain are associated with this historic land use. The majority of the trees within the remaining hedgerows are Ash, with the occasional Sycamore, Wych Elm, Cherry and Poplar evident. The hedgerow themselves are mature and have not had any significant maintenance in recent years. The hedgerow species are dominated by Blackthorn, with large portions being colonised by bramble and ivy. Elsewhere there are areas of discontinuity within the hedgerow lines, while there are portion of encroachment by Blackthorn into the existing fields.

9.3.5 Sensitivity

In landscape and visual assessments, one of the key factors is the sensitivity of a landscape to change, where the proposed development will inevitably result in adding a new element to the landscape. The publication *Guidelines for Landscape and Visual Impact Assessment* (2013) defines sensitivity as: *"A term applied to specific receptors, combining judgments of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor."* Landscape sensitivity refers to the inherent sensitivity to change of the landscape resource, and its overall ability to sustain its character in the face of change, as well as the visual sensitivity in terms of views, visibility, number and nature of viewers, and scope to mitigate visual impact. For example, a highly sensitive landscape is likely to be vulnerable to change whereas a landscape with a low sensitivity is likely to be less at risk from change.

During the initial research and evaluation, a typology was developed based on the fieldwork and research into the site. These categories will help to identify the sensitivity of the existing receptors and are defined in the following Table 9.7 and 9.8.

Table 9.7 – Baseline Evaluation – Sensitivity of Landscape Receptors *

Landscape Typology / Receptor	Category
Historic Landscape, Conservation Area and/or Urban Landscape associated with listed or protected buildings, Designated ecological landscapes.	Very High (IV)
Key Public Urban Spaces/ Historic Character Street, Mature trees in the public realm, Local Landmark, Burgage Hedgerows	High (III)

Landscape Typology / Receptor	Category
Local Streets, Residential landscapes, Semi-Mature Trees in public realm, Hedgerows (non-burgage)	Medium (II)
Degraded urban townscapes/ streetscapes, Arterial Roads	Low (I)
A low-quality landscape, e.g. Industrial landscape, etc.	Not sensitive

** This table has been developed by the author for the proposed development with reference to fieldwork and research, and with reference to Transport Infrastructure Ireland Publication no. PE-ENV-01101, published December 2020: Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document (specifically Table 5 Rating of Landscape Significance / Sensitivity - example evaluation criteria for baseline categorisation of landscape / townscape / seascape significance and sensitivity)*
Note that existing adverse landscape conditions can reduce sensitivity from the baseline above, such as existing poor-quality landscape elements, degradation or pollution. Zoning for development by local authorities also reduces landscape sensitivity ratings.

Table 9.8 – Baseline Evaluation – Sensitivity of Visual Receptors **

Receptor	Category
Listed Views/Viewshed in relevant planning documents / policies / county development plan (note that none are affected) High quality views from Key Public Urban Spaces and Parks Good quality / extensive views from listed buildings or spaces, within 50m of the development (i.e. a significant structure within the proposed development)	Very High (IV)
Local receptors within 200m of the development (residential properties, nursing homes, residential care units, schools, cemeteries, tourist accommodation, tourist facilities, parks) with direct views of the development Publicly accessible viewpoints identified in the study with high-quality views or within a high-quality visual environment. Views with visual prospects or features on horizon which add to sense of place.	High (III)
Local receptors within 200m of the site with oblique or compromised views of the development, or more than 200m from the site with existing high-quality views, or from a primary pedestrian route. Existing views from elevated viewpoints, within 1 km	Medium (II)
People travelling through the area.	Low (I)
People working in the area.	Not sensitive

*** This table has been developed by the author for the proposed development with reference to fieldwork and research, and with reference to Transport Infrastructure Ireland Publication no. PE-ENV-01101, published December 2020: Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document (specifically Table 6 Rating of Visual Significance/Sensitivity - example evaluation criteria for baseline categorisation of visual significance and sensitivity) Note that existing adverse visual conditions can reduce sensitivity from the baseline above, such as existing poor-quality elements in the view, indirect views, existing screening, lack of features or interest, etc. Zoning for development by local authorities also reduces visual sensitivity ratings.*

The Draft Landscape Character Assessment of South Dublin (2021) identifies the Newcastle Lowlands overall landscape character sensitivity as medium, with overall visual and landscape sensitivity as being medium. Landscape values within the Newcastle Lowlands Character Area are noted as being medium/high. In accordance with Table 6A of the LCA, the capacity of the landscape to accommodate development is 'Low'. This is defined in Table 6B of the LCA as follows: "*Key characteristics of the landscape are vulnerable to change. There may be limited opportunity to accommodate development without changing landscape character. Great care would be needed in locating development*."

However, while the classification provides a generalised picture of the County's landscape, it should be noted that within each classification level there may be varying natural / environmental or cultural / social reasons why distinctly different lands fall within the same category.

Although officially within the Newcastle Lowlands character area, and within the 'Historic Urban' character type, the lands in question have been zoned for substantial residential development within the Newcastle Local Area Plan (abbreviated to LAP in this chapter). Therefore, with the presence of the burgage plot system, the sensitivity of the immediate landscape within and adjacent to the site can be seen as medium where hedgerows exist and low where there are no hedgerows, as the hedgerows are the defining characteristic of the historic landscape. A strategy for retention of all important hedgerows is set out in the LAP.

Visual receptors have greater potential sensitivity to change in the landscape. Sensitive views into the site are potentially from adjacent residential properties to the north and east, and from residential properties further away to the west and south. There are no sensitive views from adjacent commercial properties of the to the north and east.

The sensitivity is affected by the following existing factors:

- The distances from the site to some of the visual receptors is relatively large and therefore the sensitivity is accordingly diminished. See figure 9.4 - Map of Visual Receptors and Table 9.12 for distances from receptors to site.
- There are existing visual barriers in the landscape for many of the receptors, including fencing, existing hedgerows/trees, tree planting, etc.
- The South Dublin County Development Plan 2016-2022 lists Athgoe Hill as a prospect to be protected from prominent public places. The only listed view within the vicinity of the site is from Hazelhatch Road to the west of the main site which this proposed development will not effect.

Sensitivity of visual receptors is therefore considered to be mainly low. Sensitivity is occasionally moderate for residential receptors that are adjacent or closer to the proposed site.

9.3.6 Magnitude of Change

Magnitude of change is the degree to which a given landscape or view will change as a result of the proposed development. This ranges from no appreciable change, to very high change, as per the following table.

Table 9.9 – Magnitude of Change

Very High (IV)	The proposed development completely changes the landscape or visual environment or a specific view.
High (III)	The proposed development changes a substantial part of the landscape or visual environment or a specific view.
Medium (II)	The proposed development partly changes the landscape or visual environment or a specific view.
Low (I)	The proposed development changes a small part the landscape or visual environment or a specific view.
No appreciable change	There is no noticeable change in the landscape or visual environment or view.

The proposed development will result in a medium to high magnitude of change to the landscape, which will give rise to landscape and visual effects. The likely extent of the change within the landscape context is considered to be significant as there will be intensive changes to landscape character within this localised area, which will be visible from several surrounding areas. The magnitude of change is somewhat ameliorated by the context of the site, being zoned for residential development within the Newcastle LAP. The magnitude of change will vary depending on the viewpoint from which it is viewed and how visible the proposed buildings are in that view. Although this is a relatively open site, views in are somewhat restricted by the enclosed nature of the agricultural field patterns and the proximity of the adjacent developments to the north and east.

With regard to quality of change, the proposed development is generally considered an to have a negative effect on the landscape. It will, however, be an improvement in the landscape amenity value of the site for users.

Some of the proposed buildings will block views of the wider landscape from some receptors and in these cases, this would be considered a localised negative impact. Construction stage impacts, where they occur, are of negative quality and short term, as the construction stage is expected to last less than seven years.

9.3.7 Significance of Landscape & Visual Effects

The significance of effects can be measured as a function of the magnitude of change (i.e. the degree of change from the baseline) and the sensitivity of the receptor, as described above. Table 9.9 below acts as a guide for the assessor in combining these assessment criteria. It is important to note that the assessor's professional judgement, common sense and experience are also factors in ascribing rational judgements for the significance of effects.

Table 9.10 – Level of Impact resulting from a combination of Sensitivity Rating & Magnitude of Change

	Magnitude of Change				
Sensitivity	**Very High**	**High**	**Medium**	**Low**	**No appreciable change**
Very High (IV)	Profound	Very Significant	Significant	Moderate	Slight
High (III)	Very Significant	Significant	Significant	Moderate	Slight
Medium (II)	Significant	Significant	Moderate	Slight	Not Significant
Low (I)	Moderate	Moderate	Slight	Not Significant	Imperceptible
No sensitivity	Slight	Slight	Not Significant	Imperceptible	Imperceptible

9.3.7 Summary

Despite the presence of the burgage hedgerows, the landscape sensitivity of the site can still be seen as low due to the existing residential zoning of the lands and the proposed setback and retention of the existing hedgerows. Visual sensitivity is generally low but steps to medium on viewpoints adjacent to the northern boundary of the site due to the closer proximity of receptors.

9.4 'DO NOTHING' IMPACT

The do-nothing scenario refers to the non-implementation of the proposed development. The primary effect of this would be that the impacts and effects identified would not directly occur. The subject lands would remain unused as open fallow land and the development of the land as set out in the 2016-2022 & Draft Development Plan of the Newcastle LAP would not be realised.

9.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development is described in Section Two of the EIAR. In brief, the development will consist of the construction of 280 no. dwellings, a creche and associated ancillary infrastructure on lands of c. 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to permitted creche c. 0.07 ha. in 'Graydon').

The proposed landscape characteristics are defined by an extensive street, pedestrian and cycle network linking the Graydon Development with the existing Athgoe Road. Within the development site there is a connected network of public and communal open spaces. Extensive sustainable drainage measures are included within these open spaces. Additionally, within the open spaces there are areas for informal play, casual recreation and passive leisure. The quality of these spaces is enhanced by the inclusion of features such as, seating, paths, native planting and landform, and the utilisation of environmentally appropriate materials.

Natural Play elements will be incorporated within the spaces. Natural Play incorporates designed elements that enable play spaces to blend in with their surroundings and encouraging interaction with the natural landscape., along with formal and informal play areas. The existing hedgerows on site are to be retained.

Figure 9.4 – Site Plan

9.6 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

The potential impacts are the effects that the development could have without consideration of landscape mitigation or amelioration – i.e. without landscape works. For the sake of clarity these shall be considered under the following headings:

- temporary effects (construction phase up to one year);
- short-term effects (construction phase up to two years);
- short-term effects (operation phase up to seven years);
- medium-term effects (operation phase, seven to fifteen years) and
- long-term effects (operation phase up to fifteen years to sixty years).

Effects lasting longer than sixty years are considered to be permanent, and this is noted where relevant.

These effects have been compiled to identify any areas where the proposed development may cause change to the scenic and visual character of the area and represent the potential effect rather than the eventual long-term effect. Landscape planting and other mitigation measures identified as part of the ongoing EIA process have been integrated into the plans as submitted for development. Notwithstanding, for this section, it is assumed that no specific landscape works are carried out with the construction of the development and that the open spaces are simply grass areas. This enables recognition of potential, rather than actual, effects which facilitates the identification of suitable landscape mitigation measures.

9.6.1 Construction Phase – Potential Landscape and Visual Impact

9.6.1.1 Landscape Effects

During this process the site will undergo a change from that of an area of previously disused pre-development and open fallow land to a large construction site. Any impacts generated at this stage will be short term in duration, save for some landscape effects which will be permanent.

There will be significantly negative effects on the existing landscape associated historic burgage hedgerows due to the construction works of this development. This will be due to the site clearance, the proposed linking in of the

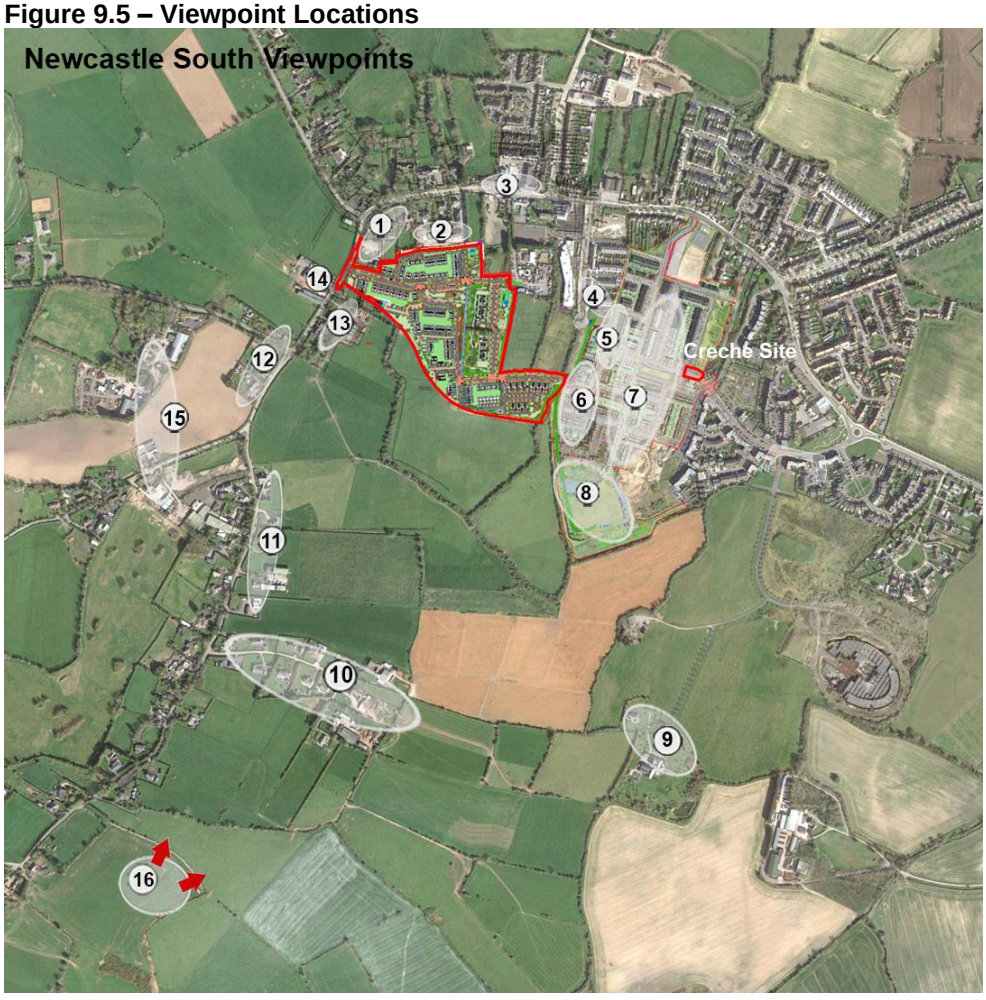
proposed road network with the existing road network, the building processes required to build the proposed development and associated distributor roadworks. Elsewhere, landscape impacts will be slightly negative due to the quality of the brownfield/fallow areas within the site. Burgage hedgerows will be retained. These hedges are of minimal arboricultural value due to the existing vegetation being highly sporadic and variable in condition. Portions have been highly modified over time.

There are large amounts of Bramble (*Rubus fruticosus*) and Ivy (*Hedera helix*) that are dominating the underlying hedge structure. The majority of the existing fabric of the hedges contain Hawthorn, (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) The hedges may offer some degree of ecological worth. However, the real value in these hedges lies with their historical importance as burgage plot boundaries.

9.6.1.2 Visual Effects

Visual impacts will be more acute than in the operational phase, but short term in duration. This is due to the construction traffic, site hoarding, cranes, etc. Cranes will be taller than the proposed buildings and therefore more visible in the landscape. There will also be vehicular and crane movement and changes to the configuration of the site, typical of building sites, resulting in visual impacts to local viewpoints. The following viewpoints have aggregated separate visual receptors into distinct groups with similar sensitivity and geographic location. The distances stated are approximate and are to the nearest point of the proposed site.

Figure 9.5 – Viewpoint Locations



- VP1,2 and 3: Several properties located to the south of Main Street (25m to 160m)
- VP4, 5, 6 and 7: Dwellings to the newly constructed Graydon development (60m to 120m)
- VP8: Users of Taobh Chnoic Park (yet to be constructed) (210m)
- VP9: Scattered one-off residential dwellings to the south east (660m)
- VP10: Scattered one-off residential dwellings to the south (390m – 520m)
- VP11: Scattered one-off residential dwellings to the south (390m – 520m)
- VP12: Scattered one-off residential dwellings to the south-west (250m)

- VP13 and 14: Scattered one-off residential dwellings directly to the west (30m – 70m)
- VP15: Scattered one-off residential dwellings further to the south-west (500m – 680m
- VP16: Elevated view from Athgoe Hill (1000m)

Note: The creche site has been assessed as part of the Graydon application in 2019 (ref: SHD3ABP-305343-19). As the creche site is within an area which is under construction presently, there are no receptors that can be affected by this element of the proposed development, in a landscape and visual context. There are therefore no likely significant effects associated with it and it is not considered further in this assessment.

The above viewpoints align with the verified views as completed by 3D Design Bureau (under separate cover).

The most substantive visual effects during construction will be experienced by varying adjacent residential receptors. Viewpoints 1, 2, 13 and 14 will be most affected, the proposed development works having a moderately negative visual impact at construction stage.

Other residents in these areas with oblique but no direct views from their properties will experience slightly negative visual effects from the public realm as they come and go from their dwellings and potentially from their rear, upper floor windows or gardens.

Table 9.11 – Construction Stage Visual Impacts without mitigation

View	Magnitude	Probability	Duration	Sensitivity	Quality	Significance of Effect
VP1	Medium	Likely	Short-Term	Medium	Negative	Moderate
VP2	Medium	Likely	Short-Term	Medium	Negative	Moderate
VP3	Low	Likely	Short-Term	Low	Negative	Not Significant
VP4	Not appreciable	Likely	Short-Term	Low	Negative	Not Significant
VP5	Not appreciable	Likely	Short-Term	Low	Negative	Not Significant
VP6	Low	Likely	Short-Term	Low	Negative	Not Significant
VP7	Not appreciable	Likely	Short-Term	Low	Negative	Not Significant
VP8	Low	Likely	Short-Term	Low	Negative	Not Significant
VP9	Not appreciable	Likely	Short-Term	Low	Negative	Imperceptible
VP10	low	Likely	Short-Term	Low	Negative	Imperceptible
VP11	Low	Likely	Short-Term	Low	Negative	Imperceptible
VP12	Low	Likely	Short-Term	Low	Negative	Imperceptible
VP13	Low	Likely	Short-Term	Low	Negative	Not Significant
VP14	Low	Likely	Short-Term	Low	Negative	Slight
VP15	Low	Likely	Short-Term	Low	Negative	Imperceptible
VP16	Not appreciable	Likely	Short-Term	Medium	Negative	Slight

9.6.2 Operational Phase

9.6.2.1 Potential Landscape Impacts <u>without Mitigation</u>

Short-term landscape impacts after the construction works (up to seven years).

Following construction, the main landscape impacts of the proposed development are associated with the change in land use from disused fallow lands of low/medium sensitivity to a more intensified residential use, as required in the Newcastle LAP.

This is considered to be a moderately negative impact, as the existing landscape is generally of low sensitivity. Where medium sensitivity exists to the eastern portion of the site where the existing hedgerows are present, the retention and enhancement of these hedgerows contributes towards giving a moderately negative impact, rather than any assessment of higher significance.

This short-term impact is likely to persist into the medium and long term in the absence of mitigation measures.

9.6.2.2 Potential Impact on Views without Mitigation

Potential visual impacts of the proposed development are assessed by examining potential views to the site of the proposed development that have the likelihood of being significantly affected. Verified Viewpoints from relevant viewpoints on public land are included under separate cover complied by 3D Design Bureau. Photographs of other viewpoints are not included due to the impact of the development being on privately owned land and the potentially ensuing access issues. The impact from these viewpoints have been assessed by professional evaluation according to the relevant prescribed methodologies as stated in Section 9.2.

The lands have been zoned for significant residential development within the South Dublin Development Plan 2016 – 2022 and the Draft South Dublin Development Plan 2022-2028, as well as the Newcastle LAP. This designation has been taken into consideration within the assessment of sensitivity of all viewpoints.

Generally the distance from the proposed site of the likely affected receptors mitigates the visual impact.
As the viewpoints get closer to the site the sensitivity and impact on views can increase. The most affected are the immediately adjacent residential receptors to the north and north-east of the development site, due to the distance from the site and the medium sensitivity of the views.

Table 9.12 – Viewpoint Effects

Ref.	Viewpoint location	Approx Distances from Site	Sensitivity Level	Duration of Effect	Quality of Effect	Description of Effect on View, incl Significance
V1	Rear of properties to Athgoe Road to the north-west of site	25 – 65m	Medium	Long-Term	Negative	There are potential direct views from rear upper floors of residential dwellings, and due to the distance from the site these are considered to be of medium sensitivity. The ground floor of the dwellings is screened by existing garden vegetation and/or boundary treatments Interceding vegetation to the north of the site also forms a screening element, as does the existing rail line. Due to the distance from the site and the existing wall and vegetation, the development will have a moderately negative impact on views.
V2	St Finians Way	25m	Medium	Long-Term	Negative	There are potential direct views from upper and lower floors of the newly built residential dwellings. There is an existing structural hedge/tree line that somewhat mitigates the effect on views. Due to the distance from the site and the existing vegetation, the development will have a moderately negative impact on views.
V3	Athgoe Road to the north of site	160m	Low	Long-Term	Negative	The potential views are to the south-west towards the site from the residential properties are partial and oblique from upper floor windows Interceding vegetation line form another screening element to the south. Due to the distance from the site and the interceding vegetation the effects on views will not be significant.
V4	Burgage Gardens	95 – 150m	Low	Long-Term	Negative	The view west and southwest towards the site from the residential properties are from upper floors and are partial and oblique, with the majority of dwellings facing north and south. Where some dwelling face east the existing school building blocks views Due to the distance from the site and the existing vegetation to the south, the development will have an imperceptible negative impact on views.
V5	Graydon Rd & Newcastle Blvd.	Approx. 150m	Low	Long-Term	Negative	The view west and southwest towards the site from the residential properties are from upper floors and are partial and oblique, with the majority of dwellings facing north and south. The proposed apartment blocks will be the most visible element. However, the existing development of Graydon Park and Graydon Row also screens the views. Due to the distance from the site and existing vegetation to the south, the effects on views will not be significant.

Ref.	Viewpoint location	Approx Distances from Site	Sensitivity Level	Duration of Effect	Quality of Effect	Description of Effect on View, incl Significance
V6	Graydon Park, Newcastle Blvd and Graydon Drive	40 – 100m	Low	Long-Term	Negative	The view west towards the site from the residential properties are from upper floors and are partial and oblique, with the majority of dwellings facing north and south. Due to the distance from the site and the interceding vegetation the effects on views will not be significant.
V7	Wider Graydon Development	Over 100m to the east	Low	Long-Term	Negative	Views of the development site are to the west and will be partial, glimpsed and oblique. Due to the distance and interceding Graydon development sensitivity is very low. glimpsed. Due to the distance from the site and the interceding development and existing vegetation the development will have an imperceptible negative impact on views.
V8	Users of Taobh Chnoic Park	Approx. 90m	Low	Long-Term	Negative	Views are to the north-west and will be partial and glimpsed. The southern portion of the park is approximately 8 metres higher than the floor levels of the nearest proposed units. This is however over a distance of 250 metres. The nearest portion of the park is approximately 3 metres higher that the proposed development. There is extensive existing tree lines and vegetation that provide good screening between the park and the development. Due to the distance from the site and the interceding existing vegetation, the effects on views will not be significant.
V9	Dwellings off Newcastle Blvd	Over 380m	Low	Long-Term	Negative	This consists of a detached house and a bungalow situated on slightly elevated lands to the south of the proposed development. The predicted effect on views would be not be significant, due to the distance to the site and the small portion of the viewshed occupied by the proposed development. Intervening boundary vegetation and field boundary vegetation also contributed towards mitigating the visual impact of the proposed development.
V10 & V11	Grand Scattered residential dwellings to the south and south-west	Various to site (350m distance at closest point)	Low	Long-Term	Negative	Viewpoint 11 comprises of detached properties on the eastern side of Athgoe Road, while Viewpoint 10 is accessed via a cul-de-sac off Athgoe Road. Both viewpoints have elevated distant views of the proposed development across existing field boundaries. The development would not have a significantly negative effect on existing views. This is due to the interceding topography of the slope; the nearest housing elements to the viewpoints would be less visible that parts of the proposed development towards the north of the site. The

Ref.	Viewpoint location	Approx Distances from Site	Sensitivity Level	Duration of Effect	Quality of Effect	Description of Effect on View, incl Significance
						existing field boundary vegetation also contributes towards a mitigation of the severity of impact on the existing views.
V12	Grand Scattered residential dwellings to the south west	290m south-west	Low	Long-Term	Negative	A group of dwellings to the west of Athgoe Road. Potential views of the development to the north-east are screened by existing vegetation, with potential occasional glimpsed views into the site from upper floor windows. Due to the distance from the site, intervening boundary vegetation and field boundary vegetation the effects on views will not be significant
V13	One-off dwellings to the east of Athgoe Rd & Tower House	30 - 100m	Low	Long-Term	Negative	Views to the north-east are oblique and potentially from upper floor windows where present. Existing and hedges also contribute towards screening the site. Due to the distance from the site, oblique views and existing vegetation, the effects on views will not be significant. Views to the east from the Tower House are of low sensitivity due to the residential zoning designation. The Tower House is anticipated to be part of the Open Space network within the Newcastle LAP. Due to this, the effect on views are not considered significant.
V14	One-off dwelling to the west of Athgoe Rd	50m	Low	Long-Term	Negative	Potential direct views exist east towards the site. Existing vegetation gives an element of screening. Due to the proximity of the site, the development will have a slightly negative effect on views not significant negative effect from the development.
V15	Scattered one-off dwelling further to the south-west.	Over 500m	Low	Long-Term	Negative	Scattered dwellings with potential views from upper storey windows towards the north-east. Due to interceding vegetation and the distance from the site, the effect of the development on views will be imperceptible.
V16	Athgoe Hill	1k south	Medium	Long-Term	Negative	Open views are available northwards from Athgoe Hill. The proposed development is visible in partial glimpses due to the existing hedgerow and tree vegetation. The development is seen as an extension of the existing Graydon development and as such blends into the existing urban fabric of Newcastle. Due to the distance from the site and interceding vegetation, the effect on views of the proposed development will be slight.

9.6.3 Potential Positive Impacts

The proposed development will have a positive impact on landscape amenity as there are three parks and considerable areas of open space and new greenways in the proposed development, which will be open to all residents of Newcastle. At present and historically, these fields are and have been in private ownership and were not accessible to the public.

9.6.4 Potential Cumulative Impacts

Within the Newcastle LAP boundary there are further lands zoned for development to the south of the proposed development. Any further development within the vicinity of the proposed lands could have the possibility of impacting on the same sensitive receptors as identified above. The cumulative effect of the impact of this future development associated with these zoned lands will contribute towards lessening the magnitude of the impact of the proposed residential development. However, these future developments will have further impact on the named receptors above that cannot at this stage be quantified but would be subject to their own assessment.

An adjacent development to the immediate north is currently at FI Stage with South Dublin County Council (Ref SD22A/0045). This is a continuation westwards of the newly constructed development on St Finian's Way. This may screen existing views southwards from properties within Viewpoint 1.

Taken together, these developments, and the lands zoned for development as envisaged in the LAP will result in very significant change to the landscape and visual environment. As this is in accordance with the LAP, the development is planned and orderly and while residential development will generate landscape and visual impacts, it is considered that the policies in the LAP, as well as planning and development standards for landscape treatments, retention of important vegetation and historic landscape patterns etc. will result in a continuation of high-quality development, such as that already granted permission at Graydon and adjacent, and will be in line with current and emerging trends. The new LAP creates several new public spaces for the people of Newcastle, improving landscape access and amenity. Thus, similar to the current development, cumulative impacts of further development may result in visual impacts to existing sensitive receptors of varying degrees, but overall, the expansion of the settlement in a planned and orderly manner will result in positive landscape amenity and access benefits with new public parks and greenways, including playing pitches, allotments and areas of high amenity value for the wider population.

9.7 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

The following recommendations are put forward to mitigate against the negative impacts mentioned above and to reinforce the positive impacts of the proposed development. Mitigation measures are proposed and considered only on the lands of the subject site.

9.7.1 Construction Phase

During the construction phase, site hoarding will be erected to restrict views of the site during construction. Hours of construction activity will be as set out in the Preliminary Construction Environment Management Plan and as set out in Chapter 2 of the EIAR.

9.7.2 Operational Phase

A comprehensive landscape architectural design for the entire site is proposed, integrating mitigation measures that are required to avoid or reduce potential negative effects of the development. Please see the landscape plans and reports by Murray & Associates, Landscape Architecture as submitted with the planning application for full details of the extensive landscape proposals. The primary measures of note are as follows:

- Retention of existing hedgerows associated with the historic landscape and burgage pattern
- Extensive tree planting to screen and soften the proposed development, create structure in the streetscapes, impart character to the proposed development and
- Extensive native shrub and hedgerow planting, as well as wildflower and perennial plantations to encourage pollinators and native wildlife. Planting is in accordance with the All-Ireland Pollinator Plan.
- Three new public parks with recreational space, habitat plantation and integrated Sustainable Drainage measures.
- Extensive areas of greenway and streetscape for walking and cycling.

The existing boundary hedges around the site to the east and north are to be retained. In areas where these existing boundaries need rehabilitation and filling in, semi-mature native tree planting, bare-root tree planting and native shrub planting is proposed as part of the planning application. This will create a landscape buffer space that will reduce the views into the site from adjacent properties to the east and south-east. The south-eastern edge of the site contains an open space that will have semi-mature tree planting, contributing to screening the development from properties to the south and south-east.

Native trees, shrubs and wildflowers will be used where possible, particularly in the buffer spaces surrounding the development site.

Internal streets within the development will also contain a substantial amount street tree planting that will continue to soften and screen the development over the medium to long-term as the trees and planting mature.

Mitigation measures are shown on the submitted landscape drawings. At time of planting, the proposed standard trees in the landscaped buffer zones will be at least 3.0m in height. The trees will reach a mature height of at least 7 to 15 metres, dependent on species within the medium term.

9.7.3 'Worst-case' Scenario

The views selected for analysis are those from where the proposed development is most likely to be visible and so the analysis of impacts, above, represents a worst-case scenario.

9.8 PREDICTED LANDSCAPE IMPACTS (RESIDUAL IMPACTS)

9.8.1 Construction Impacts and Effects on the Landscape

Tree Protection Measures to existing trees to be retained will protect the important burgage hedgerows within the site.

Screening measures implemented will not significantly change the assessment due to the distance from the site of the majority of receptors. The greatest visual impact from mitigation will be to dwellings to the north-west, a site hoarding element. This is specified for site protection and prevention of access and gives a small amount of amenity screening gain.

Therefore, anticipated residual effects will be as per Table 9.11 due to the short-term nature of the construction process and the proposed height and scale of the development.

9.8.2 Operational Impacts and Effects on the Landscape

9.8.2.1 Short-term landscape impacts after the construction works (up to seven years)

Following construction, the main landscape impacts of the proposed development are associated with the change in land use from agricultural lands of low sensitivity to a more intensified residential use, which, while the density is higher than that proposed in the Newcastle LAP, the subject lands have the capacity to absorb the range of building heights from 2, 3 and 5 storeys. This is considered to be a slightly to moderately negative impact, as the majority of existing landscape is of low sensitivity.

Where medium sensitivity exists closer to the eastern boundary with the burgage hedgerow, the new native tree and shrub planting, the increase in biodiversity and the strengthening of this existing ecological corridor will give a slightly positive impact on the landscape over the length of the hedgerow. However, as this is only a minority portion of the site area to the east, when considering the entirety of the site the assessment would remain slight to moderately negative. However, it is important to note that the proposed development is reflective of the existing and emerging development trends in the area in terms of massing and scale, located in 'Graydon' to the east.

9.8.2.2 Medium-term landscape impacts (seven to fifteen years)

As the existing planting matures on site the moderately negative impact will be reduced to a slightly negative impact upon the subject site.

9.8.2.3 Long-term landscape impacts (over fifteen years)

Maturing trees and hedgerows will further integrate the proposed development into the existing landscape, resulting in a long term not-significantly negative impact on the landscape.

9.8.3 Summary of Effects on the Landscape

The landscape impacts due to the proposed development would overall be not-significant and negative, particularly considering the general low sensitivity of the landscape and the fact that the most significant hedgerows will be retained and where hedgerows are removed, they will be reinstated or marked in the landscape design.

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 native trees and other planting will enhance the overall appearance of the new development.

The impact is primarily mitigated by the potential quality of the proposed public realm including new parks and greenways, the cohesive land use and pattern that would result, and the new spaces, landscape features and distinctiveness introduced by the proposed development and its associated landscape spaces and planting interventions. The proposed planting will substantially increase the tree resource and tree quality in the area overall.

Moderate positive landscape amenity impacts due to the provision of new parks and greenways occurs as a result of the proposed development.

9.9 PREDICTED VISUAL EFFECTS (RESIDUAL IMPACTS)

9.9.1 Operational Impacts and Effects on Visual Receptors

In the longer term, the assessment concludes that there will be some continuing moderately negative visual impacts to receptors immediately adjacent to the north and northeast, with not significant negative visual impacts to receptors to the west and south of the site and some imperceptibly negative/neutral visual impacts to the residential receptors further away to the south-east, west and east. As above, it is important to note that the proposed development is reflective of the existing and emerging development trends in the area in terms of massing and scale, located in 'Graydon' to the east.

The residual impacts on views is somewhat mitigated by the inclusion of additional tree planting, hedgerow planting, woodland planting, resulting in a slight improvement in screening measures to the south, though not significantly enough to change the assessment.

Table 9.13 – Predicted Visual Effects – Summary Table

View	Quality	Significance	Magnitude	Sensitivity	Probability	Duration
VP1	Negative	Moderate	Medium	Medium	Likely	Long-Term
VP2	Negative	Moderate	Medium	Medium	Likely	Long-Term
VP3	Negative	Not Significant	Low	Low	Likely	Long-Term
VP4	Negative	Not Significant	Low	Low	Likely	Long-Term
VP5	Negative	Not Significant	Low	Low	Likely	Long-Term
VP6	Negative	Not Significant	Low	Low	Likely	Long-Term
VP7	Negative	Imperceptible	Low	Low	Likely	Long-Term
VP8	Negative	Not Significant	Low	Low	Likely	Long-Term
VP9	Neutral	Imperceptible	Not appreciable	Low	Likely	Long-Term
VP10	Negative	Not Significant	Low	Low	Likely	Long-Term
VP11	Negative	Not Significant	Low	Low	Likely	Long-Term
VP12	Negative	Not Significant	Low	Low	Likely	Long-Term
VP13	Negative	Not Significant	Low	Low	Likely	Long-Term
VP14	Negative	Not Significant	Low	Low	Likely	Long-Term
VP15	Neutral	Imperceptible	Not appreciable	Low	Likely	Long-Term

View	Quality	Significance	Magnitude	Sensitivity	Probability	Duration
VP16	Negative	Slight	Low	Medium	Likely	Long-Term

9.10 MONITORING

9.10.1 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 planting season after completion of the main civil engineering and building work.

9.10.2 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. A landscape management plan accompanies the planning application.

9.10.3 Summary of Mitigation & Monitoring

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

Table 9.14 – Construction: Mitigation & Monitoring Measures

Likely Significant Effect	Mitigation	Monitoring
Visual: - Construction Traffic/Cranes	Site Hoarding	Regular site visits as per the Inspection Plan
Landscape: Site Clearance, Change from agricultural landscape to residential	Mitigation measures for landscape only applicable in operational phase	Inspection of tree and hedge protection measures to southern boundary

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

Table 9.15 – Operation: Mitigation & Monitoring Measures

Likely Significant Effect	Mitigation	Monitoring
Visual: Negative effect on adjacent visual receptors	Proposed tree planting will mature over time, contributing to the visual softening of the development.	Initial Defects period applicable as per regular planning grant. Landscape Management plan detailing maintenance of trees etc included as part of planning application.
Landscape: Change in landscape character	Retention of existing boundary hedgerows. Proposed planting within development of new native standard trees, native woodland, native wildflower meadow.	Regular maintenance regime by experienced landscape contractor

9.11 INTERACTIONS

The assessment of the landscape impacts associated with the proposed development has a number of interactions with other parameters of the assessment. In summary, these are as follows:

- Population and Human Health
- Biodiversity

The interactions of landscape with these parameters were as follows:

9.11.1 Population & Human Health

The landscape and visual impact associated with human beings focuses on the effects to dwellings. The proposed development generates visual effects; the effects and associated amelioration of these effects is discussed in the impact section of the chapter.

9.11.2 Biodiversity

The long-term effects of the proposed development will have a positive effect on the tree cover associated with the development. Extensive native wildflower meadow areas are proposed that further add to the diversity of native flora. Further consultation with the Ecological Consultant will take place at detailed design, implementation and monitoring stages to ensure adherence to best practice and sound ecological principles.

9.11.3 Accidents and Disasters

The proposed managed mitigation measures do not contribute to any potential risk with regards to relevant accidents or disasters.

9.12 SUMMARY

During construction there will be a change to the landscape and there will be short-term negative visual effects for residents and visitors to the areas adjacent to the site associated with construction activity.

Landscape works are proposed to reduce and partly offset any effects generated due to the proposed development, where possible. The mitigating effect planting substantial numbers of new native trees and other shrub and hedge planting, allied with the high-quality accessible public realm will enhance the overall appearance of the new development and partly compensate for the removal of existing hedgerows where needed for the construction works.

In the long term, the landscape effects due to the completed development would overall be not-significantly negative, considering the existing residential zoning designation within the Newcastle LAP (2012) against the change in character of the site and the removal of existing vegetation. The high-quality landscape treatments within the development and the additional ameliorative native planting to the existing hedgerow goes some way towards mitigating the negative effect.

The following conclusions are considered relevant in accordance with the EPA Guidelines 2022

- Public access: New access to lands currently and historically in private ownership is included in the proposed development in the form of three new public parks and new greenways. This is considered a moderate positive effect of the development.
- Public amenities: The new parks and greenways will improve the public amenities of Newcastle significantly for all of the population, not just residents of this proposed development.
- Recreation: The recreational opportunities afforded by the above-mentioned parks will be primarily passive recreation, as well as walking, exercise and kickabout space.
- Tourism: The proposed development is unlikely to benefit tourism, nor detract from tourism potential.

In the longer term, the assessment concludes that there will be some moderately negative visual effects to receptors immediately adjacent to the north-east of the site, with slight or not significant negative and imperceptible visual effects to the remaining residential receptors to the east, south and west.

10.0 MATERIAL ASSETS - TRAFFIC AND TRANSPORTATION

10.1 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.

This Chapter of the EIAR has been prepared by Mark McKenna BEng (Hons) MSc CEng MIEI. Mark is a Chartered Senior Transportation Engineer with over 10 years' experience in the design and planning of traffic & transportation projects. Projects have included works associated with the commercial, residential and transport infrastructure sectors. Mark has been involved in leading the traffic and transport deliverables of development planning applications including the generation of Traffic & Transport Assessments, Mobility Management Plans and Traffic & Transport input into Environmental Impact Assessment Reports.

The information outlined within this chapter has been extracted from the proposed development's Traffic and Transport Assessment (TTA) Report which has been submitted as part of this planning application and should be referenced for further details of the assessment undertaken.

10.2 CONSULTATION

In addition to the statutory S.247 and Tri-Partite consultations, DBFL consulted with SDCC roads department in relation to the Athgoe Road and connectivity from the subject site to Newcastle Main Street. It was agreed to provide a footpath on the eastern side of the carriageway to link the development to the exiting footpath to the north on the Athgoe Road and provide pedestrian connectivity to Newcastle Main Street. In order to provide a 2m wide footpath the road carriageway will be reduced to 6.5m wide. This layout is displayed on drawing 210026-DBFL-RD-SP-DR-C-110.

10.3 BACKGROUND

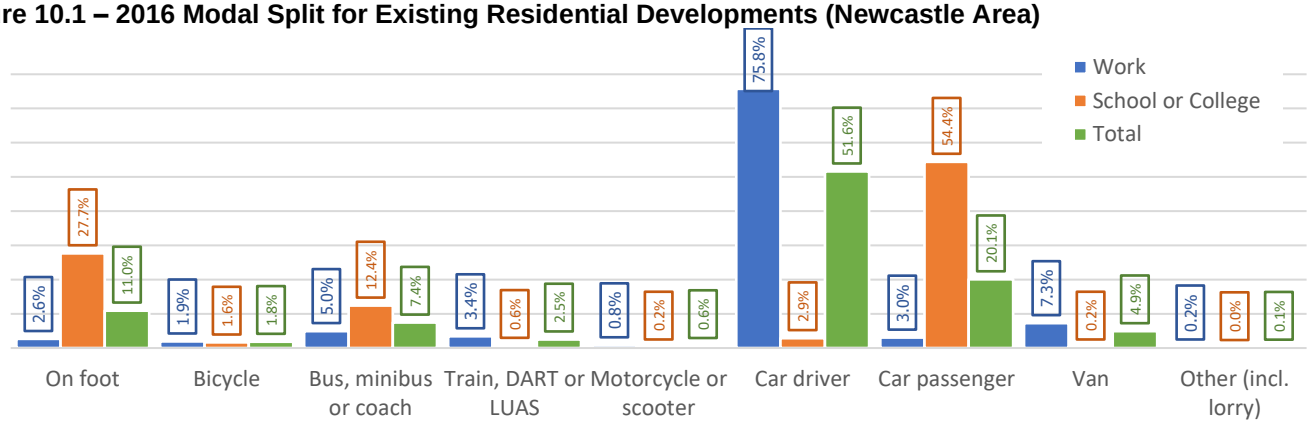
The approach to this assessment accords with policy and guidance both at a national and local level. Accordingly, the adopted methodology responds to best practices, current and emerging guidance, exemplified by a series of publications, all of which advocate the adopted method of analysis. Key publications consulted include:

- 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (May 2022) Environmental Protection Agency
- 'Traffic and Transport Assessment Guidelines' (May 2014) Transport Infrastructure Ireland,
- 'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003);
- Guidelines for Traffic Impact Assessments' The Institution of Highways and Transportation;
- Newcastle Local Area Plan 2012; and
- South Dublin County Development Plan 2016-2022
- Draft South Dublin County Development Plan 2022-2028.
- Design Manual for Urban Roads and Streets (DTTS, DHPLG 2013)
- National Cycle Manual (NTA, 2011)
- Design Standards for New Apartments – Guidelines for Planning Authorities (DHPLG, March 2018)

10.3.1.1 Trip Generation

It is predicted that, particularly in the 2024 Opening Year (when, for the purposes of this assessment, it has been assumed that all 128 no. houses will be constructed and occupied), the residents travel mode share will be similar to that illustrated in **Figure 10.1** (local area 2016 Census data). Nevertheless, with the objective of investigating the long term vehicle trip demand that could potentially be generated by the proposed development, trip rates have been derived from the TRICS database for residential developments with similar characteristics to the subject development site. These vehicle trip rates as predicted by TRICS are presented in **Table 10.2** and **10.3** below.

Figure 10.1 – 2016 Modal Split for Existing Residential Developments (Newcastle Area)



Based on the mode share proportions derived from the Census 2016 data, the total person trips can be estimated.

It has been assumed that the predicted vehicle trips generated by the subject residential development (as predicted in the TRICS trip generation database as discussed further below) correspond to the proportion of vehicle trips derived within the Census mode share data. **Table 10.1** below presents the predicted person trips generated by the subject residential development during the AM (08:00-09:00) and PM (17:00-18:00) peak hours.

Table 10.1 – Predicted Residential Person Trip Generation

Mode of Travel	Average Mode Share (%)	AM Peak Hour		PM Peak Hour	
		Arr	Dep	Arr	Dep
On Foot	11.0%	4	11	16	8
Bicycle	1.8%	1	2	3	1
Bus, minibus or coach	7.4%	3	8	11	6
Train, DART or LUAS	2.5%	1	3	4	2
Motorcycle or scooter	0.6%	0	1	1	0
Car driver	51.6%	19	53	74	40
Car Passenger	20.1%	7	21	29	16
Van	4.9%	2	5	7	4
Total Person Trips		37	104	144	77

Table 10.2 presents the predicted trip generation and the estimated traffic flows arriving and departing the proposed development during the morning and evening peak hour periods.

Table 10.2 – Proposed Residential Development Trip Rates

Land Use	Unit	AM Peak Hour		PM Peak Hour	
		Arr	Dep	Arr	Dep
Houses	Per Unit	0.081	0.267	0.309	0.168
Apartments	Per Unit	0.056	0.130	0.120	0.347

Based on the above trip rates, potential peak hour vehicle traffic flow has been calculated based on the total development quantities (i.e. 280 residential units). **Table 10.3** summarises the predicted AM and PM peak hour traffic generated by the proposed development. The trip generation exercise predicts that the subject Newcastle South residential development could generate 73 no. and 115 no. two-way vehicle trips in the AM and PM peak hours respectively.

Table 10.3 – Proposed Residential Development Trips

Unit Type	AM Peak Hour			PM Peak Hour		
	Arr	Dep	2-way	Arr	Dep	2-way
Apartment / Duplex	9	20	29	35	18	53
House	10	34	44	40	22	62
Total	19	54	73	75	40	115

10.3.1.2 Impact on Junctions

The TII document 'Traffic and Transport Assessment Guidelines (2014)' states that the impact of a proposed development upon the local road network is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the networks operational performance.

In accordance with TII guidelines we have undertaken an assessment to establish the potential level of impact upon the key junctions of the local road network for an adopted Opening Year (2024) and Future Design Year (Opening Year +15 years). To enable this calculation to be undertaken we have based the analysis upon the 2024 Opening Year and 2039 Future Design Year.

There are currently no definitive criteria for assessing "significance of effects" ratings against the seven generalised degrees of effect significance as set out in the EIAR Guidelines (2022) for traffic impacts. As introduced above, TII guidance does provide thresholds for determining when to carry out a traffic assessment for a planning application: if a proposed development is likely to increase traffic by 10% (or 5% in traffic sensitive or congested areas), the planning application should be accompanied by a traffic assessment. It should be noted that the TII guidance does not provide criteria for assessing significance of impacts for EIA purposes. Nevertheless, the prevailing traffic levels local to the proposed development and professional judgement, a significance effect rating has been assigned to the different levels of potential traffic increases (see **Table 10.4**). This is intended to guide the assessment of the potential impact of the proposed development.

Table 10.4 – Rating of Effects based on Traffic Contribution

Significance of Effects	Traffic Increase
Imperceptible	0-2.5%
Not Significant	2.5-5%
Slight	5-10%
Moderate	10-20%
Significant	20-30%
Very Significant	30%-50%
Profound	50%+

10.3.1.3 Parking

10.3.1.4 Car Parking

As presented in the Architects Site Layout Plan and included as part of the subject planning application documentation, the proposed development layout design provides a total of 423 no. car parking spaces comprising 251 no. for the houses and 172 no. for the apartment / duplex units (13 no. car parking assigned to the creche as permitted within the Graydon development and outside of the subject application site boundary). **Table 10.5** below provides a summary of the proposed vehicle parking provision. The provision of 423 no. residential car parking spaces is comparable to the SDCC development plan 2016-2022 standards requirement of and the DHPLG standards for apartments which requires a maximum car parking requirement of 434 no. spaces for the number of units proposed. The proposals include for a total of 172 no. apartment / duplex car parking spaces which is slightly lower than the DHPLG requirement of between 190 to 203 no. car parking spaces respectively. This level of car parking provision is considered appropriate due to the following:

- A car parking management regime will be implemented by the management company for the apartment and duplex units. All of the proposed development's on-site apartment / duplex car parking facilities whilst accessible via public roads will not be located within public areas (i.e., areas adopted by the local roads authority). Accordingly, the proposed developments on-site apartment/ duplex car parking spaces will remain within the control of the appointed management company. A management regime will be implemented by the development's management company to control access to these on-site apartment car parking bays thereby actively managing the availability of on-site car parking for residents / visitors. The residents within one of the proposed residential apartments / duplexes will NOT include the ownership of a designated parking space. Nevertheless, all residents of the proposed apartments/ duplexes will have the opportunity to apply to the management company for both a (i) residents car parking permit (updated annually or upon return of same permit) to the management company to gain access to a dedicated (assigned) on-site car parking space or (ii) a visitor's car parking permit (which will be issued electronically and subject to time restrictions). A nominal charge will be applied to obtain a permit with the objective of covering the associated management and enforcement costs. Each permit will enable the resident (or visitor) to park a vehicle within a specific assigned parking bay within the car park for a defined period of time. This management regime will enhance the availability of on-site car parking, ensure that every resident who needs car parking can avail of an on-site car parking space whilst residents that do not own a car are not unnecessarily assigned a car parking space;
- 4 no. car share spaces are proposed. The benefits of providing car share spaces are discussed further below; and
- A much higher cycle parking provision is proposed compared to the development plan minimum requirement thereby ensuring travel by bicycle to / from the subject development site is a viable option.

Disabled car parking spaces are required at a rate of 5% of total car parking provision for the apartment / duplex units which equates to a total of 8 no. dedicated mobility impaired car parking spaces. 13 no. mobility impaired parking spaces are proposed, with 10 to serve the residential units and 1 for the creche (5% required as per SDCC development plan 2016-2022 which equated 2 1 no. bay), and 2 no. universal access drop off bays. Accordingly, this level of provision complies fully with the local development management requirements.

A total of 38 no. electrical vehicle car parking spaces are proposed which equates to 21% of the apartment / duplex car parking provision. It is assumed that residents of the housing units can utilise their private power supply to charge electric vehicles parked in-curtilage and infrastructure in place to allow for future installation of charging points. This provision is higher than both the current SDCC development plan 2016-2022 which requires 10% of parking spaces and draft development plan 2022-2028 which requires 15-20% of parking spaces.

5 no. car share spaces for car club members (e.g. GoCar) are proposed within the development site boundary including 2no. located in close proximity to the houses, 1 no. located at the apartment blocks, 1 no. located at the duplex units and 1 no. located at the creche. Residents / visitors of the subject development can book cars online or via the app for as little as an hour, then unlock with their phone; the keys are in the car, with fuel, insurance and city parking all included.

Table 10.5 – Proposed Car Parking provision

Land Use	General	Visitor	Disabled	Electric Vehicles	Car Share	Total
Apartments	84	6	5*	16	1	**112**
Duplexes	36	8	5*	10	1	**60**
Houses	227	10	2	10	2	**251**
Creche	9	-	1	2	1	**13**
Subtotal	356	24	13	38	5	**436**
Total	**436**					

* Includes 1 no. drop off space

10.3.1.5 Cycle Parking

A total of 364 number residential bicycle parking spaces are proposed as part of the development scheme comprising 252 no. long stay secured / sheltered spaces for the residential units and 112 no. short stay parking spaces for the residential units. 6 no. long stay cycle parking spaces are proposed for the creche comprising in addition to the short

stay provision permitted as part of the Graydon development located outside the subject application site boundary. **Table 10.6** below provides a summary of the cycle parking provision proposed. The proposed overall cycle parking provision of 370 spaces is 321 (or over 655%) higher than the current Development Plan minimum requirement and 140 (or 61%) higher than the draft Development Plan minimum requirement. The proposed apartment / duplex cycle parking provision of 330 spaces represents approximately 96% of the DHPLG requirement (344 no. spaces).

Table 10.6 – Proposed Cycle Parking provision

Land Use	Long Stay	Short Stay	Total
Houses[1]	16	18	**34**
Apartment Blocks	172	66	**238**
Duplexes / GF Apts	64	28	**92**
Creche	6	-[2]	**6[2]**
Total	**258**	**112**	**370**

1 Houses with external side access to rear gardens can utilise rear gardens for long stay cycle parking
2 Additional 22 no. Short stay parking are permitted Graydon Residential Development – not included in subject application

10.4 METHODOLOGY

The methodology incorporated a number of key inter-related stages as per the TII Guidelines, including:

- **Background Review:** This important exercise incorporated three parallel tasks which included (a) an examination of the local regulatory and development management documentation; (b) an analysis of previous 'transport' related, strategic and site specific studies of development and transport infrastructure proposals across the Newcastle area, and (c) a review of planning applications to establish the legal status of various third party development schemes that were either considered within the strategic 'transport' studies or which have emerged and received full planning permission.
- **Site Audit:** A site audit was undertaken to quantify existing road network issues and identify local infrastructure characteristics, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport. An inventory of the local road network was also developed during this stage of the assessment.
- **Traffic Counts:** Classified junction traffic counts in addition to automatic traffic counts were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed residential development.
- **Trip Generation:** A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed residential development.
- **Trip Distribution:** Based upon both the existing and future (for the adopted assessment future design years i.e. Opening year plus 5 years and plus 10 years as per TII Guidelines) network characteristics, a distribution exercise has been undertaken to assign site generated vehicle trips across the local road network.
- **Network Impact:** Ascertain the specific level of influence generated by the proposed development upon the local road network and subsequently identify which junctions need to be assessed in greater detail in accordance with the appropriate NRA (TII) guidelines.
- **Network Analysis:** Further to quantifying the predicted impact of vehicle movements across the local road network for the adopted optimum site access strategy more detailed computer simulations have been undertaken to assess the operational performance of key junctions in the post development **2023, 2029 and 2039** development scenarios.

10.5 RECEIVING ENVIRONMENT

10.5.1.1 Site location

The general location of the subject site in relation to the surrounding road network is illustrated in **Figure 10.2** below whilst **Figure 10.3** indicatively shows the extent of the subject site boundary and neighbouring lands. The subject Newcastle site is located approximately 4km north west of Rathcoole and 10km northwest of Tallaght whilst Dublin City Centre lies approximately 18km to the northeast.

Figure 10.2 – Site Location

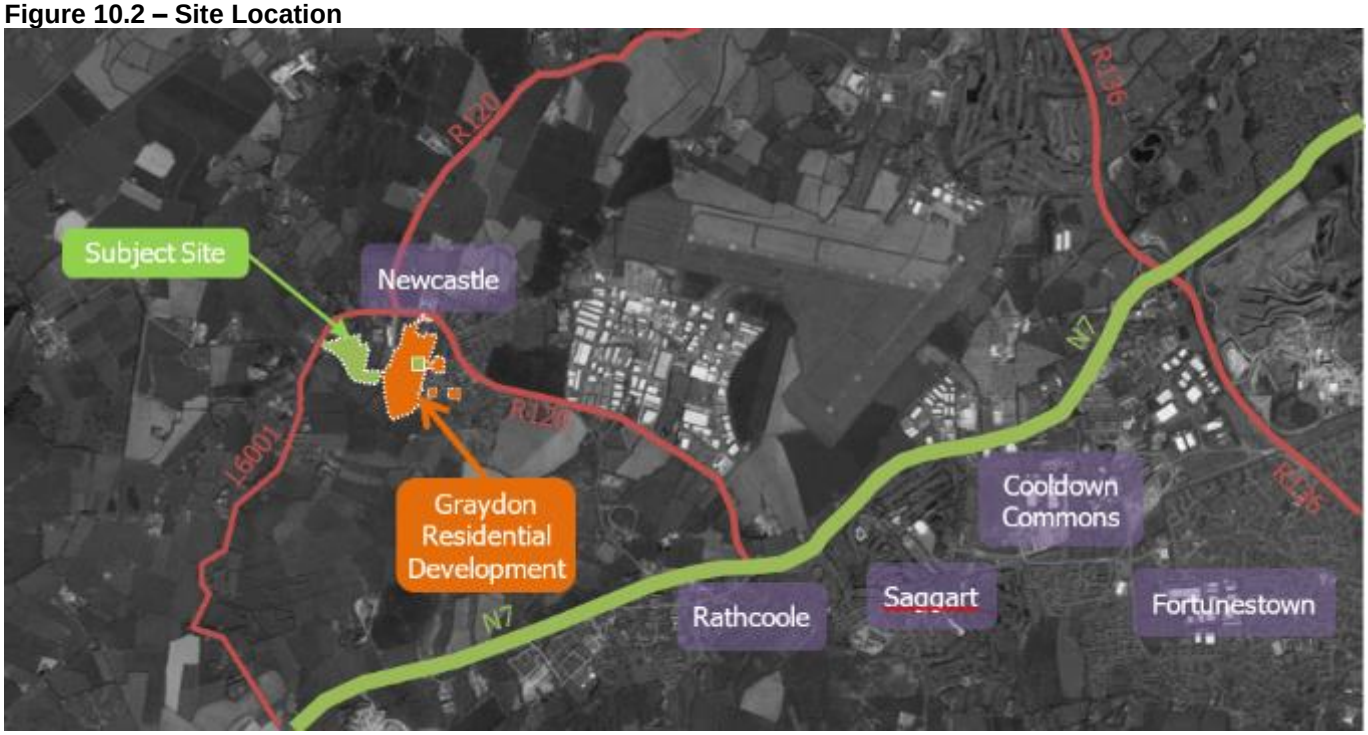
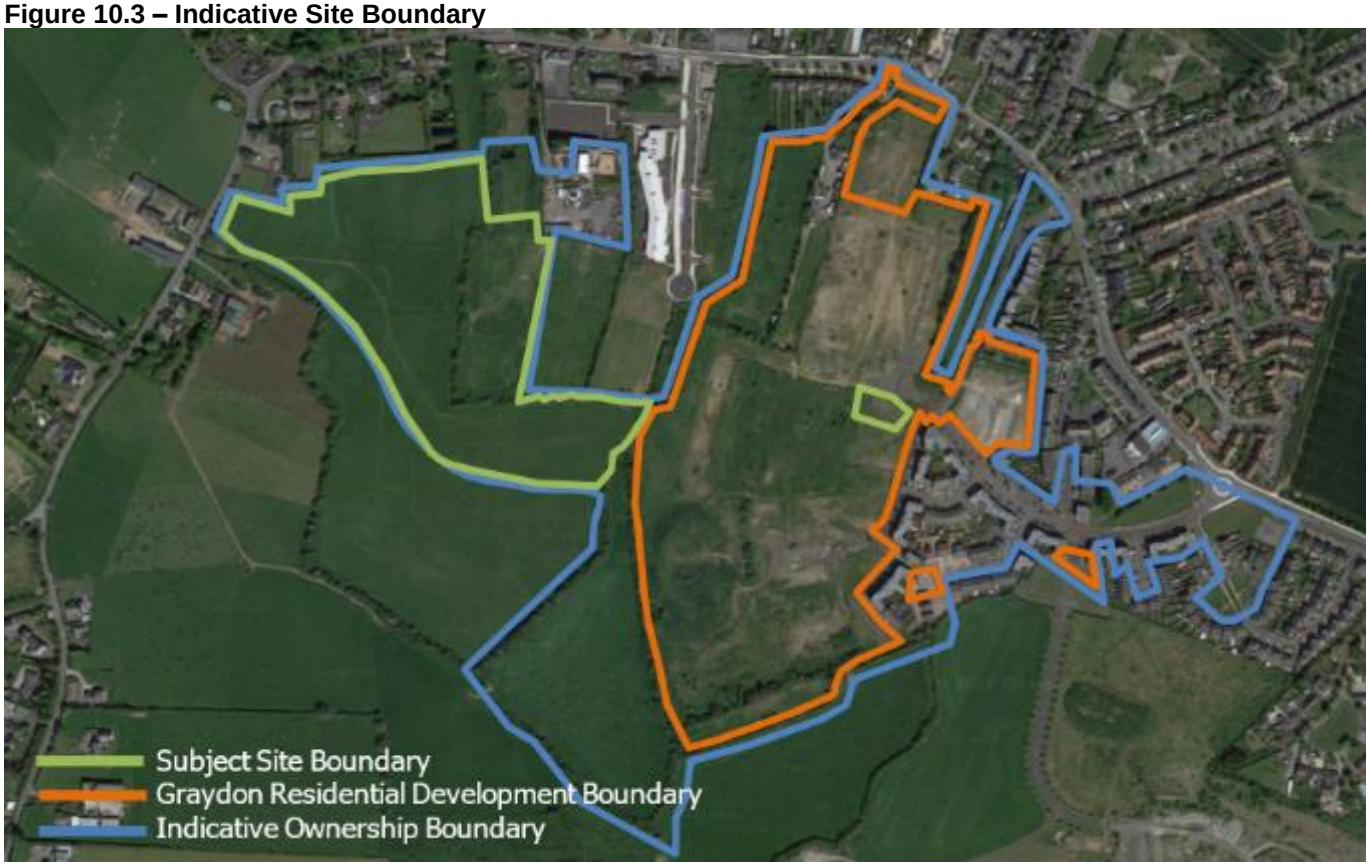


Figure 10.3 – Indicative Site Boundary



The development site is bounded by the R120 road corridor to the north in addition to a number of residential units. The emerging Graydon residential development scheme forms the eastern boundary whilst the Athgoe Road (L6001) corridor forms western site boundary comprises. The southern boundary is formed by Agricultural lands.

10.5.1.2 Local road network

The subject lands are bounded to the north by Newcastle Main Street (R120) and existing / emerging residential dwellings. Travelling west and north along the R120 leads to Lucan (8km) and the N4 corridor (J4). Continuing west along Newcastle Main Street leads to the R405 corridor which provides access to Celbridge (6km), Maynooth (12km) and the strategic M4 Motorway.

The N7 national road corridor is located approximately 3.5km to the south east and is accessed along the R210 via the Rathcoole Interchange. Travelling northbound on the N7 leads to the M50 motorway and Dublin City Centre. The strategic M7 motorway is accessible by travelling southbound on the N7.

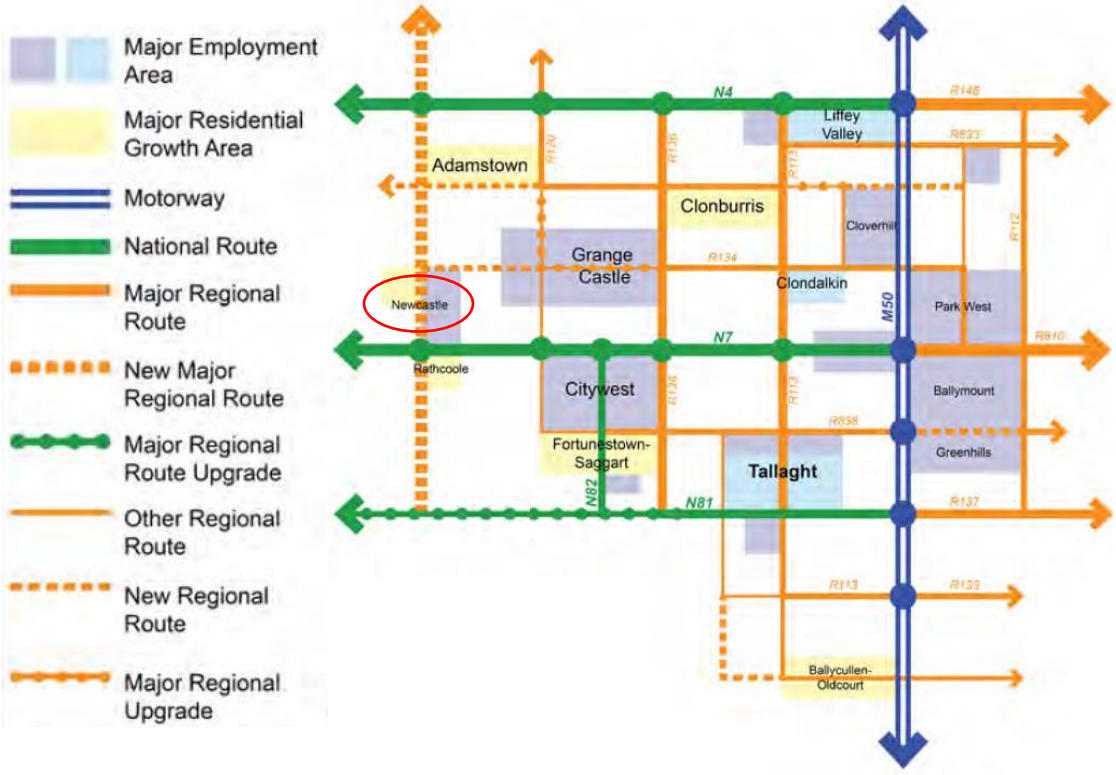
The proposed site access on Athgoe Road is positioned within a 60kph zone whilst the 50kph zone commences approx. 20m to the north.

10.5.1.3 Proposed road improvements

The South Dublin County Development Plan 2016-2022 proposes a "strategic road network consisting of national and regional routes". Newcastle is located along / adjoining a route designated as a "New Major regional Route" as presented in Figure 10.4 below. Table 6.5 of the Development Plan (and Table 7.5 of the Draft Development Plan 2022-2028) lists 6-year roads objectives of which 2 will, once complete, improve road infrastructure within and / or travelling to Newcastle and include;

- Newcastle Street Network – includes various streets within the Newcastle LAP lands;
- Newcastle Road (R120) – comprises junction upgrades at Supervalu roundabout, Hillcrest Road and N4 overbridge; and
- Western Dublin Orbital Route – comprises a new road from the N81 to the Leixlip interchange (medium / long term objective in the current development but 6 year objective in the draft development plan)

Figure 10.4 – SDCC Strategic Road Network



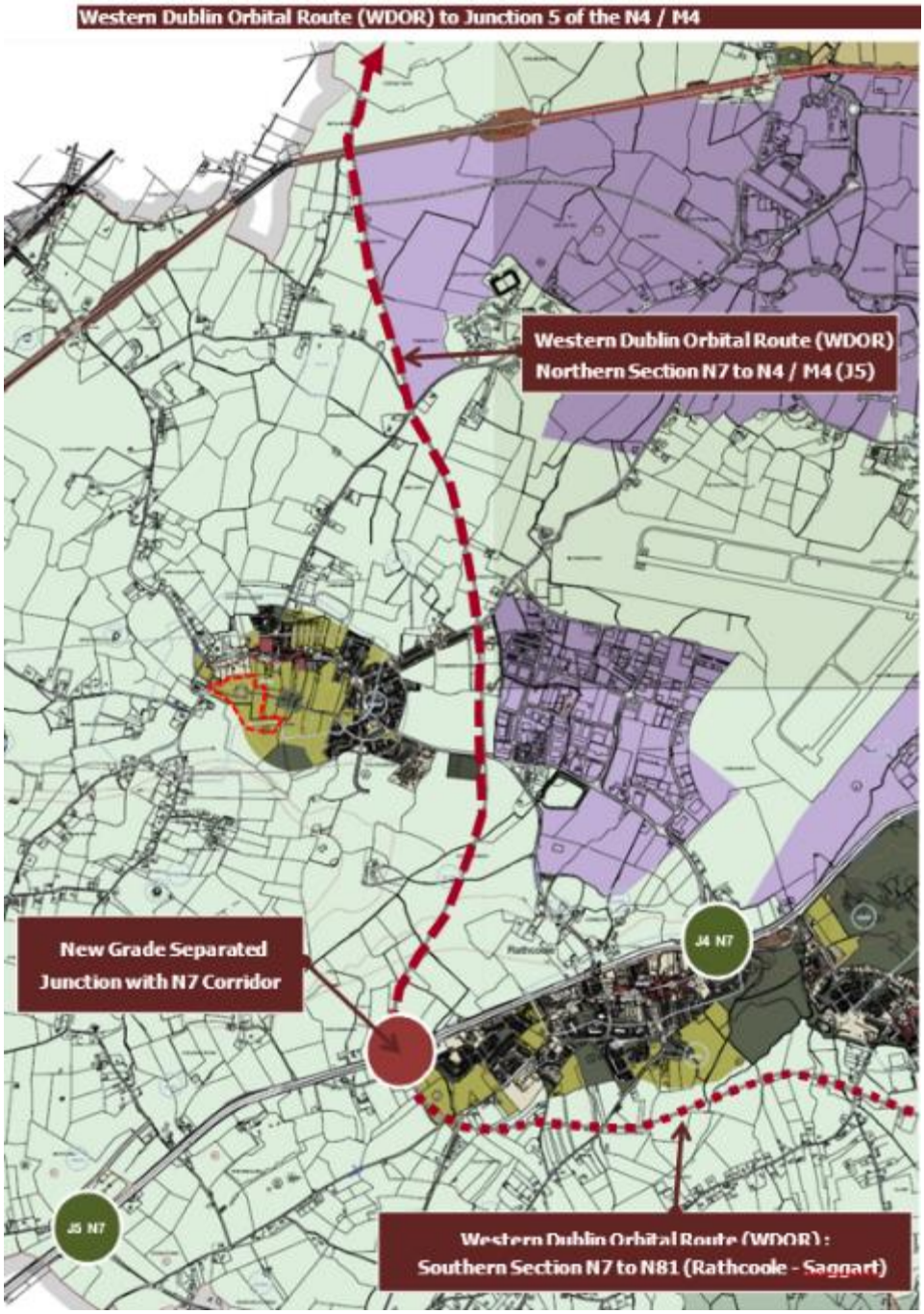
(Source: Fig 6.3 SDCC Development Plan 2016-2022)

A medium to long term objective in the current development plan (but 6 year objective in the draft development plan), , promotes the provision of the Western Dublin Orbital Route (North) which is a "New high capacity road from

Tootenhill to the Leixlip Interchange (with a provision to make a further connection to the N3)". This roads objective will form a "Major regional link between the N7 to N4". Furthermore, of the Western Dublin Orbital Route (South) is proposed also as a medium to long term objective and is described as a "New road from Boherboy to Tootenhill" which will act as a "link between the N81 and the N4 with a by-pass function around Rathcoole and Saggart". Figure 10.5 below presents the location of these SDCC road infrastructure proposals relative to the subject development site lands.

The future delivery of the Western Dublin Orbital Route will transform Newcastle by removing all through traffic. Accordingly, the quantum of vehicle movements along the R120 and through the busy N7 Rathcoole Interchange (Junction 4) will reduce dramatically in time.

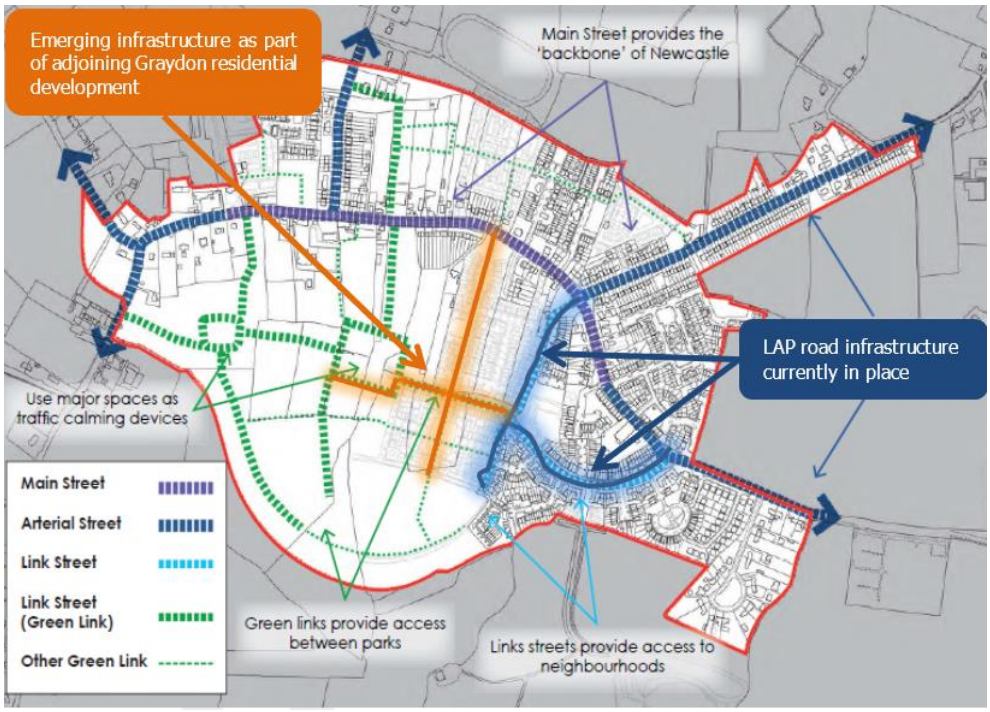
Figure 10.5 – Western Dublin Orbital Route Proposal



(Source: SDCC Dev. Plan Maps)

The subject development site is located within the Newcastle LAP lands. The Newcastle LAP 2012 (Extended to December 2022) includes an movement framework map which indicatively shows the proposed road network within the LAP lands (**Figure 10.6**).

Figure 10.6 – Newcastle LAP Overall Strategy Map



(Source: Fig 5.6 Newcastle LAP 2012)

10.5.1.4 Baseline traffic data

With the objective of quantifying the existing traffic movements across the local road network vehicle turning counts were undertaken at a number of local junctions. Weekday traffic counts (classified junction turning counts) were conducted by Irish Traffic Surveys LTD over a 13-hour period from 07:00 to 20:00 on Thursday 31st March 2022 at the following eleven junctions:

- Junction 1 – Lyons Road / Athgoe Road priority junction
- Junction 2 – Athgoe Road / Site Access
- Junction 3 – Athgoe Road / R405 Hazelhatch Road
- Junction 4 – Peamount Road / Main Street 3-arm priority controlled junction
- Junction 5 – Graydon Road / Main Street priority controlled junction
- Junction 6 – Burgage Street / Main Street / Aylmer Road signal controlled junction
- Junction 7 – Newcastle Boulevard / R120 roundabout controlled junction
- Junction 8 – Newcastle Boulevard / Burgage Street priority controlled junction
- Junction 9 – Hazelhatch Road canal crossing signal controlled shuttle system
- Junction 10 –R120 (N) / N7 slip road roundabout controlled junction
- Junction 11 –R120 (S) / N7 slip road roundabout controlled junction

The analysis of the survey results established that the local weekday AM and PM peak hours currently occur between 08:00 – 09:00 and 17:00 – 18:00 respectively.

Figure 10.7 – Traffic Survey Locations

10.5.1.5 Pedestrian and cycling facilities

Currently there are cycle lanes in on both sides of the Burgage Crescent, Newcastle Boulevard corridors (**Figure 10.8**) and along the main spine road through the emerging Graydon residential development lands located to the east of the subject Newcastle South development lands.

Figure 10.8 – Pedestrian & Cycle Facilities on Newcastle Boulevard and Burgage Crescent

To the northeast of the subject site lands, a 2-way cycle track is located on the western side of the St. Finian's school access road (**Figure 10.9**) which will in the future also serve the recently constructed (Pl. Ref. SD17A/0378) 40 unit residential development located to the east of St. Finian's NS access road.

Figure 10.9 – Pedestrian & Cycle Facilities on St. Finian's Access Road

Along the R120 (north of the subject site) a footway is currently provided along both sides of the carriageway with street lighting on the southern side of the corridor (**Figure 10.10**).

Figure 10.10 – Pedestrian Facilities Along R120

Figure 10.11 – Existing Link to Main Street from St. Finian's Way

10.5.1.6 Public transport accessibility

Dublin Bus operates two routes (one of which is an express route) that serve the subject site locale including the number 68/a and 68x (Newcastle – Greenogue Business Park Towards Dublin City Centre). These routes provide links from the Newcastle Main Street to the city centre and all intermediate destinations. The associated bus stops are all within convenient walking distance (approx. 500m) of the subject site. The scheduled number of bus services to and from the city centre are outlined in **Table 10.7** below. During peak frequency, the 68/A operates every 30-45 minutes.

Table 10.7 – Dublin Bus Service Frequency (No. of services per day)

Bus Route	Weekdays		Saturdays		Sundays & Bank Holidays	
	To City Centre	From City Centre	To City Centre	From City Centre	To City Centre	From City Centre
66/a	22	20	19	17	13	13
68x	1	-	-	-	-	-

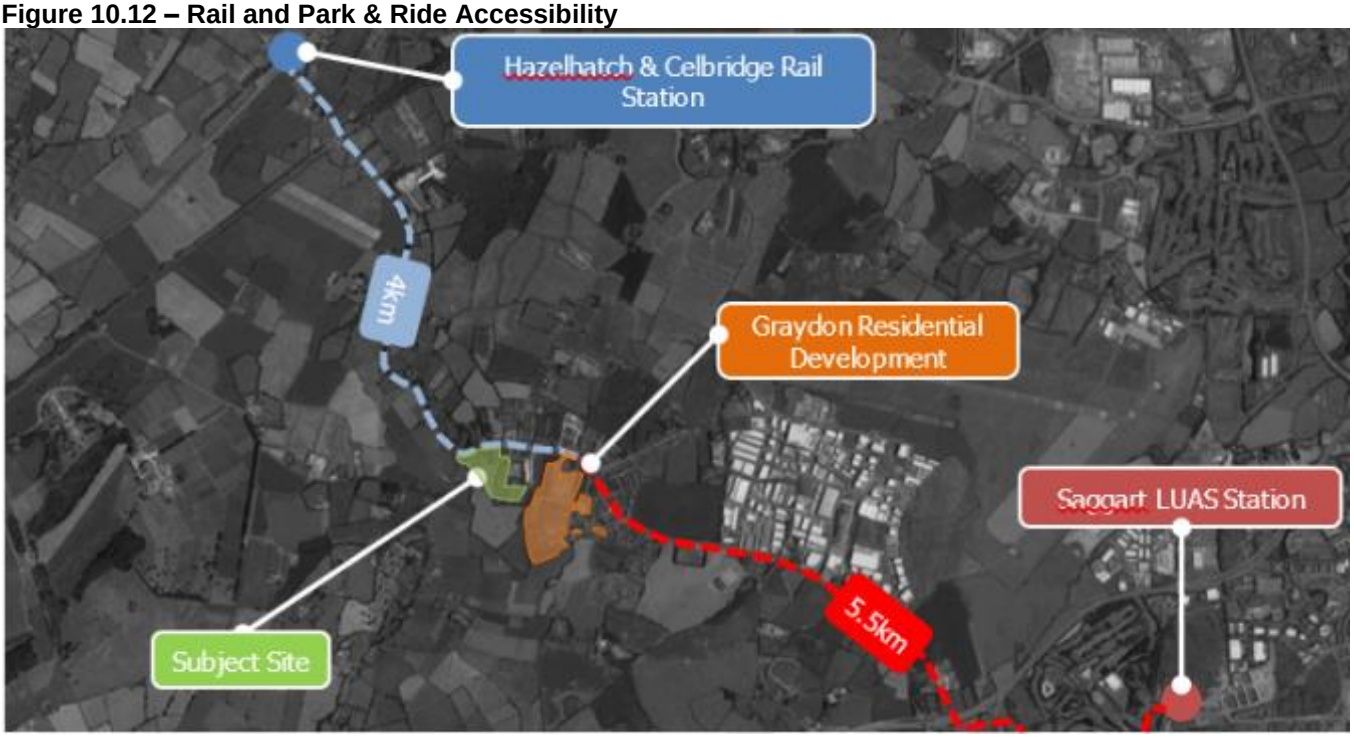
The subject development site is located approximately 4km away from the Hazelhatch and Celbridge rail station where services are available between Dublin Heuston and various destinations including Cork, Galway and Limerick / Ennis. The Hazelhatch and Celbridge rail station benefits from a Park & Ride facility incorporating 400 no. car parking spaces making travel by rail a feasible alternative to future residents of the subject development. In addition, 30 no. sheltered cycle parking spaces are available in addition to bike lockers.

Furthermore, the Saggart LUAS station and Cheeverstown LUAS Park & Ride station are located approximately 5.5km and 8.0km respectively to the east of the subject site providing access to LUAS Red Line services operating between Saggart and Connolly Station / The Point via Dublin City Centre. In addition, Dublin Bus Route 68 provides access to LUAS services at the Kylemore LUAS stop by way of bus stops located in close proximity to this LUAS interchange. At the Kylemore interchange, LUAS Red line services operate between 05:33-00:16 Monday to Friday, 06:12-00:16 on Saturday's and 07:02-23:16 on Sunday's (and Bank Holiday's). A summary of the average LUAS frequency by day of the week is presented in **Table 10.8** below.

Table 10.8 – LUAS Red Line Service Frequency (Minutes)

Time	Monday – Friday	Saturday	Sunday
Earlier than 07:00	7	-	-
07:00 – 10:00	4	9	9-12
10:00-16:00	4	6	
16:00-19:00	4	6	
Later than 19:00	11	11	11

Figure 10.12 – Rail and Park & Ride Accessibility



10.5.1.7 Public transport capacity

A Public Transport Network Capacity report has been produced by Derry O'Leary and is submitted as part of this planning application.

In concludes that, in terms of existing bus network capacity, both the 68/A and 68X currently operate with 76% spare capacity at the Main Street bus stop.

With the inclusion of the proposed development and associated additional bus patronage, assuming a worst case scenario that all additional bus trips occur within the busiest 30 minute AM peak period, there is predicted to remain spare seated capacity of 66% for a 67 seater bus. Accordingly, the the current level of spare seated capacity would cater for this increase even during the busiest period in the AM peak hour.

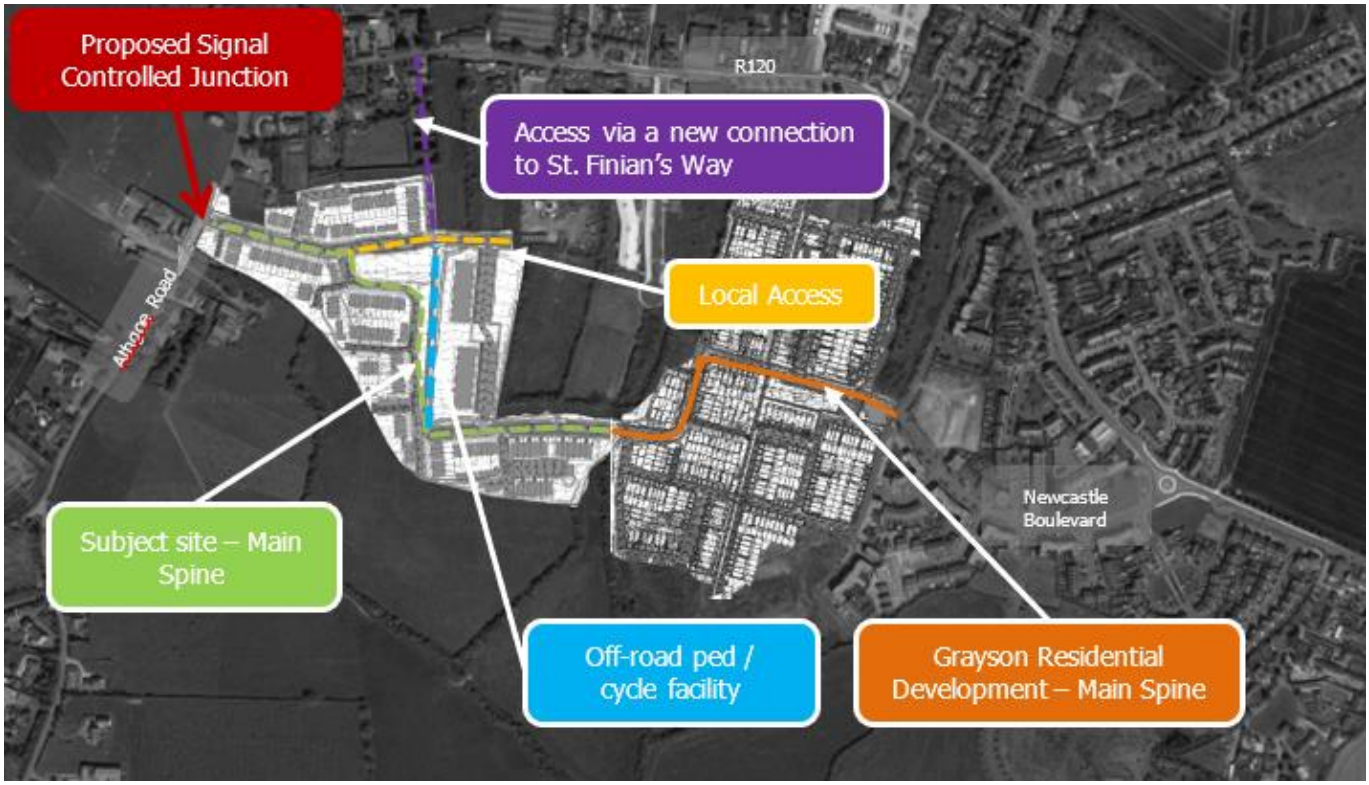
10.6 CHARACTERISTICS OF THE PROPOSAL

10.6.1.1 Physical infrastructure

The subject proposals seek permission for the provision of 280 no. residential units comprising 152 no. apartments / duplexes and 128 no. houses in addition to a creche facility (c. 778 sq. m). 4 no. parks and greenways are proposed to serve the proposed development and the wider Newcastle community. A full description of the proposed development is provided in **Chapter 2** of this EIAR.

The subject proposals include for the provision of the continuation of the east-west access road, as per the Newcastle LAP, between the Graydon development site boundary westwards to Athgoe Road as presented in **Figure 10.13**.

Figure 10.13 – Proposed Roads Infrastructure



A series of 'green' links are proposed as part of the subject scheme comprising:

- 2m wide footpaths and cycle tracks on both sides of the main spine road for the initial 220m from the Graydon development section;
- 4m wide off-road shared pedestrian / cycle facility in a north / south direction through the subject development lands; and
- 2m wide footpath and cycle track on both sides of the east-west section of the main spine road extending back from Athgoe Road and continuing to the eastern boundary.

The proposed development site is proposed to be accessible from 3 no. vehicular access points. The first will be located to the east where the subject lands connecting with the emerging Graydon development lands. The second is via a proposed new signal controlled junction located on Athgoe Road. The third vehicular access is proposed to the north with the R120 Main Street corridor via St. Finian's Way. **Figure 10.14** below presents the aforementioned site access locations.

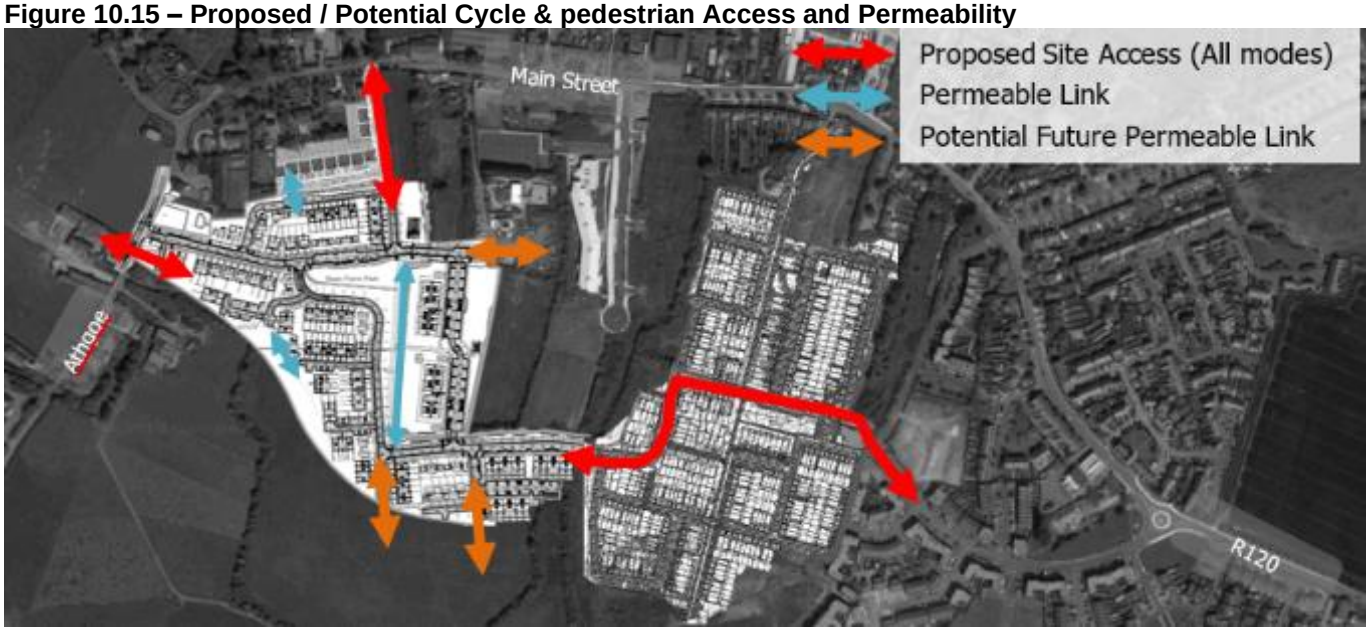
The proposed new site access junction on Athgoe Road will take the form of a three-arm signal-controlled junction comprising the following key characteristics:

- Right turn lane on the southern approach so that right turning vehicles do not delay ahead moving traffic;
- Pedestrian crossings across all arms to ensure convenient access / egress for non-vehicular modes; and
- Right turn set back to facilitate any left turning HGV's exiting the site. This set back allows for the provision of 'tight' corner radii (6m) compliant with DMURS to minimise crossing widths for pedestrians and control vehicle speeds.

Figure 10.14 – Proposed Site Access Locations

The proposed vehicular site access locations introduced above will also facilitate access to the subject site lands for cyclists and pedestrians. Furthermore, a number of permeable links have been facilitated which will accommodate accessibility to existing / future 3rd party developments as presented in **Figure 10.15** below.

Figure 10.15 – Proposed / Potential Cycle & pedestrian Access and Permeability



10.7 POTENTIAL IMPACT OF THE PROPOSAL

10.7.1.1 Construction Phase

All construction activities will be governed by a Construction Traffic Management Plan (CTMP) which will implement the mitigation measures identified in this Section 10.7 of this EIAR Chapter and as summarised within the Preliminary Construction Environmental Management plan which accompanies this planning application. The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programmed respecting key stakeholders requirements thereby ensuring that both the public' and construction workers' safety is maintained at all times, disruptions are minimised and undertaken within a controlled hazard free environment. It is noted that the impact of the construction works will be temporary in nature.

Construction Access and Phasing: For the purposes of the traffic & transport assessment it is assumed that the 128 residential houses as located within Phases 1 to 3 of the subject Newcastle South development and the proposed Athgoe Road junction upgrade will be complete and operational by the adopted 2024 Opening Year. The main construction access will be via the existing construction access located on Athgoe Road which currently facilitates access to construction vehicles at the adjacent Graydon residential development currently under construction.

Construction Activity: The period (time of day and day of week) during which construction activities will be permitted on-site, and during which construction traffic will be travelling across the local road network are set out in the detailed Construction and Environmental Management Plan. This includes works between the hours of 08:00 to 18:00 Monday to Friday (excluding bank holidays) and 08:00-15:00 on Saturdays with no construction activities on Sundays and Bank Holidays.

Construction Traffic Generation: During the general excavation of the foundations there will be additional HGV movements to and from the site. Utilising typical construction rates, it is predicted that, during the excavation stage, there could be 2 no. truckloads per hour equating to 4 no. two-way HGV movements per hour. Assuming a 10 hour working day, this equates to 40 no. two-way HGV movements per day on the local road network. All suitable material will be reused for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site in consultation with the local authority. In addition to the traffic generated by the disposal of surplus subsoil from the site, there will be traffic generated from construction staff and deliveries of construction materials and equipment.

On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 18:00. It should be noted that a large proportion of construction workers would arrive in shared transport. It is assumed that the approximately 140 no. construction staff could be working on-site on a typical day. It is further assumed that 5% of these will travel by private car as single vehicle occupants, 70% car share (assuming 3 staff per car) and a further 25% by minibus / public transport / set down. Accordingly, approx. on-site construction staff could generate up to 40 no. inbound and outbound car trips daily plus 21 staff travelling by minibus, public transport or dropped off locally.

Construction Traffic Routing: The proposed construction 'haul' route will be via the primary road network between the subject lands and the M4 strategic road network. Furthermore, the identified 'haul' route, will respect local accessibility characteristics. The potential route from the M4 could be via Junction 5 and subsequently via the R403 and R405 road corridors. Accordingly, any potential impact as a result construction traffic on Newcastle Town Centre will be minimised.

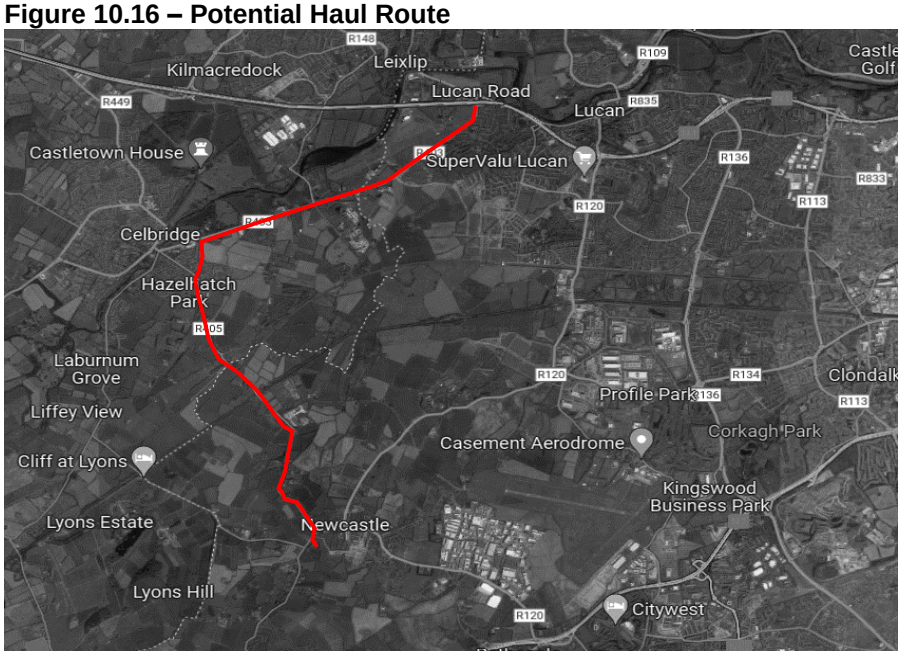
Construction Traffic Vehicle Types: Construction traffic will consist of the following two principal categories. (i) Private vehicles owned and driven by site construction staff and by full time supervisory staff. On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 18:00. It should be noted that a large proportion of construction workers would arrive in shared transport or use public transport. (ii) Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

Construction Traffic Impact: The predicted construction HGV and staff vehicle generation levels (40 no. inbound in the AM and 40 no. outbound in the PM) as summarised above (including potential impact on the haul route) are lower than those predicted during the operational stage (73 two-way in the AM and 115 two-way in the PM). The impact at construction stage (which will be discussed in more detail in the following Section) is predicted to be imperceptible to not significant and therefore the lower vehicular traffic generated at construction stage is predicted to have a lesser impact compared to the operational stage. In addition, the peak construction stage traffic will occur before the local road networks AM peak hour (08:00-09:00) and after the PM peak hour (17:00-18:00). Outside of peak network hour times, the local junctions and road links will have significantly more capacity compared to the peak hours and therefore are predicted to have more than enough capacity to accommodate the predicted construction vehicular traffic generation. The level of significance of the above findings are categorised in **Table 10.10**.

Table 10.9 – Summary of Potential Construction Stage Impact

Description	Quality of Impact	Impact Significance	Duration
HGV Traffic	Negative	Not Significant	Short-term
Dust generation	Negative	Not Significant	Short-term
Noise & Vibration	Negative	Not Significant	Short-term
Parking	Neutral	Imperceptible	Short-term

Figure 10.16 – Potential Haul Route



10.7.1.2 Operational Phase

10.7.1.3 Vehicular Traffic Impact

The potential effect of the subject development traffic at the key off-site junctions on the surrounding road network are summarised in **Table 10.11** below for both the 2024 Opening Year scenario and 2039 Future Design Year scenario. The analysis of effects has demonstrated that the proposals are predicted to generate a sub-threshold impact upon all key off-site junctions. This table reveals that, with the exception of the eastern and western site access junctions, the impact on the surrounding road network is predicted to be sub threshold at all key off-site junctions with the introduction of the subject development traffic. With the introduction of the subject development and associated through route, a reduction in traffic flows within the Town Centre is predicted due to the redistribution of base traffic flows as signified by the negative values in **Table 10.11** below.

The predicted above threshold impacts at the western site access (on Athgoe Rd) and eastern site access (on Burgage Street) are a result of a cumulation of factors including:

- Existing low flows at these locations;
- Diverted base traffic flow which will re-route through these junctions following the introduction of a through route that avoids the Town Centre This includes traffic that, without the implementation of a through route via the Graydon Development and the subject development, would travel through Newcastle via Main Street but with the new through route will now divert away from main street and onto the proposed new road infrastructure through the subject development; and
- Vehicles entering / exiting the future site access arms of these junction comprise construction traffic only associated with the emerging Graydon residential development only.

In **Table 10.12** (AM Peak Hour) and **Table 10.13** (PM Peak Hour) the predicted impacts have been categorised for the 2039 Future Design Year. At the key off-site junctions, the subthreshold impacts range from 'Imperceptible' to 'Not Significant'.

Table 10.12 reveals that, during the AM peak hour, the impact significance of the subject proposals are categorised (based on the ratings of effects outlined in Table 10.4) as *Imperceptible* to *Slight* at all key off-site junctions. At the future site access locations, the impacts are classified as *Moderate* to *Very Significant*.

Similarly, during the PM peak hour (**Table 10.13**), the impact significance of the subject proposals are categorised (based on the ratings of effects outlined in Table 10.4) as *Imperceptible* to *Slight* at all key off-site junctions. At the future site access locations, the impacts are classified as *Moderate* to *Very Significant*.

Table 10.10 – Proposed Developments Predicted Network Impact

Ref	Junction	Design Year	AM Peak Hour	PM Peak Hour
1	Athgoe / L6001 / Lyons Rd	2024	0.8%	0.1%
		2039	1.0%	0.3%
2	Athgoe / Western Site Access	2024	17.2%	18.2%
		2039	16.2%	17.2%
3	Athgoe / Hazelhatch Rd (R405)	2024	- 5.2%	- 4.2%
		2039	- 4.1%	- 3.0%
4	Peamount Rd / Main St / Athgoe	2024	- 10.2%	- 8.6%
		2039	- 8.6%	- 8.2%
5	Main St / Graydon Rd / Main St	2024	- 10.0%	- 7.9%
		2039	- 8.8%	- 8.0%
6	Main St / Aylmer Rd / Main St / Burgage St	2024	- 8.5%	- 7.7%
		2039	- 6.9%	- 5.9%
7	R120 / Newcastle Blvd / R120	2024	2.2%	2.7%
		2039	3.0%	4.2%
8	Eastern Site Access / Burgage St / Newcastle Blvd / Lyons Ave	2024	107.4%	73.6%
		2039	113.1%	85.7%
9	Hazelhatch Rd / Grand Canal Way	2024	0.6%	0.4%
		2039	0.8%	1.1%
10	R120 / N7 Interchange	2024	0.9%	1.4%
		2039	1.2%	2.1%
11	R120 / Rathcoole Junction	2024	1.3%	1.8%
		2039	1.4%	2.3%

Table 10.11 – Network Impact Categorisation 2039 AM Peak Hour

Junction		Impact Scale	Impact Level	Quality of Impact
1	Athgoe / L6001 / Lyons Rd	1.0%	Imperceptible	Negative
2	Athgoe / Western Site Access	16.2%	Moderate	Negative
3	Athgoe / Hazelhatch Rd (R405)	- 4.1%	Not Significant	Positive
4	Peamount Rd / Main St / Athgoe	- 8.6%	Slight	Positive
5	Main St / Graydon Rd	- 8.8%	Slight	Positive
6	Main St / Aylmer Rd / Main St / Burgage St	- 6.9%	Slight	Positive
7	R120 / Newcastle Blvd / R120	3.0%	Not Significant	Negative
8	Eastern Site Access / Burgage St / Newcastle Blvd / Lyons Ave	113.1%	Very Significant	Negative

Junction		Impact Scale	Impact Level	Quality of Impact
9	Hazelhatch Rd / Grand Canal Way	0.8%	Imperceptible	Negative
10	R120 / N7 Interchange	1.2%	Imperceptible	Negative
11	R120 / Rathcoole Junction	1.4%	Imperceptible	Negative

Table 10.12 – Network Impact Categorisation 2039 PM Peak Hour

Junction		Impact Scale	Impact Level	Quality of Impact
1	Athgoe / L6001 / Lyons Rd	0.3%	Imperceptible	Negative
2	Athgoe / Western Site Access	17.2%	Moderate	Negative
3	Athgoe / Hazelhatch Rd (R405)	- 3.0%	Not Significant	Positive
4	Peamount Rd / Main St / Athgoe	- 8.2%	Slight	Positive
5	Main St / Graydon Rd	- 8.0%	Slight	Positive
6	Main St / Aylmer Rd / Main St / Burgage St	- 5.9%	Slight	Positive
7	R120 / Newcastle Blvd / R120	4.2%	Not Significant	Negative
8	Eastern Site Access / Burgage St / Newcastle	85.7%	Very Significant	Negative
9	Hazelhatch Rd / Grand Canal Way	1.1%	Imperceptible	Negative
10	R120 / N7 Interchange	2.1%	Imperceptible	Negative
11	R120 / Rathcoole Junction	2.3%	Imperceptible	Negative

Based on the network impact assessment above, and the subthreshold impact predicted at all key off-sit junctions considered, two of the site access junctions are required to be subjected to further detailed assessment. These are:
Junction 2 - Athgoe / Western Site Access / Athgoe
Junction 8 - Eastern Site Access / Burgage St / Newcastle Blvd / Lyons Ave
An additional detailed assessment has also been carried out at Junction 7 - R120 / Newcastle Blvd / R120 roundabout due to the projected alterations to traffic movements through this junction following the implementation of a through route via the subject development and Graydon residential development lands.

The operational assessment of the local road network has been undertaken using junction modelling software which calculate junction capacity and operational performance based on parameters entered inter alia geometry, vehicle flows etc.. The Transport Research Laboratory (TRL) computer packages TRANSYT for signal-controlled junctions, ARCADY for roundabouts and PICADY for priority junctions. When considering signalised junctions, a Degree of Saturation (DoS) of greater than 90% (0.90) would indicate a junction to be approaching capacity, as operation above this DoS value is poor and deteriorates quickly. Similarly, for roundabout junctions and priority junctions, a Ratio of Flow to Capacity (RFC) of greater than 85% (0.85) would indicate a junction to be approaching capacity, as operation above this RFC value is poor and deteriorates quickly.

For the TRANSYT analysis a one-hour AM and PM period has been simulated from 08:00 to 09:00 and 17:00 to 18:00. Additionally, for the ARCADY and PICADY analyses a 90-minute AM period and PM period has been simulated; from 07:45 to 09:15 and 16:45 to 18:15 respectively. For the ARCADY, PICADY and TRANSYT analyses, traffic flows were entered using an Origin-Destination table for the peak hours.
In order to analyse and assess the impact of the proposed development on the surrounding road network, a traffic model of the key junctions were analysed for the schemes following opening and design years:

- 2024 Opening Year
- 2029 Future Design Year (Opening Year +5 years)
- 2039 Future Design Year (Opening Year +15 years)

Tables 10.14 to **10.16** below provide a summary of the predicted impact on junction for each design year at each of the aforementioned 3 no. junctions assessed. A detailed review of junction performance can be found in the Traffic and Transport Assessment report included as part of this planning submission.

Table 10.13 – Junction Performance Impact : 2024 Opening Year

Junction		AM Peak Hour		PM Peak Hour	
		DOS / RFC	Queue (pcu)	DOS / RFC	Queue (pcu)
2	Western Site Access	+4%	+0.17	+1%	+0.09
7	R120 / Newcastle Blvd	+1%	0	+2%	+0.1
8	Eastern Site Access	+1%	0	+1%	+0.1

Table 10.14 – Junction Performance Impact : 2029 Future Design Year

Junction		AM Peak Hour		PM Peak Hour	
		DOS / RFC	Queue (pcu)	DOS / RFC	Queue (pcu)
2	Western Site Access	+6%	+0.29	+1%	+0.28
7	R120 / Newcastle Blvd	+1%	0	+3%	+0.30
8	Eastern Site Access	+1%	+0.1	+3%	+0.10

Table 10.15 – Junction Performance Impact : 2039 Future Design Year

Junction		AM Peak Hour		PM Peak Hour	
		DOS / RFC	Queue (pcu)	DOS / RFC	Queue (pcu)
2	Western Site Access	+7%	+0.30	+2%	+0.18
7	R120 / Newcastle Blvd	+1%	+0.10	+3%	+0.30
8	Eastern Site Access	0%	0	+3%	0

10.7.1.4 Potential Non-Vehicular Traffic Impact

The subject development will result in additional public transport, pedestrian and cycle movements on the local network. In order to provide an estimate of the potential increase in movements by the aforementioned modes of travel, reference is made to the Census 2016 data as presented in **Figure 10.1** and **Table 10.1** earlier in this Chapter. It has been possible to estimate the number of trips undertaken by sustainable modes of travel that the proposed development could generate in the peak travel periods i.e. (0600-1000 in the AM and 1600-2000 in the PM). The predicted AM and PM peak period trips are presented in **Table 10.17** below.

Table 10.16 – Potential Two-Way Development Trips by Sustainable Modes of Travel

Peak Period	PT Rail Trips	PT Bus Trips	Cycling	Walking
AM (06:00-10:00)	11	33	8	49
PM (16:00-20:00)	15	46	11	68

10.7.1.5 Summary of Potential operational Stage Impact on Traffic and Transport

A summary of the potential impacts on traffic and transportation before the introduction of any mitigation measures is summarised in **Table 10.17** below. The quality of impact on active travel modes are characterised as positive due to the proposed improvements in cycle and pedestrian infrastructure being proposed as part of this development. Whilst a reduction in traffic movements is predicted at a number of junctions within the study area, the quality of impact of traffic has been categorised as negative due to the modest negative impact at other key off-site junctions.

The subject assessment of the local transport network reveals that, whilst the proposed dwelling densities on the subject development lands and adjoining Graydon development lands are higher than that envisioned in the Newcastle LAP 2012, the local internal and external transport network will experience only an imperceptible impact as a result of the subject proposed uplift in densities.

Table 10.17 – Summary of Potential Impact

Node Ref.	Quality of Impact	Impact Significance	Duration
Traffic	Negative	Not Significant	Long Term
Pedestrian Network	Positive	Significant	Long Term
Cycling Network	Positive	Significant	Long Term
Public Transport	Negative	Not Significant	Long Term

10.7.2 Risks to Human Health

The development proposals include the delivery of a range of new transport infrastructure which caters for all modes of travel. Pedestrians and cyclists will benefit from additional infrastructure proposals including pedestrian / cycle connections with existing external facilities will enhance the attractiveness, safety and convenience of active modes of travel for journeys both (i) to/from the subject development proposals and (ii) existing urban areas who will be able to benefit from the new off-road routes through the subject development site when traveling to/from a range of destinations along both north-south and east-west travel desire lines. This will result in a slight positive effect and long-term in duration.

10.7.2.1 "Do-nothing" scenario

The proposed development site is greenfield and generates no traffic. In the absence of the proposed development, the overall operational performance of the existing junctions on the surrounding road network will be affected by the impact caused by committed development and forecast background network traffic growth (should that growth arise). Nevertheless, it is also noted that the subject lands are zoned 'Objective RES-N' "*To provide for new residential communities in accordance with approved area plans"*. Accordingly, in the absence of the subject development, a development of a similar nature would likely be progressed on the subject development lands in the short to medium term and it is anticipated that the impact would be similar to this proposal.

10.8 REMEDIAL OR REDUCTIVE MEASURES

10.8.1.1 Construction phase

A Preliminary Construction Environmental Management Plan accompanies this application and sets out the measures to mitigate the impact on the local environment during the construction phase. A Construction Traffic Management Plan (CTMP) will be developed by the appointed contractor and submitted to South Dublin County Council for approval prior to commencement of work. It will implement the relevant Mitigation Measures in this EIAR including the PCEMP accompanying this planning application (contained in Appendix D2 Volume III of this EIAR.

In general, the impact of the construction period will be short-term in nature and less significant than the operational stage of the proposed development due to the reduced traffic volumes generated during the construction stage compared to the operational stage. In addition, the peak construction arrivals / departures will be outside of the road network peak hours and therefore will not exacerbate any existing delays encountered during peak times. It is anticipated that the generation of HGV's during the construction period will be evenly spread throughout the day and such will not impact significantly during the peak traffic period.

The main construction access will be via the existing construction access located on Athgoe Road which currently facilitates access to construction vehicles at the adjacent Graydon residential development currently under construction as introduced in Section 10.6.1.

Construction traffic will continue to enter the site via the Athgoe Road for the construction phase of the development with construction traffic diverted to internal, temporary haul routes to access construction areas.

All construction related parking will be provided on site. Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff. As introduced in Section 10.6.1, there is predicted to be 40 no. staff car trips daily. The proposed on-site car parking area will be designed to have the capacity to accommodate this parking demand in addition to an element of visitor parking spaces.

- Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

It is anticipated that the generation of HGV's during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods.

On-site employees will generally arrive before 08:00, thus avoiding morning peak hour traffic. These employees will generally depart after 18:00 and avoid the PM peak hour.

To minimise disruption to the surrounding environment, the following mitigation measures will be implemented:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- A dedicated 'construction' site access / egress junction will be provided during all construction phases. This will be via the existing accesses constructed on Athgoe Road as introduced in Section 10.6.1.
- Provision of sufficient on-site parking for staff and visitors (as described above) and compounding through the construction of temporary hardstanding areas to ensure no potential overflow of construction generated traffic onto the local network.
- A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.
- A series of 'way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.
- A dedicated construction haul route has been identified and will be agreed with the local authority prior to the commencement of constructions activities on-site.
- Truck wheel washes will be installed at construction and discharge from wheel wash area will be directed to on-site settlement ponds.
- On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.
- Measures will be put in place to minimise the risk of road traffic accidents during the construction phase including;
    - appropriate temporary traffic management as required,
    - strict adherence to the proposed construction vehicle haul route, and
    - Wayfinding signage so all visitors can navigate to the designated visitor parking and sign in areas.

10.8.1.2 Operational phase

A package of integrated mitigation measures has been identified and will be implemented to off-set the additional local demand that the proposed development on the subject zoned lands could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures are summarised below:

- Management – A Mobility Management Plan (MMP) is included with the application (Appendix H Volume III of this EIAR). The measures identified in the MMP form part of the specific mitigation of this EIAR and a dedicated resident specific Mobility Management Plan (MMP) is to be compiled with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor. Resident specific MMPs include specialised plans and associated implementation strategies for the subject development proposals. The MMP ultimately seeks to encourage sustainable travel practices for all journeys by residents and visitors traveling to and from the proposed development. It involves the incorporation of a wide range of possible "hard" and "soft" tools from which to choose from with the objective of influencing travel choices. The measures in the MMP comprise a number of different categories including;

    - Management & Monitoring
    - Walking Strategy
    - Cycling Strategy

- Public Transport Strategy
- Private Car Strategy
- Marketing & Promotion Strategy.

- Infrastructure (Through Road) – The delivery of a through route between the eastern access point at Burgage Crescent and the western access location on Athgoe Road will provide an alternative routing option between origins / destinations to the east / west negating the need to travel via Newcastle Town Centre. This will help improve the operational performance of junctions along Main Street and create a more pedestrian / cyclist friendly environment in the Town Centre.

- Infrastructure (Permeability) – The subject development will be highly accessible to both pedestrians and cyclists via a range of convenient connection points and internal linkages. New dedicated pedestrian / bicycle facilities have been provided as part of the aforementioned new road infrastructure through the site. Pedestrians and cyclists will also be well provided for through the provision of dedicated (i.e., non-vehicular) connections onto Newcastle Main Street. Furthermore, the design of the proposed development has sought to provide for the opportunity for pedestrian / cycle connection to be provided in the future to adjoining third party lands. The provision of these internal linkages safeguards the ability for the local authority to deliver in the future a viable, convenient and permeable network of cycle / pedestrian links thereby increasing the attractiveness of these modes of travel for all local trips. Furthermore, the proposals also provide for the provision of a total of 370 no. bicycle parking spaces on-site comprising 112 no. short stay spaces and 258 no. long stay spaces. This level of cycle parking provision is 321 no. spaces higher than the current development plan requirement and 140 no. spaces higher than the draft development plan requirement.

- Service (Car Sharing) – 5 no. Car Share spaces are proposed within the development site boundary including 2no. located in close proximity to the houses, 1 no. located at the apartment blocks, 1 no. located at the duplex units and 1 no. located at the creche. GoCar members can book cars online or via the app for as little as an hour, then unlock with their phone or GoCar; the keys are in the car, with fuel, insurance and city parking all included. The benefits of such car sharing services include, (i) the reduction of the number of cars on the road and therefore traffic congestion, noise and air pollution; (ii) frees up land traditionally used for private parking spaces but which may not be used, (iii) increases use of public transport, walking and cycling as the need for car ownership is reduced and (iv) Car sharing allows those who cannot afford a car the opportunity to drive, encouraging social inclusivity.

10.9 PREDICTED (RESIDUAL) IMPACT OF THE PROPOSAL

10.9.1.1 Construction phase

Following mitigation, the residual impacts upon the local receiving environment are characterised as being '*direct*' and '*negative*' but '*not significant*' as the vehicle generation during construction will be significantly lower than that predicted by the subject development proposals once operational. These effects are '*likely*' to occur; however, they will be '*short-term*' in nature only lasting for the duration of the construction stage.

10.9.1.2 Operational phase

The implementation of the mitigation measures outlined above including the MMP will ensure that the residual effect on the local receiving environment is both managed and minimised. The future public transport improvements as part of Bus Connects will increase the capacity of public transport services for residents within Newcastle. The network impact will likely be reduced following the roll out of MMP measures which aim to reduce private car travel amongst future residents by 15% resulting in the reassignment of these vehicle trips to more sustainable modes as stated within the 'Essential Guide to Travel Planning' which states "*good travel plans have succeeded in cutting the number of people driving to work by 15%.*".

Table 10.18 – Summary of Predicted Impact Post-Mitigation

Node Ref.	Quality of Impact	Impact Significance	Duration
Traffic	Negative	Imperceptible	Long Term
Pedestrian Network	Positive	Significant	Long Term
Cycling Network	Positive	Significant	Long Term

Public Transport	Negative	Imperceptible	Long Term

10.10 'WORST CASE' IMPACT

10.10.1 CONSTRUCTION STAGE

The level of daily construction staff traffic as highlighted in Section 10.6.2 is considered to be an average value. The assumed 'worst case' construction staff levels during peak construction stages, is expected to be in the region of 180 no. staff based on similar construction activities on similar schemes (i.e. adjoining Graydon development currently under construction). Accordingly, based on the 'worst case' staffing levels and assuming the same travel proportions as those identified in Section 10.6.1, during the peak construction stages a total of 51 no. daily two-way car trips plus 27 no. staff travelling by minibus, public transport or dropped off locally. This represents an uplift of 11 no. two-way car trips daily compared to the projected average staffing levels on-site.

Table 10.19 – Summary of Potential Construction Stage Worst Case Impact

Description	Quality of Impact	Impact Significance	Duration
HGV Traffic	Negative	Not Significant	Short-term
Dust generation	Negative	Not Significant	Short-term
Noise & Vibration	Negative	Not Significant	Short-term
Parking	Neutral	Imperceptible	Short-term

10.10.2 OPERATIONAL STAGE

The analysis detailed above under Section 10.6.2 undertaken above represents a worst-case appraisal of a typical weekday as it is focused upon the two busiest periods of the day (i.e. AM and PM peak hours). During the remaining 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods. Similarly, over the weekend periods both the site generated traffic and the external road network traffic flows are generally lower compared to the weekday peak hour periods that have been assessed.

10.11 MONITORING

The mobility management plan of the development will be monitored and updated every two years over a period of 10 years from the initial occupancy of the units. This will allow the progress made towards achieving mode split targets to be tracked and updated as necessary. These modal split targets include the reduction in vehicular trips by 15% with reassignment onto more sustainable modes of travel as outlined earlier in this Chapter, . The information obtained from the monitoring surveys will be used to identify ways in which the MMP initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics. A specific aim of the MMP is to reduce the number of trips by private car. Accordingly, an objective of the MMP is to reduce travel by private car by 15% compared to the Opening Year mode share. The 15% reduction in car travel amongst residents shall reassign to more sustainable modes of travel including walking, cycling and public transport through the successful implementation of the mobility management plan measures.

10.12 REINSTATEMENT

Reinstatement is not applicable to the Traffic and Transportation Section of this EIAR because it not planned to reinstate the land as this is a permanent development.

10.13 POTENTIAL CUMULATIVE IMPACTS

With the objective of assessing the cumulative impacts the potential traffic that could arise from committed development schemes in the local area in addition to growth factors applied to base traffic flows have been incorporated into the analysis in Section 10.6.2. which ensures the cumulative impact of potential additional vehicular movements as a result of the implementation of both the subject proposals and the committed development have been assessed and included in the junction performance analysis.

A total of seven number third party committed developments have been identified, which being located in close proximity to the proposed residential development, may generate an impact upon the local road networks existing traffic characteristics..

- **Site 1** – Residential Development (Planning Ref: SD17A/0378) – 46 no. houses
- **Site 2** – Residential Development (Planning Ref: SD15A/0193 - SD17A/0288) – 77 no. houses

- **Site 3** – Residential Development (Planning Ref: SD16A/0117) – 49 no. houses
- **Site 4 and 5** – Residential Development (Planning Ref: SD17A/0010 – SD18A/0363) – 45 residential houses, 4 apartments and 346 sqm of retail units
- **Site 6** – Graydon Residential Development (Planning Ref: ABP-305343-19) including – The demolition of 5 structures on site, total area measuring 359sq.m, comprising 2 habitable dwellings and 3 associated outbuildings/sheds located to the northwest of the site; (2) development of 406 residential homes; (3) a childcare facility (518sq.m GFA); (4) 1 commercial unit (67.7sq.m GFA); (5) reservation of a school site (1.5ha); (6) new vehicular, cycle and pedestrian access from Main Street; (7) continuation of Newcastle Boulevard forming part of a new east-west link street; (8) a new Public Park (2ha); (9) pocket parks and greenway together with associated internal access roads, pedestrian and cycle paths and linkages; (10) 1 single storey marketing suite (81sqm)
- **Site 7** - A mixed use development (SD20A/0037) comprising, 1 habitable house and 2 associated outbuildings/sheds, and the construction of 1 double storey (c.9.2m overall height) retail development in the form of a convenience supermarket (GFA c.1,759sq.m); 1 two storey mixed-use building (c.10.7m overall height) comprising of a café (c.225sq.m) at ground floor and a community centre at the first floor (c.140sq.m) with associated ground floor access (total GFA c.468sq.m)

Figure 10.17 – Committed Development Sites incorporated into the subject network analysis

10.14 INTERACTIONS

10.14.1 Accidents & Disasters

10.14.1.1 Construction Phase

During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. Measures (as described in the mitigation measures above in Section 10.7.1) will be put in place to minimise the risk of road traffic accidents during the construction phase. Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices employing safe working practices as per the Safety Health and Welfare at Work Act 2005 and Safety Health and Welfare at Work (Construction) Regulations 2013 which are to be used and no unusual or hazardous substances or underground tunnelling works required or predicted.

10.14.1.2 Operational Phase

During the operational phase, it is anticipated that the risk of accidents will be influenced by the additional traffic generated by the proposed development. The potential likelihood of any incidents and the severity of such incidents is minimised due to the appropriate segregation of vulnerable road users through the development as a result of the new dedicated infrastructure proposals the design of which advocates self-regulating low speed streets through the implementation of horizontal and vertical deflection and dedicated pedestrian / cycle linkages.

10.14.2 Noise and Vibration

The influence of traffic upon noise and vibration is considered in an earlier section of this EIAR.

10.14.3 Air Quality and Climate

The influence of traffic upon air quality and climate is considered in an earlier section of this EIAR.

10.15 DIFFICULTIES ENCOUNTERED IN COMPILING

There were no material difficulties encountered in compiling and assessing the data for this EIAR Chapter sufficient to prevent modelling of the likely transportation effects of the proposed development as the traffic survey data was undertaken post Covid-19 lockdown conditions and all other information required for the compilation of this Chapter being accessible.

10.16 REFERENCES

'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (May 2022)
TII Traffic & Transportation Assessment Guidelines; National Roads Authority (May 2014)
TII Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (PE-PAG-02017); TII (October 2016)
'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003)
'Guidelines for Traffic Impact Assessments' The Institution of Highways and Transportation (1994)
Newcastle local Area Plan 2012
South Dublin County Development Plan 2016-2022
Draft South Dublin County Development Plan 2022-2028
Greater Dublin Area Cycle Network Plan; National Transport Authority (2013); www.nta.ie
Dublin Bus Website; www.dublinbus.ie
Irish Rail Website; www.irishrail.ie
LUAS Website; www.luas.ie
Ordnance Survey Ireland; www.osi.ie
Transport Infrastructure Ireland; www.tii.ie
Transport for Ireland; www.transportforireland.ie
Design Manual for Urban Roads and Streets (DTTS, DHPLG 2013)
National Cycle Manual (NTA, 2011)
Design Standards for New Apartments – Guidelines for Planning Authorities (DHPLG, March 2018)

11.0 MATERIAL ASSETS – WASTE MANAGEMENT

11.1 INTRODUCTION

This Chapter of the EIAR comprises an assessment of the likely impact of the Proposed Development from the waste generated from the development as well as identifying proposed mitigation measures to minimise any associated impacts.

This Chapter was prepared by David Doran and Chonaill Bradley of AWN Consulting. Chonaill Bradley is a Principal Environmental Consultant in the Environment Team at AWN. He holds a BSc in Environmental Science. He is an Associate Member of the Institute of Waste Management (CIWM). Chonaill has over seven years' experience in the environmental consultancy sector. David Doran is an Environmental Consultant in the Environment Team at AWN. He holds a MSc in Environmental and Energy Management. David has completed Material Assets – Waste EIAR chapters, Operational and Resource & Waste Management Plans for AWN's clients.

A site-specific Resource & Waste Management Plan (RWMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the construction phase of the Proposed Development and has been included as Appendix E 11.1 Volume III of this EIAR. The RWMP was prepared in accordance with the *'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition on-sites'* document produced by the Environmental Protection Agency (EPA) in 2021 in conjunction with the Department of Environment, Climate and Communications, Department of Housing, Planning and Local Government, Construction Industry Federation and Waste Enforcement Regional Lead Authorities.

A separate Operational Waste Management Plan (OWMP) has also been prepared by AWN Consulting Ltd. for the operational phase of the Proposed Development and is included as Appendix E 11.2.
Volume III of this EIAR.

The Chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), the EPA Guidelines on the Information to be contained in EIAR 2022), published May 2022 and the EU Commission Notice on changes and extensions to projects, 2021.

These documents will ensure the management of wastes arising at the Proposed Development site in accordance with legislative requirements and best practice standards.

11.2 STUDY 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 the RWMP and in the OWMP provided in Appendix E 11.1 and Appendix E 11.2 (Volume III of this EIAR).

This Chapter is based on the Proposed Development, as described in Chapter 2 (Project Description and Alternatives Examined) and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation and excavation); and
- Operational phase.

A desktop 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 11.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 5 of this EIAR (Land and Soils). Chapter 5 also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the Proposed Development.

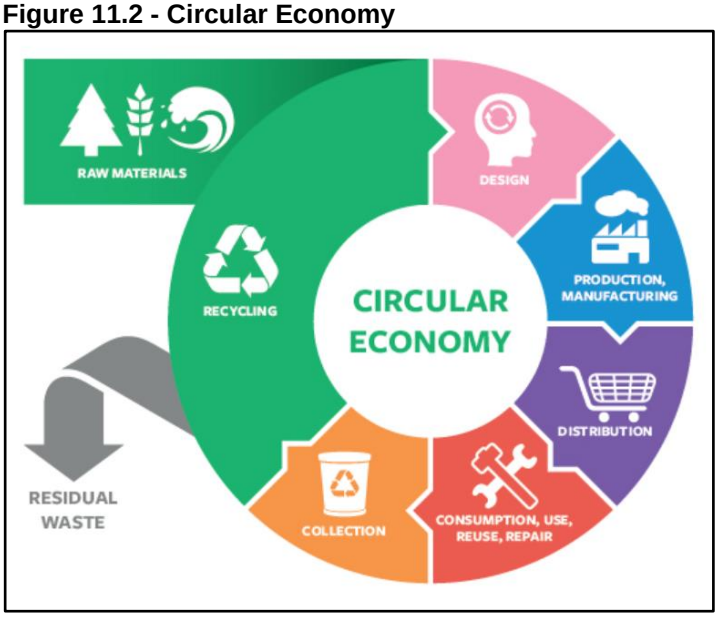
11.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, 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). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 11.1).

Figure 11.1 - Waste Hierarchy (Source: European Commission)

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 11.2).

Figure 11.2 - Circular Economy



(Source: Repak)

The Irish government issues policy documents which outline measures 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, *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland*, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, *A Resource Opportunity,* in 2012.

One of the first actions to be taken from the WAPCE was the development of the *Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less*' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's '*Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects*' (2021). The guidance documents, *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* and *Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers* (FÁS & Construction Industry Federation, 2002), were 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 Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021, BS 5906:2005 Waste Management in Buildings – Code of Practice, the South Dublin County Council (SDCC) County of South Dublin (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws (2018), the EPA National Waste Database Reports 1998 – 2019 and the EPA National Waste Statistics Web Resource.

11.2.2 Terminology

Note that the terminology used herein is consistent with the definitions set out in the Waste Management Act 1996 (S.I. No. 6 of 1996). Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.
Prevention - Measures taken before a substance, material or product has become waste, that reduce:

- the quantity of waste, including through the re-use of products or the extension of the life span of products;
- the adverse impacts of the generated waste on the environment and human health; or
- the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

11.3 EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The proposed residential development is located on a greenfield at the Newcastle South, Co. Dublin on lands of c. 8.47 hectares.

The Proposed Development will consist of the construction of 280 no. dwellings, a creche and associated ancillary infrastructure on 2 no. sites comprising main development site (8.4 ha.) and a site relating to the permitted crèche c. 0.07 ha. in 'Graydon', where it is proposed to construct a creche of 778 sq. m. A full project description can be found in Chapter 2.

In terms of waste management, the receiving environment is in the jurisdiction of SDCC 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 EMR Waste Management Plan 2015 – 2021, which sets out 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 EMR Waste Management Plan 2015 – 2021 sets a specific target for construction and demolition (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 August 2020 identifies that Ireland's current progress against this C&D waste target is at 77% 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 51%. Both of these targets were required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive; however, the EPA are yet to confirm that these were met.

Currently the EMR and other regional waste management plans are under review and the Regional Waste Management Planning Offices expect to publish the final National Waste Management Plan for a Circular Economy in 2022.

The SDCC Development Plan 2016 – 2022 and Draft SDCC Development Plan 2022 – 2028 also set policies and objectives for the SDCC area which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, SDCC no longer operates any municipal waste landfill in the area. 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.

11.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A full description of the Proposed Development can be found in Chapter 2 (Project Description and Alternatives Examined). The characteristics of the Proposed Development that are relevant in terms of waste management are summarised below.

11.4.1 Demolition Phase

There is no demolition associated with this development as it is a greenfield site.

11.4.2 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 appointed Contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

There will be topsoil and subsoil generated from site clearance and excavations required to facilitate site levelling, construction of foundations, the installation of services and roads for the development and below ground services. Excavated material will be reused on site where possible with the remainder made available for re-use off-site. The volume of material to be excavated has been estimated at c. 60,000m^3. Please see Chapter 5 for further details. Whilst every effort will be made reuse excavated material on-site, it is expected that 45,000m^3 of this material will be removed from site for appropriate off-site reuse, recovery, recycling and / or disposal.

If the material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011). For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix E 11.1 Volume III of this EIAR).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2019).

Environmental testing, including Waste Acceptance Criteria (WAC) testing was carried out by Jones Environmental Laboratory in the UK. Landfill acceptability testing, WAC, was carried out to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill. The results of the Waste Acceptance Criterial Test Suite are presented with the individual parameter limits for "Inert" "Non Hazardous" and "Hazardous" as outlined within European Council Directive 1999 131/EC Article 16 Annex II, "Criteria and procedures for the acceptance of waste at landfills". The intended disposal site should be consulted to ensure compliance with their specific requirements. The results indicate that the results are below the inert limits with the exception of TP54 at 1.00mBGL where the results indicate that the total organic carbon is above the inert limits (3.86% vs 3%).

Further environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. Given that the proposed development is to take place on a greenfield site, it is likely that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase 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 on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes 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 RWMP (Appendix E 11.1 Volume III of this EIAR). The RWMP provides an estimate of the main waste types likely to be generated during the Construction phase of the Proposed Development. These are summarised in Table 11.1.

Table 11.1 - Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	523.4	10	52.3	80	418.8	10	52.3
Timber	444.1	40	177.7	55	244.3	5	22.2
Plasterboard	158.6	30	47.6	60	95.2	10	15.9
Metals	126.9	5	6.3	90	114.2	5	6.3
Concrete	95.2	30	28.6	65	61.9	5	4.8
Other	237.9	20	47.6	60	142.8	20	47.6
Total	**1586.3**		**360.1**		**1077.2**		**149.1**

11.4.3 Operational Phase

An Operational Waste Management Plan (OWMP) has been prepared for the Proposed Development by AWN and can be viewed in Appendix E 11.2 (Volume III of this EIAR). The plan will ensure the development contributes to the targets outlined in the *EMR Waste Management Plan 2015 – 2021*. Mitigation measures to manage impacts arising from wastes generated during the operation of the Proposed Development are summarised below.

Segregation of Waste Material On-site

The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the houses, apartments, duplexes and crèche during the operational phase including dry mixed recyclables (DMR), organic waste and mixed non-recyclable waste (MNR), as well as providing a strategy for management of waste glass, batteries, WEEE, printer / toner cartridges, chemicals, textiles, waste cooking oil and furniture.

AWN's Waste Generation Model (WGM), is based on published data from the Irish EPA national waste data reports and the EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned (2015).* This provides a more representative estimate of the likely waste arisings from the proposed development (See Appendix E 11.2 (Volume III of this EIAR)). The total estimated waste generation for the Proposed Development for the main waste types, based on the AWN WGM, is presented in Tables 11.2 and 11.3, below, and is based on the uses and areas as advised by the Project Architects, MOLA Architecture.

Table 11.2 - Estimated waste generation for the Residential Units.

Waste type	Waste Volumes in m^3 per week			
	Apartment Block 1	Apartment Block 2	Duplex Block 1	Duplex Block 2
Organic Waste	0.90	0.90	0.22	0.22
DMR	6.38	6.38	1.52	1.52
Glass	0.17	0.17	0.04	0.04
MNR	3.35	3.35	0.80	0.80
Total	**10.80**	**10.80**	**2.58**	**2.58**

Table 11.3 - Estimated waste generation for the Residential Units and Crèche.

Waste type	Waste Volumes in m^3 per week				
	Duplex Block 3	2-bed house (individual)	3-bed house (individual)	4-bed house (individual)	Crèche
Organic Waste	0.22	0.02	0.02	0.02	0.08
DMR	1.52	0.12	0.14	0.17	2.86
Glass	0.04	<0.01	<0.01	<0.01	0.01
MNR	0.80	0.06	0.07	0.09	1.56
Total	**2.58**	**0.20**	**0.23**	**0.28**	**4.51**

11.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

This section details the potential waste effects associated with the Proposed Development.

11.5.1 Construction Phase

The Proposed Development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction (See Appendix E 11.1 Volume III of this EIAR for more details). 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 at a suitable location pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with the European Union, regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative***.

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 EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the development site 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 and within Ireland. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

There is a quantity of excavated material which will need to be excavated to facilitate the Proposed Development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 5 (Land and Soils). It is anticipated 45,000m^3 excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

11.5.2 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. In the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative***.

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. 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 site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

Waste contractors will be required to service the Proposed 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. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative.***

11.5.3 'Do Nothing' Scenario

If the Proposed Development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no excavation or construction or operational waste generated at this site. There would, therefore, be a neutral effect on the environment in terms of waste.

11.6 AVOIDANCE, REMEDIAL AND MITIGATION 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. The concept of the 'waste hierarchy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

11.6.1 Construction Phase Waste Management Plan

The following mitigation measures will be implemented during the construction phase of the Proposed Development:

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of the Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects (EPA, 2021), and is included as Appendix E 11.1 Volume III of this EIAR. The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this RWMP 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, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix E 11.1 Volume III of this EIAR) in agreement with SDCC and in compliance with any planning conditions, or submit an addendum to the RWMP to SDCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed construction phase.

A quantity of topsoil and sub soil will need to be excavated to facilitate the Proposed Development. The Project Engineers have estimated that 45,000m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. 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 (alternatively the waste will be sorted for recycling, recovery or disposal);
- 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 Resource 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 suitably 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). 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 Proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and 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 promote more sustainable consumption of resources.

11.6.2 Operational Phase Waste Management Plan

As previously stated, a project specific OWMP has been prepared and is included as Appendix E 11.2 Volume III of this EIAR. The mitigation measures outlined in the OWMP will be implemented in full and form part of mitigation strategy for the site. 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, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland and the SDCC waste bye-laws.

- The residents / crèche staff / facilities management company will be responsible for ensuring
    - allocating personnel and resources, as needed;
    - the ongoing implementation of this OWMP; and
    - ensuring a high level of recycling, reuse and recovery at the site of the Proposed Development.

The following mitigation measures will be implemented:

- The residents / crèche staff / facilities management company will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Cardboard (for bailing);
    - Plastic (for bailing);
    - Glass;
    - Waste Oil;
    - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
    - Batteries (non-hazardous and hazardous);
    - Light bulbs; and
    - Cleaning and Farming chemicals (pesticides, paints, adhesives, resins, detergents, etc.).

The residents / crèche staff / facilities management company for the site will ensure that 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;

The residents / crèche staff / facilities management company will ensure that all waste collected from the site of the Proposed Development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and

The residents / crèche staff / facilities management company will ensure that 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 Proposed Development during the operational phase 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 SDCC Waste Management Bye-Laws 2020. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

11.7 PREDICTED (RESIDUAL) IMPACTS

The implementation of the mitigation measures outlined in Section 11.7 will ensure that high rates of reuse, recovery and recycling are achieved at the site of the Proposed Development during the construction and operational phases. 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.

11.7.1 Construction Phase

A carefully planned approach to waste management as set out in Section 11.7.1 and adherence to the RWMP (which includes mitigation measures) during the construction phase will ensure that the predicted effect on the environment will be ***short-term*****,** ***imperceptible*** and ***neutral*****.**

11.7.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 11.7.2 and adherence to the OWMP (which includes mitigation) 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.***

11.8 POTENTIAL CUMULATIVE IMPACTS

The following considers the cumulative impacts of the Proposed Development along with planned, permitted and existing facilities in the surrounding area in relation to Material Assets Waste Management.

11.8.1 Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase.

Developments that potentially could overlap during the construction phase.

SHD-ABP-305343-19 and SD20A/0178

Planning permission was granted on the 23rd of December 2019 for the strategic housing development. The development comprised the demolition of five structures on site and construction of 406 residential units; childcare facility; commercial unit; reservation of a school site; new vehicular, cycle and pedestrian access from Main Street; continuation of Newcastle Boulevard forming part of east-west link street; new public park and associated site development works.

On the 30th of November 2020, South Dublin County Council granted permission for the following amendment application on the wider site:

“Amendments to the development permitted under Reg. ABP 305343-19 at Newcastle South (development to be known as Graydon) as required under Condition 6(d) of An Bord Pleanála’s decision. Amendments consist of: (a) re-

alignment of Graydon Drive; (b) provision of 9 three bedroom two storey houses as previously proposed and omitted by Condition 6(d) of permission Reg. ABP 305343-19; (c) extension of Graydon Row by 4m and the provision of 1 additional three bedroom, two storey terraced house; (d) minor revisions to the positioning of 6 houses, necessitated by re-alignment of the road and (e) all associated and ancillary works associated with the development. Proposed amendment will result in the provision of 16 houses where there were 15 previously proposed."

SD20A/0186
On the 28th of October 2020, South Dublin County Council granted permission for the following amendment application
"The option of the inclusion of an ancillary single storey garden room structure (c. 12.5sqm) in gardens of permitted dwellings under planning reg. ref. ABP305343-19."

SD21A/0247
An application for the demolition of existing derelict dwelling and the construction of a replacement two storey, four bedroom detached dwelling (169.97sq.m) together with all associated landscape, boundary, site and development works was lodged by Cairn Homes Properties Ltd., on the 3rd of September. SDCC granted permission on the 14th of December 2021.

SD20A/0312 (An Bord Pleanála Reference 310998-21)
South Dublin County Council granted permission for development comprising 9 no. residential units in 2 no. blocks at Parson's Court, Ballynakelly, Newcastle, Co. Dublin. The decision was appealed to An Bord Pleanála. A decision to grant permission with revised conditions was issued on the 7th June 2022.

SD22A/0045
On the 7th of April 2022, South Dublin County Council issued a Further Information Request for development comprising the Construction of 6 three bedroom dwelling houses; construction of proposed access road and footpaths; provision of car parking facilities.

SD20A/0037 Supermarket
On the 17th of April 2020 SDCC granted permission for development comprising the Demolition of 3 existing structures on site (total c.226sq.m) comprising of 1 habitable house and 2 associated outbuildings/sheds (permitted under Ref. ABP-305343-19), and the construction of 1 double storey (c.9.2m overall height) retail development in the form of a convenience supermarket (GFA c.1,759sq.m); 1 two storey mixed-use building (c.10.7m overall height) comprising of a café (c.225sq.m) at ground floor and a community centre at the first floor (c.140sq.m) with associated ground floor access (total GFA c.468sq.m); an ESB sub-station (c.22sq.m); the anchor supermarket unit will provide for a net retail sales area of c.1,222sq.m; a warehouse of c.200sq.m; welfare area of c.190sq.m including ancillary office accommodation; a delivery and loading dock; service yard; customer lobby and wc and entrance lobby; the development shall also provide for 98 car parking spaces and 50 bicycle parking spaces; advertising structures and signage (totaling c.81sq.m); new pedestrian and cyclist connections; public realm areas; refuse storage; a trolley shelter; new priority controlled junction at Main Street; a new access road and shared pedestrian/cyclist greenlink from Main Street (permitted under Ref. ABP-305343-19); vehicular entrances to the surface car park and service yard; all associated site development, site services and landscape works at Lands at Main Street, Newcastle, Co. Dublin, bordered by Main Street to the north, Orchard Grove to the east, greenfield land to the south and residential properties fronting Main Street to the west (new road will be adjacent to 1 Main Street, Newcastle, Co. Dublin.)

SD20A/0343 Amendments to Supermarket
On the 22nd February 2021 SDCC granted permission to an amended previously permitted development (Reg SD20A/0037); relocation of the staff welfare and ancillary office accommodation to a new approx. 192sq.m first floor mezzanine level within the permitted anchor supermarket unit; relocation of the staff welfare and office accommodation to mezzanine level will allow for additional warehouse floor space at the ground floor level (approx. 150sq.m increase; there is no proposed increase to the net retail floor space; external amendments to the permitted elevations including glazing and material changes; 2 roof lights will also be provided at roof level; no other changes are proposed to the anchor supermarket unit or the remainder of the development permitted under Reg. SD20A/0037.

SD21A/0311
SDCC granted permission to the Change of use of the permitted cafe unit (approx. 225sq.m net) as granted under ref. S020A/0037 to use as a pharmacy (approx. 251sq.m net) and all associated internal and external layout alterations

Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be ***short-term, not significant*** and ***neutral***.

11.8.2 Operational **Phase**

There are existing residential and commercial developments close by, along with the multiple proposed developments which have been granted permission or are awaiting a decision. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area as higher demand will allow waste contractors to expand their services or new waste contractors may begin to service the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a ***long-term, imperceptible*** and ***neutral***.

11.9 MONITORING

The management of waste during the construction phase will be monitored by the contactor's appointed Resource Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

The management of waste during the operational phase will be monitored by the residents / crèche staff / facilities management company to ensure effective implementation of the OWMP internally and by the nominated waste contractor(s).

11.9.1 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 excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The RWMP specifies the need for a Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. If targets are not being met, the Resource Manager will identify the reasons for this and then work to resolve any issues. Recording of waste generation during the construction phase of the Proposed Development will enable better management of waste contractor requirements and identify trends. The data will be maintained to advise on future developments.

11.9.2 Operational Phase

During the operational phase, waste generation volumes will be monitored by the facilities management company against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the waste storage areas (WSAs), where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency by reducing the required for the storage area of waste receptacles and by reducing the time spent managing waste by facilities management and the waste contractor.

Table 11.4 - Monitoring Proposals

Likely Significant Effect	Monitoring Proposals
Litter Pollution	The Contractor will review and maintain waste records and site audits
Unlicensed Waste Collection (Illegal Dumping)	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.

Likely Significant Effect	Monitoring Proposals
Insufficient Waste Facilities	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Lack of waste Classification	An appointed Resource Manager will monitor all on-site waste segregation and classification
Unlicensed Waste Collection (Illegal Dumping)	The Residents / Commercial Tenants / Facilities Manager will maintain waste receipts on-site for a period of 7 years and make available to DCC as requested.
Poor Waste Segregation	Waste generation volumes will be monitored by the Residents / Commercial Tenants / Facilities Manager
Litter Pollution	Waste storage areas will be monitored by the Residents / Commercial Tenants / Facilities Manager

11.10 REINSTATEMENT

In the event that the proposed project is reinstated, there is not likely to be any significant impacts on waste management at the site.

The Proposed Development may be decommissioned at some stage in the future. At that time, a demolition or refurbishment plan will be formulated for the decommissioning phase of the Proposed Development to ensure no waste nuisance occurs at nearby sensitive receptors.

11.11 REFERENCES

- Waste Management Act 1996 (No. 10 of 1996) as amended.
- BS 5906:2005 Waste Management in Buildings – Code of Practice.
- Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
- Department of Communications, Climate Action and Environment (DCCAE), Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (2020).
- DCCAE, Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021)
- Department of Environment and Local Government (DELG) (1998). Waste Management – Changing Our Ways, A Policy Statement.
- Department of Environment, Communities and Local Government (DECLG) (2012). A Resource Opportunity - Waste Management Policy in Ireland.
- South Dublin County Council (SDCC), South Dublin County Council Development Plan 2016-2022 (2016)
- SDCC, Draft South Dublin County Council Development Plan 2022-2028 (2021)
- SDCC, County of South Dublin (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws (2018)
- Department of Housing, Local Government and Heritage (DoHLGH) (2020). Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities.
- Department of Environment, Heritage and Local Government (DEHLG) (2006). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.
- Eastern-Midlands Region Waste Management Plan 2015-2021 (2015).
- Environmental Protection Agency (EPA). National Waste Database Reports 1998-2019.
- EPA (2015). Waste Classification-List of Waste & Determining if Waste is Hazardous or Non-Hazardous.
- EPA and Galway-Mayo Institute of Technology (GMIT) (2015). EPA Research Report 146-A Review of Design and Construction Waste Management Practices in Selected Case Studies-Lessons Learned.
- FÁS and the Construction Industry Federation (CIF) (2002). Construction and Demolition Waste Management-a handbook for Contractors and Site Managers.
- Forum for the Construction Industry-Recycling of Construction and Demolition Waste.
- Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended.
- Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended.
- Environmental Protection Agency Act 1992 as amended.

12.0 MATERIAL ASSETS - UTILITIES

12.1 INTRODUCTION

DBFL Consulting Engineers examined the material assets serving the subject lands relating to foul sewerage, surface water drainage and water supply. This section was prepared by Noel Gorman of DBFL Consulting Engineers. Noel Gorman is a Chartered Civil Engineer with 9 years post graduate experience in the design and construction of residential and commercial development. Utilities sections (ESB, Telecoms & Gas) was prepared by Kevin Farrell, Chartered Engineer with Waterman Moylan Consulting Engineers. Kevin has 30 years' experience within the construction industry.

12.2 METHODOLOGY

The following section outlines the legislation and guidelines considered, and the adopted methodology for preparing this chapter.

12.2.1 Guidelines

The methodology followed for this section is in accordance with the EPA "Guidelines on the Information to be contained in Environmental Impact Assessment Reports, May 2022" and "Advice Notes on Current Practice (in the preparation on Environmental Impact Statements Draft September 2015". Information on built assets in the vicinity of the development lands was assembled from the following sources:

- A desktop review of Irish Water Utility Plans, ESB Networks Utility Plans, Gas Networks Ireland Service Plans, Eir E-Maps and Virgin Media Maps;
- Consultation with Irish Water and South Dublin County Council;
- Submission of a Pre-Connection Enquiry Application to Irish Water;
- Review of ESB Network Utility Plans;
- Review of Gas Networks Ireland exiting network maps;
- Review of EIR Telecommunications exiting network maps;
- Review of Virgin Media Telecommunications exiting network maps;
- Site Inspection / Walkover;

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage discharge and water usage calculations were carried out in accordance with the following guidelines which are standard and best practice:

- Greater Dublin Strategic Drainage Study (GDSDS);
- IS EN752, "Drain and Sewer Systems Outside Buildings";

Foul water, surface water and potable water calculations are included in the Infrastructure Design Report prepared by DBFL Consulting Engineers.

12.2.2 Study Area

The subject site, of approximately 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche on a site of c. 0.07 ha), is located to the south of the R120/Main Street at Newcastle Village. The site is bounded by Graydon residential development to the east, the Athgoe Road to the west, by single dwellings to the north and existing agricultural lands to the south. The St Finian's National School and Church is located to the north of the site.

Figure 12.1 – Project Site

12.3 EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

12.3.1 Existing Storm Water Infrastructure

The existing site is predominantly greenfield with a construction access traversing the site from the Athgoe to the south east. A construction compound is also located on the subject site. The proposed creche is located in an area in an area within the previously permitted Graydon development A network of existing drainage ditches currently drains the site. Drainage infrastructure has been constructed as part of Graydon residential development (under planning reference ABP 305343-19) to the east of the subject site in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). The proposed Creche will utilise this permitted infrastructure. There are existing 225mm surface water sewers located in Athgoe road to the west of the subject site.

An existing “pond” is identified on the Newcastle LAP, 2012 in the south western area of the subject site. DBFL have reviewed this area on site and no pond was present but there is a depression in this area of the site based on the topography. Some evidence of an overland flow route is present on historic aerial mapping.

The existing surface water sewers are shown on drawing 210026-DBFL-CS-SP-DR-C-1200.

12.3.2 Existing Foul Water Infrastructure

The existing site is predominantly greenfield apart from the creche which is located in an area within the previously permitted Graydon development. There is an existing 225mm diameter foul sewer on Main Street (R120) to the north of the site. According to local authority records, this foul sewer connects to a 525mm foul sewer on Aylmer Road which ultimately outfalls to Newcastle Pump Station which pumps foul water to a gravity sewer at the Rathcoole Interchange which ultimately discharges to Ringsend Waste Water Treatment Plant (WWTP) where it is treated and ultimately discharges into South Dublin. The WWTP and pumping station operate under an EPA license D0034-01.. Foul infrastructure has been constructed as part of Graydon residential development to the east of the subject site in accordance with the Irish water code of practice (Document IW-CDS-5030-03 Revision 2). A 225mm foul sewer is located in the Athgoe Road to the west of the site.

The existing foul sewers are shown on drawing 210026-DBFL-CS-SP-DR-C-1200.

12.3.3 Existing Potable Water Infrastructure

The existing site is predominantly greenfield with a construction access traversing the site from the Athgoe to the south east. A construction compound is also located on the subject site. The proposed creche is located in an area in the previously permitted Graydon Development. Water supply infrastructure has been constructed as part of Graydon residential development to the east of the subject site (under planning reference ABP 305343-19) in accordance with the Irish water code of practice. There is a 100mm and 150mm watermain along the L6001 to the west of the subject site.

The existing watermains are shown on drawing 210026-DBFL-WM-SP-DR-C-1300.

12.3.4 Existing ESB Infrastructure

ESB Networks have been contacted and an existing ESB network map for the area surrounding the proposed development has been obtained, refer to Appendix F Volume III of this EIAR. There are existing ESB Networks (ESBN) infrastructure within the site in the form of Medium Voltage overhead power lines which traverse south east corner of the site.

12.3.5 Existing Broadband Infrastructure

There two main telecommunication providers (Eir and Virgin Media) in the area. Both have been contacted and the existing network maps for the area surrounding the proposed development have been obtained, refer to Appendix F Volume III of this EIAR. Both providers will be brought to the new development to give homeowners more flexibility to choose providers that suit their needs.

12.3.6 Existing Gas Infrastructure

Gas Networks Ireland (GNI) have been contacted and an existing gas network map for the area surrounding the proposed development has been obtained, refer to Appendix F Volume III of this EIAR No Gas will be brought to the new development.

12.3.7 Telecommunications (Mobile)

ISM have prepared a report in relation to Telecommunications. It is noted the existing mobile reception in Newcastle is poor. The assessment identified Radio Frequency coverage for the local geographic area is served by a distinct lack of cells at a range of long distances to the Development on less than a 360° basis, which is not a typical cell pattern for urban/semi-rural Radio Frequency coverage.

The average indoor coverage signal recorded was -115db across all 3 mobile phone networks. With -85db being the benchmark optimal coverage signal, and anything over -100db being poor too bad, -115db denotes extremely poor coverage for the local area.

In this regard, it is proposed to include some GPS Antennae and associated cabinets at roof level of the apartment Building, which will improve the existing mobile reception. This is set out in the ISM Report included with the application.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Newcastle South development will consist of the construction of 280 no. dwellings, a creche, open space, telecommunications infrastructure, and associated ancillary services infrastructure as well as associated road infrastructure and open space, refer to Chapter 2.0 (Description of Development and Alternatives) for a detailed site and development description.

Further information regarding the proposed infrastructure elements of the proposed development are detailed in the separate “Infrastructure Design Report”, (IDR) document reference 210026-DBFL-CS-SP-RP-C-1001 IDR by DBFL

Consulting Engineers. These include details on road design, surface water, foul drainage and potable water supply as well as SUDs considerations on the scheme.

12.4.1 Surface Water Drainage

The development will include the construction of a surface water network throughout the lands, which will collect surface water runoff from all hard standing areas. The proposed creche will utilise the infrastructure provided under the previously permitted Graydon development.

The management of surface water for the proposed development has been designed to comply with the policies and guidelines outlined in the Greater Dublin Strategic Drainage Study (GDSDS) and with the requirements of South Dublin County Council.

To prevent pollutants or sediments discharging into water courses the GDSDS requires “interception storage” to be incorporated into the development. This interception storage is designed to receive the run-off for rainfall depths of 5mm up to 10mm if possible. The SUDS features including permeable driveways, tree pits, green roofs, swales and “open bottom” attenuation facilities will provide the necessary interception volume required by the GDSDS. Refer to chapter 6 for details related to water and hydrology.

The attenuation volume required for the 100 year design event plus 20% climate change allowance (as per SDCC County Development Plan) will be accommodated using above ground storage in order to maximize the use of SuDs and limit the requirement of underground tanks to promote biodiversity. Where design constraints exist in the form of space constraints and the requirement to provide a useable open space to residents it was not possible to provide open ponds. At these constrained locations, underground attenuation facilities will store up to the 30-year critical storm in underground stormtech attenuation systems and shallow detention basins will be used to store surface water for storms between the 30 year and the 100 year critical storms. It is intended that the creche utilises the permitted Graydon surface water infrastructure which is suitably designed to accommodate the proposed creche.

Surface water calculations for the development made use of rainfall values for the Newcastle area as provided by Met Eireann. Rainfall intensities were increased by a factor of 20% to take account of climate change, as required by the South Dublin’s County Council’s County Development Plan for attenuation storage design. The surface water network, attenuation storage and site levels are designed to accommodate a 100-year storm event and includes climate change provision. Refer to Infrastructure Design Report for more information.

Table 12.1 outlines the proposed attenuation zones associated with the development. The surface water management strategy for the proposed development is outlined in Chapter 6.

Table 12.1 – Attenuation Facility Volumes

Attenuation Facility	Location	Contributing Area (m2)	Vol. required (m3)	Vol. provided (m3)
1	Catchment 2A	37,910	1,059	1,072
2	Catchment 2D	11,392	208	283
3	Catchment 3	10,220	215	233
4	Catchment 2E	16,718	404	531
5	Catchment 2F	8,242	157	170

12.4.2 Foul Drainage

The proposed foul drainage system for the subject site will connect to the existing 225mm diameter foul sewer in Graydon residential development provided under planning reference ABP 305343-19. A Wastewater Pumping Station is proposed to serve 238 units of the proposed site and the remaining units will drain by gravity. The creche will use the previously permitted Graydon infrastructure and forms part of this planning application. Foul drainage from the proposed development (238 units) will drain to a proposed pumping station at the north of the site by gravity before being pumped back to a stand-off manhole at the south of the site and discharging to infrastructure provided by the Graydon residential development. A portion of the development to the south (42 units) of the subject site will not make use of the pumping station and will flow by gravity and discharge to the Graydon residential development.

Individual houses will connect to main sewer network via individual 100mm diameter house connections, as per Irish Water Code of Practice for Wastewater Infrastructure.

The proposed foul sewer network is shown on DBFL drawing 210026-DBFL-CS-SP-DR-C-1200.

12.4.3 Water Supply

The watermain layout and connections, valves, hydrants, meters etc. are designed in accordance with Irish Water's Code of Practice / Standard Details and the Department of the Environment's Building Regulations "Technical Guidance Document Part B Fire Safety".

It is proposed to connect to the existing 250mm watermain provided in the Graydon residential development at Newcastle boulevard to the south east of the site through the link street of the proposed site. A closed valve connection is also proposed to the existing watermain in Athgoe road. The proposed 250mm trunk watermain will serve a number of 150mm diameter watermain loops throughout the development. A number of 100mm watermain loops will be fed from the 150mm watermains along the Local Streets (street types defined on 210026-DBFL-RD-SP-DR-C-1104 Roads Hierarchy drawing).

Individual houses will have their own connections to the distribution main via service connections and boundary boxes. Individual service boundary boxes will be of the type to suit Irish Water and to facilitate domestic meter installation. Hydrants are provided for fire-fighting at locations to ensure that each dwelling is within the required Building Regulations distance of a hydrant.

The proposed watermains layout is shown on drawing 210026-DBFL-WM-SP-DR-C-1300.

12.4.4 ESB Power

The existing overhead services on the site will be undergrounded and diverted as required to accommodate the new development. A new Medium Voltage below ground network will be provided in the proposed development which will connect to the existing ESB Networks infrastructure in the area. Two new "unit sub-stations" will be provided throughout the site to meet the electrical demands associated with the new houses and duplex units while a further 1no "in-building" sub-station will be provided to serve the apartments.

12.4.5 Gas

It is not proposed to provide gas to this development Heating and hot water will be provided via electrically powered heat pumps.

Any works on the existing gas supply infrastructure will be carried out in accordance with Gas Networks Ireland relevant guidelines. All gas infrastructure will be below ground with the possible exception of a gas pressure reduction station if required by Gas Networks Ireland.

12.4.6 Telecommunications – Eir

There is an extensive Eir Network in the roads surrounding the site in Graydon located to the east.

New connections will be made to the existing Eir networks at the boundary of the site and services will be distributed throughout the site as required. The exact extent and location of these connections will be agreed with Eir during the design stage of the project.

12.4.7 Telecommunications – Virgin Media

There is an extensive Virgin Media Network in the roads surrounding the site in in Graydon located to the east.
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New connections will be made to the existing Virgin Media networks at the boundary of the site and services will be distributed throughout the site as required. The exact extent and location of these connections will be agreed with Virgin Media during the design stage of the project.

12.4.8 Telecommunications - Mobile

The proposal includes the following at roof level telecommunications infrastructure comprising 9 no. support poles on ballast mounts (to accommodate 1No. 2m 2G/3G/4G antenna & 1No. 5G antenna each) & 3 no. poles on lift overrun (to accommodate 2No. Ø0.3m Microwave links each at roof level of Apartment building B, together with associated equipment and cabinets/shrouds)

12.5 POTENTIAL EFFECT OF THE PROPOSED DEVELOPMENT

12.5.1 Construction Phase

Surface Water
The installation of the surface water sewers for the development will be conducted in parallel with the other services. This will involve construction of pipes and manholes using trench excavation. The potential adverse effect of the proposed development during the construction phase of the development would therefore be short term and minimal as the trenches will be backfilled with appropriate fill material following installation and completion of connection to existing drainage ditch.

Damage to existing underground and over ground infrastructure resulting in possible contamination of the existing systems (including watercourses) with construction related materials. This likely adverse effect would be temporary, regionally short term and moderate.

Foul Water
The installation of the foul sewers and rising mains for the development will be conducted in parallel with the other services. This will involve construction of pipes and manholes using trench excavation. The potential adverse effect of the proposed development on the local foul sewerage network during the construction phase of the development would therefore be short term and minimal following connection to the existing network being made.

The site compound will require a temporary foul connection. This likely adverse effect will be temporary and negligible. Improper discharge of foul drainage from contractor's compound could contaminate groundwater and nearby watercourses through seepage. The likely adverse effect on the nearby watercourses would be temporary, regionally short term and moderate.

Watermain
Provision of a new water main distribution network would involve construction activities within the subject lands involving trench excavations conducted in parallel with the other services.

There is a risk of contamination of the public water supply during the construction and in particular the connection of the watermain network for the scheme to the public supply. The potential adverse effect on the local public water supply network would be short term and imperceptible.

The site compound will require a water connection. This likely adverse effect will be temporary and negligible.

Power, Gas & Telecommunications

The installation of the utilities for the development will be conducted in parallel with the other services. This will mainly involve excavation of trenches to lay ducting, construction/installation of access chambers and backfilling of trenching. The trenching and backfilling works will be carried out in conjunction with the construction of the roads and footpaths throughout the scheme.

The relocation or diversions of the existing overhead ESB lines may lead to loss of connectivity to and/or interruption of the supply from the electrical grid to the surrounding areas. Any loss of supply will be managed by ESB Networks to minimise the impact on neighbouring properties.

There is also a potential loss of connection to the Telecommunications infrastructure while carrying out works to provide service connections. Any loss of supply will be managed by Eir / Virgin Media to minimise the impact on neighbouring properties.

The construction of the proposed development has the potential to cause **a slight, adverse, temporary, residual impact** on receiving the electricity, gas and telecommunication networks.

12.5.2 'Do-nothing' scenario

There are no predicted impacts on these material assets should the proposed development not proceed.

12.5.3 Operational Impacts

Potential operational phase effects on the water infrastructure are noted below:

Surface Water
Given the fact that the site will be attenuated to greenfield run-off rates as per GDSDS guidance in order to mimic the current scenario and then discharge to the aforementioned drainage ditch, no capacity issues are anticipated in the proposed outfall to the existing drainage ditch.

Increased impermeable areas will reduce local ground water recharge and increase surface water runoff (if not attenuated to greenfield runoff rate –refer to Chapter 6 – Water and Hydrogeology).

Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas) would result in an adverse, slight effect.

Foul Water
The impact of the proposed development on the public foul sewerage system will be to increase the quantity of wastewater discharging to Ringsend for treatment and disposal. The estimated loading from the occupancy of the proposed development site would be approximately 115,500 L/day.

There also exists a minor risk associated with the possibility of leakage from damaged foul sewers and drains within the development site. Any foul water leakage could result in minor contamination of groundwater in the area.

The potential impact from the operational phase of the development is therefore likely to be long term and minimal.

Watermains
The impact of the operational phase of the proposed development on the public water supply will increase the demand on the existing supply by approximately 1.34 l/s. As such additional water quantities would need to be treated and supplied through the existing network to the site. This will require extra cost as well as increasing abstraction volumes from the existing source. The potential adverse impact of the proposed development on the public water supply network is likely to be long term and minimal.
Telecommunications – Mobile

The inclusion of the telecommunications infrastructure at roof level will improve the local mobile phone reception which is considered positive moderate short term.

12.6 MITIGATION MEASURES

12.6.1 Construction Mitigation

Mitigation measures proposed in relation to the drainage and water infrastructure include the following:

Stormwater Infrastructure
A detailed “Construction Environmental Management Plan” will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the “Construction Environmental Management Plan”.

Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement tanks where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

In the event of groundwater being encountered during the construction phase, mitigation measures will include dewatering by pumping to an appropriate settlement pond/tank prior to discharge. Other measures would include excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.

Foul Infrastructure
In order to reduce the risk of defective or leaking sewers, all new sewers will be laid in accordance with Irish Water standards, pressure tested and CCTV surveyed to ascertain any possible defects.

The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established.

Potable Water Infrastructure
The construction compound's potable water supply shall be protected from contamination by any construction activities or materials by constructing it to Irish Water standards with appropriate cover.

Please also refer to Chapter 6.0 – Water for mitigation measures.

Power, Gas & Telecommunications

The relocation or diversions of the existing overhead ESB lines may lead to loss of connectivity to and / or interruption of the supply from the electrical grid to the surrounding areas. Any loss of supply will be managed by ESB Networks to minimise impact on neighbouring properties.

Any loss of supply will be managed by Eir / Virgin Media to minimise impact on neighbouring properties.

12.6.2 Operational Mitigation

Where possible backup network supply to any services will be provided should the need for relocation or diversion or existing services be required otherwise relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.

Please refer to Chapter 6.0 Water for further operational mitigations.

12.7 CUMULATIVE IMPACTS

The cumulative impacts include the recently constructed Graydon development scheme under planning reference ABP 305343-19 which compromises of 406 dwellings, a creche and associated site works, along with associated amendments as well as the subject Newcastle South which comprises of the construction of 280 no. dwellings along with open space and associated internal road infrastructure. In addition, there is a supermarket (PRR SD20A/0037) along with associated amendments located at the entrance to Graydon which is currently under construction.

In addition, it is noted while the proposed development can be catered for by an underground pumping station (as part of the proposed development), in the event there is an upgrade undertaken to the Newcastle Pumping Station (at Grant's View) to the east of Newcastle by Irish Water the potential cumulative effects to Material Assets is deemed to be slight positive and long term. As indicated by Irish Water, in the Confirmation of Feasibility, this SHD is not reliant on the Irish Water Newcastle pumping station project by reason of the installation of the on-site pumping station proposed.

In the event of future development adjacent to the proposed development, there are no predicted cumulative impacts arising from the construction or operation phase related to the material assets – built services provided that the other developments implement appropriate mitigation measures.

12.7.1 Stormwater Infrastructure

The proposed surface water drainage infrastructure for Newcastle South along with the preceding Graydon development and the proposed Supermarket have been designed in accordance with the relevant guidelines. Any other future development in the vicinity of the site would be required to be similarly designed in relation to permitted surface water discharge, surface water attenuation and SuDS, therefore, no potential cumulative impacts are anticipated in relation to surface water drainage and flooding.

12.7.2 Foul Infrastructure

No potential cumulative impacts are anticipated in relation to wastewater as Irish Water have advised that provision of a wastewater connection is feasible. The foul discharge from the site will ultimately join the public sewer and will be treated at the Irish Water Ringsend Wastewater Treatment Plant (WWTP) prior to subsequent discharge to Dublin Bay. This WWTP is required to operate under an EPA license (D0034-01) and meet environmental legislative

requirements as set out in such licence. It is noted that a planning permission for a new upgrade to this facility was received in 2019 and is currently in the process of construction/ implementation. This plant operates under an EPA licence (D0034-01) and is currently in the process of being upgraded to a PE of 2.4million to meet the increased demand of the Dublin area. The most recent Annual Environmental Report (AER 2020) shows it is currently operating for a PE peak loading of 2.27million while originally designed for 1.64million. However, the current maximum hydraulic load (832,269 m3 /day) is less than the Peak hydraulic capacity as constructed (959,040 m3 /day) i.e. prior to any upgrade works. Moreover, according to the most recent Wastewater Treatment Capacity Register for Dublin (link: https://www.water.ie/connections/developer-services/capacityregisters/wastewater-treatment-capacity-register/ accessed on 7 June 2022), there is currently spare treatment capacity available at Ringsend WWTP based on loads received in 2020 and available treatment plan capacity now or through the completion of a project by 2023. Irish Water is working to provide infrastructure to achieve compliance with the Urban Wastewater Treatment Directive for a population equivalent of 2.1million in the second half of 2023. When all the proposed works are complete in 2025, the Ringsend Wastewater Treatment Plant will be able to treat wastewater for up to 2.4 million population equivalent. These upgrade works (described in section 3.4 below) have commenced and comprise a number of phases and are ongoing and expected to be fully completed by 2025. Refer to Hydrological Qualitative Risk Assessment prepared by AWN Consulting for further information.

12.7.3 Potable Water Infrastructure

No potential cumulative impacts are anticipated in relation to potable water as Irish Water have advised that provision of a wastewater connection is feasible. The preceding Graydon development has also been designed to cater for the subject site.

12.7.4 ESB Infrastructure

The relocation or diversions of the existing overhead ESB lines may lead to loss of connectivity to and / or interruption of the supply from the electrical grid to the surrounding areas. Any loss of supply will be managed by ESB Networks to minimise impact on neighbouring properties.

12.7.5 Broadband Infrastructure

There is could be a potential loss of connection to the Telecommunications infrastructure while carrying out works to provide service connections. Any loss of supply will be managed by Eir / Virgin Media to minimise impact on neighbouring properties.

12.7.6 ‘Do Nothing’ Impact

In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely impacts upon the receiving environment should the proposed development not take place.

If the proposed development does not proceed there would be no impact on the subject site. The current material assets would continue to operate in their current state.

12.8 PREDICTED (RESIDUAL) IMPACTS OF THE PROPOSED DEVELOPMENT

12.8.1 Construction Phase

Implementation of the measures outlined in Section 12.6 will ensure that the potential effects of the proposed development on the site’s material assets do not occur during the construction phase and that any residual effects will be short term.

12.8.2 Operational Phase

The volume of potable water for treatment and use will increase due to the development of the lands. Please refer to Infrastructure Design Report prepared by DBFL Consulting Engineers for details.

The demand on power supply, gas supply and telecommunications supply will all increase due to the development of the lands.

12.9 MONITORING

Please refer to Chapter 6.0 – Water and Chapter 4.0 Biodiversity for the proposed monitoring in relation to the surface water during the construction phase. There is no specific monitoring is proposed in relation to the remaining material assets infrastructure during the construction phase.

Proposed monitoring during the operational phase in relation to the water infrastructure are as follows:

- All drainage works will be approved by South Dublin County Council, Sanitary Services Division, and will be carried out in accordance with the GDRCOP (Greater Dublin Regional Code of Practice for Drainage Works).
- The surface water and foul drainage systems will be monitored by way of observation of any flooding events if such occur and the establishment of a proper maintenance programme for all sewers / Suds features etc.
- Regular cleaning of pipe networks within the development taken in charge will ensure no blockage will obstruct any flow from surface and foul networks.
- On-going water usage within the proposed development will be monitored by bulk water meters. Water usage will be monitored by the relevant authority to avoid waste and leaks etc.
- All drainage works will be approved by South Dublin County Council and will be carried out in accordance with the GDRCOP (Greater Dublin Regional Code of Practice for Drainage Works).
- All foul and surface water sewers will be CCTV surveyed prior to being 'taken in charge' by South Dublin County Council.

12.10 REINSTATEMENT

Reinstatement of any excavations relating to the provision of surface and foul drainage, electrical, gas and telecommunications connections is to be carried out in accordance with the relevant asset provider's requirements and the requirements of South Dublin County Council.

12.11 INTERACTIONS

The potential significant impacts on Material Assets – Utilities arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant temporary or permanent residual negative impacts will occur.

There are interactions between utilities and lands and soils, with the construction of drainage and utilities impacting the quantity of soil and subsoil as these materials will be removed to facilitate construction. The likely impact will be permanent slight, permanent and negative.

12.12 DIFFICULTIES ENCOUNTERED IN COMPILING

There were no difficulties encountered in relation to compiling information.

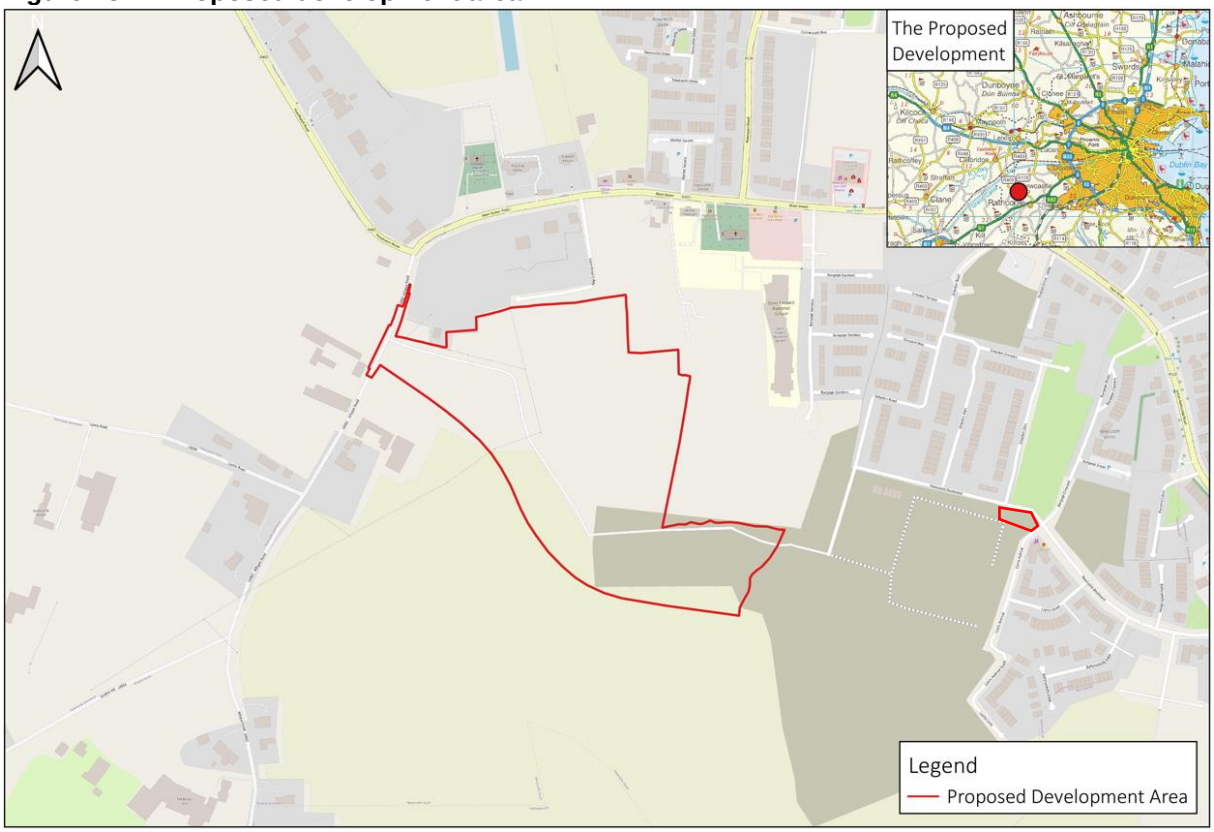
13.0 CULTURAL HERITAGE (ARCHAEOLOGY)

13.1 INTRODUCTION

13.1.1 General

IAC Archaeology has prepared this chapter on behalf of Cairn Homes Properties Ltd to assess the impact, if any, on the archaeological and cultural heritage resource of the proposed development at Newcastle South, County Dublin (Figure 13.1; ITM 699728, 728516). This chapter was prepared by Faith Bailey (MA, BA (Hons), MIAI, MCIfA). Faith has over 18 years' experience in archaeological and cultural heritage consultancy, responsible for the production of EIAR and assessments for all aspects of development nationwide.

Figure 13.1 –Proposed development area



This study determines, as far as reasonably possible from existing records, the nature of the archaeological, architectural and cultural heritage resource in and within the vicinity of the application area using appropriate methods of study. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets (Chartered Institute for Archaeologists 2014). This 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 upon the setting of known cultural heritage sites in the surrounding area;
- Suggested mitigation measures based upon the results of the above research.

13.1.2 Definitions

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 '*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.

Architectural, or built heritage, is specifically addressed in Chapter 14 of this EIAR.

13.1.3 Consultations

Following the initial research (section 13.2.1), a number of statutory and voluntary bodies were consulted to gain further insight into the cultural background of the background environment, receiving environment and study area, as follows:

- Department of Housing, Local Government and Heritage (DoHLGH) – the Heritage Service, National Monuments: Record of Monuments and Places; Sites and Monuments Record; Monuments in State Care Database and Preservation Orders;
- National Museum of Ireland, Irish Antiquities Division: topographical files of Ireland;
- South Dublin County Council: Planning Section;
- Trinity College Dublin, Map Library: Historical and Ordnance Survey Maps

13.1.4 Guidance and Legislation

The following legislation, standards and guidelines were consulted as part of the assessment.

- 2014 EIA Directive (2014/52/EU);
- National Monuments Act, 1930 to 2014;
- The Planning and Development Acts, 2000 (as amended);
- Heritage Act, 1995 (as amended);
- Draft Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), 2015, EPA;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Report, 2022, EPA;
- 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, 2000 and the Local Government (Planning and Development) Act 2000.

13.2 ASSESSMENT METHODOLOGY - BASELINE

Research has been undertaken in four phases. The first phase comprised a paper survey of all available archaeological, historical, and cartographic sources. The second phase involved a field inspection of the proposed development area. The third phase comprised of geophysical survey and the fourth phase comprised a programme of archaeological testing.

13.2.1 Paper Survey

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Dublin;
- 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;
- South Dublin County Council Development Plan 2016-2022;

- South Dublin Draft County Development Plan 2022-2028;
- Newcastle Local Area Plan 2012 (as extended);
- Place name analysis;
- Aerial photographs; and
- Excavations Bulletin (1970–2021).

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g., only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on a website maintained by the Department of Housing, Local Government and Heritage (DoHLGH) – www.archaeology.ie.

National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the DoHLGH may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the National Monuments Act 1930. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the National Monuments (Amendment) Act 1954. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

The topographical files of the National Museum of Ireland are the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

Documentary sources were consulted to gain background information on the archaeological and cultural heritage landscape of the proposed development area.

Development Plans contain a catalogue of all the Protected Structures and archaeological sites within the county. The South Dublin County Council Development Plan 2016-2022, The South Dublin Draft County Development Plan 2022-2028 and Newcastle Local Area Plan 2012 (as extended were consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed development area.

Place Names are an important part in understanding both the archaeology and history of an area. Place names can be used for generations and in some cases have been found to have their root deep in the historical past.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey and Google Earth.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP.

13.2.2 Field Inspection

Field inspection is necessary to determine the extent and nature of archaeological and historical remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

The archaeological field inspection was carried out on the 4th March of 2019 and entailed -

- Walking the proposed development and its immediate environs.
- Noting and recording the terrain type and land usage.
- Noting and recording the presence of features of archaeological or historical significance.
- Verifying the extent and condition of any recorded sites.
- Visually investigating any suspect landscape anomalies to determine the possibility of their being archaeological in origin.

13.2.3 Geophysical Survey

Geophysical survey is 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 within the proposed development in 2018 to inform the overall development of the lands (Nicholls 2018, Licence Ref.: 18R0042). A summary of the geophysical report is presented in this chapter and the full report included in Appendix A 13.1. (Volume III of this EIAR)

13.2.4 Archaeological Testing

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’ (CIfA 2020a, 4). A programme of archaeological testing based on the results of the geophysical survey was carried out within the proposed development in November 2021. This was undertaken by David Bayley of IAC under licence 20E0024ext (Bayley 2022). Detailed results of the archaeological testing are included in this chapter and Appendix A 13.2 Volume III of this EIAR.

13.3 ASSESSMENT METHODOLOGY – POTENTIAL IMPACTS

The quality and type of an impact can be classed as one of the following (as per the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022)):

- Negative Impact: A change which reduces the quality of the environment, for example a change that will detract from or permanently remove an archaeological or cultural heritage site from the landscape;

- Neutral Impact: A change which does not affect the quality of the environment; or
- Positive Impact: A change which improves the quality of the environment, for example a change that improves or enhances the setting of archaeological or cultural heritage site.

The below terms are used in relation to the archaeological and cultural heritage and relate to whether a site will be physically impacted upon or not:

- Direct Impact: Where an archaeological/cultural heritage feature or site is physically located within the footprint of the proposed development and entails the removal of part, or all, of the monument or feature; and
- Indirect Impact: Where a feature or site of archaeological or cultural heritage merit or its setting is located in close proximity to the footprint of a development.

13.3.1 Significance of Effects

Impact definitions (description of effects) are as per the most recent EPA guidelines (2022):

Imperceptible
An effect capable of measurement but without significant consequences

Not significant
An effect which causes noticeable changes in the character of the environment but without noticeable consequences

Slight
An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

Moderate
An effect that alters the character of the environment in a manner that is consistent with existing or emerging baseline trends.

Significant
An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

Very Significant
An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment

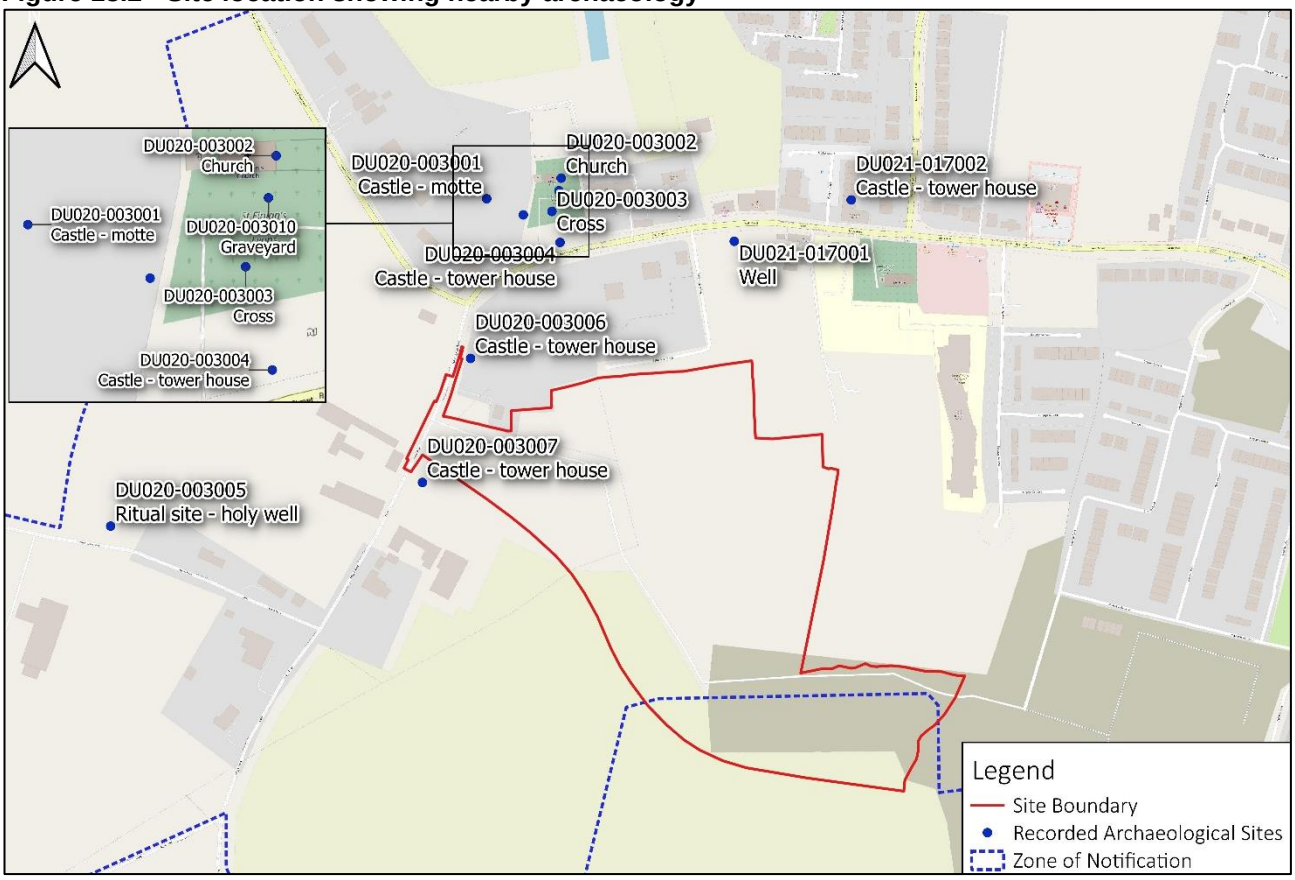
Profound
An effect that obliterates sensitive characteristics.

13.4 EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

13.4.1 Archaeological and Historical Background

The proposed development area is located at Newcastle, within the townland of Newcastle South, barony of Newcastle, and parish of Newcastle, County Dublin. The northern two-thirds of the development area are located within the zone of archaeological potential associated with the medieval settlement of Newcastle (RMP DU020-003008). A further 10 archaeological sites are located within 500m, with the nearest of these consisting of a castle tower-house (DU020-003007), located c. 22m to the southwest of the development area (Figure 13.2).

Figure 13.2 - Site location showing nearby archaeology



13.4.1.1 Prehistoric Period

Mesolithic Period (8000–4000 BC)

Although very recent discoveries may push back the date of human activity by a number of millennia (Dowd and Carden, 2016), the Mesolithic period is the earliest time for which there is clear evidence for prehistoric activity in Ireland. During this period people hunted, foraged and gathered food and appear to have led a primarily, but not exclusively, mobile lifestyle. The presence of Mesolithic communities is most commonly evidenced by scatters of worked flint material, a by-product of the production of flint implements.

The current archaeological evidence suggests that the environs around Dublin were first inhabited towards the later part of this period. At this time people made crude flint tools known as Larnian (or Bann) Flakes. Small numbers of these flakes have been found along coastal areas of County Dublin such as Dun Laoghaire, Dalkey Island, and Loughlinstown and may indicate small-scale transient settlement along the riverbanks and seashores (Corlett, 1999). There are no known Mesolithic sites located within the immediate vicinity of the proposed development area.

Neolithic Period (4000–2500 BC)

During the Neolithic period, communities generally became less mobile and their economy became based on the rearing of stock and cereal cultivation. The transition to the Neolithic was marked by major social change. Communities had expanded and moved further inland to more permanent settlements. This afforded the development of agriculture which demanded an altering of the physical landscape. Forests were rapidly cleared and field boundaries constructed. Pottery was also being produced, possibly for the first time.

While recent years have seen a large increase in the number of identified Neolithic settlement and habitation sites, the period is most commonly characterised by its impressive megalithic tombs. A flint axe-head of likely Neolithic date was recovered c. 137m to the northwest of the development area in 1979.

Bronze Age (2500–800 BC)

The Bronze Age was marked by the widespread use of metal for the first time in Ireland. As with the transition from Mesolithic to Neolithic, the transition into the early Bronze Age was accompanied by changes in society. The construction of megalithic tombs went into decline and the burial of the individual became typical. Cremated or inhumed bodies were often placed in a cist, which is a stone-lined grave, usually built of slabs set upright to form a box-like construction and capped by a large slab or several smaller lintels (Buckley & Sweetman, 1991). Barrows are earthen burial monuments, which consist of a circular area surrounded by a fosse, often with an external bank. The term ring-ditch is sometimes applied to barrows with a flat centre. These sites often contain a cist burial. There are a number of ring-ditches within the wider region. A ring-ditch, urn burial and three cremation pits were identified c. 627m southeast of the proposed development site under licence 07E0245 (Bennett 2007:431). A saddle quern was also recovered from a pit on the site, as was an unusually large possible Bronze Age well or pool. The feature was fed by a natural spring and evidence of heat-shattered stones suggests attempts were made to heat the water within the feature.

Another site type thought to reveal of glimpse of domestic life at this time is the burnt mound and *fulacht fia*. Over 4500 *fulachta fia* have been recorded in the country making them the most common prehistoric monument in Ireland. They are normally interpreted as temporary cooking sites but may have been used for other industrial or even recreational functions. They survive as low mounds of charcoal-enriched soil mixed with an abundance of heat-shattered stones. They are usually horseshoe shaped and located in low-lying areas near a water source and are often found in clusters. Even when levelled by an activity such as ploughing, they are identifiable as burnt spreads in the landscape (Brindley & Lanting, 1990). During 2020 a programme of archaeological excavation (Licence Ref.: 20E0024) was carried out within the proposed development area (as part of the establishment of a compound associated with permitted development to the east – ABP-305343-19 - Graydon). This revealed scattered archaeological remains comprising pits, kilns and post holes, some of which contained heat affected stones and spreads of burnt mound material. Post excavation analysis is ongoing but the remains may represent scattered Bronze Age activity across this portion of the site (Bayley and Murtagh, 2022).

A *fulacht fia* (RMP DU021-095) was uncovered during testing and subsequently excavated c. 541m to the east of the proposed development (Licence 01E1068, Bennett 2001:246; Licence 03E0369, Bennett 2003:459). A geophysical survey and targeted archaeological testing also revealed two truncated burnt mounds c. 870m southeast of the proposed development area (Bennett 2006:682, Licence Ref.: 06E0878).

The remains of a middle Bronze Age enclosure with an entrance to the southeast were excavated to the east of the proposed development area in 2007 (Bennett 2007:430, Licence Ref.: 06E1137). A single pit of possible prehistoric date was also identified c. 962m east under licence 04E1116 (Bennett 2004:0628).

Iron Age (800 BC-AD 500)

Until recently, the dearth of evidence representing the Irish Iron Age led to it being amongst the most enigmatic and least understood period in Irish prehistory. However, large scale commercial excavations carried out over the past two decades have produced large quantities of new data relating to Iron Age settlement and industry across the country. This raw excavation data is still being analysed and a picture of life during the Iron Age is being assembled (Becker 2012, 1). There are no previously recorded Iron Age sites within the immediate vicinity of the area of proposed development.

13.4.1.2 Early Medieval Period (AD 500–1100)

The early medieval period is depicted in the surviving sources as entirely rural, characterised by the basic territorial unit known as *túath*. Byrne (1973) estimates that there were probably at least 150 kings in Ireland at any given time during this period, each ruling over his own *túath*. During this sometimes-violent period, roughly circular defensive enclosures known as ringforts were constructed to protect farmsteads. Although most of the ringforts that have been excavated are shown to date to this period, some have earlier origins and may have been originally constructed during the Iron Age, or even earlier.

One of the most common indicators of settlement during this period is the ringfort. Ringforts were often constructed to protect rural farmsteads and are usually defined as a broadly circular enclosure. One of the most recent studies of the ringfort (Stout, 1997) has suggested that there is a total of 47,000 potential ringforts or enclosure sites throughout Ireland. They are typically enclosed by an earthen bank and exterior ditch and range from 25m to 50m in diameter. Ringforts can be divided into three broad categories – univallate sites, with one bank or ditch; multivallate

sites with as many as four levels of enclosing features and platforms or raised ringforts, where the interior of the ringfort has been built up. These enclosed farmsteads were intimately connected to the division of land and the status of the occupant. Ringforts are most commonly located at sites with commanding views of the surrounding environs, which provided an element of security. While raths, for the most part, avoid the extreme lowlands and uplands, they also show a preference for the most productive soils (Stout, 1997). In 2006 a large double-ditched enclosure was excavated c. 538m east of the proposed development area (Licence 06E0176, Bennett 2006:564). This was interpreted as being early medieval in date and is likely to represent settlement. An early medieval settlement was also identified c. 678m southeast of the proposed development area, with numerous linear features and pits dating to this period (Bennett 2007:431, Licence Ref.: 07E0245). A stick-pin, metal ring, stone loom weight, broken whetstone and long-handled metal pot were recovered from the site.

This period was also characterised by the foundation of a large number of ecclesiastical sites throughout Ireland, in the centuries following the introduction of Christianity in the 5th century AD. These early churches tended to be constructed of wood or post-and-wattle. Between the late 8th and 10th centuries, mortared stone churches gradually replaced the earlier structures. Many of the sites, some of which were monastic foundations, were probably originally defined by an enclosing wall or bank similar to that found at the coeval secular sites. This enclosing feature was probably built more to define the sacred character of the area of the church than as a defence against aggression. An inner and outer enclosure can be seen at some of the more important sites; the inner enclosure surrounds the sacred area of the church and burial ground and the outer enclosure provides a boundary around living quarters and craft areas. Where remains of an enclosure survive, it is often the only evidence that the site was an early Christian foundation.

The site of a church and graveyard is found within the settlement of Newcastle (RMP DU020-00302), c. 186m north of the proposed development area. Although there are no references to a pre-Norman church at Newcastle, it is possible that the 14th/15th-century medieval church of Newcastle succeeded an earlier medieval church, which in turn served an early Christian settlement on the same site. The fact that the church in Newcastle is dedicated to St. Finian; along with the presence of a granite cross (RMP DU020-00303) in the medieval churchyard (closely paralleled by examples found at Tallaght and Saggart), may suggest an early medieval settlement pre-dating the Anglo-Norman colonisation.

13.4.1.3 Medieval Period (AD 1100–1600)

The beginning of the medieval period was characterised by political unrest that originated from the death of Brian Borumha in 1014. In 1171 AD, Dublin was besieged and taken by Diarmait MacMurchada and his Leinster forces supported by a force of Anglo-Norman knights led by Strongbow (Richard Fitz-Gilbert de Clare) and Raymond le Gros. Diarmait MacMurchada, deposed King of Leinster, sought the support of mercenaries from England, Wales and Flanders to assist him in his challenge for kingship. Norman involvement in Ireland began in 1169 AD when Richard de Clare and his followers landed in Wexford to support MacMurchada. Two years later de Clare (Strongbow) inherited the Kingdom of Leinster and by the end of the 12th century, the Normans had succeeded in conquering much of the country (Stout & Stout, 1997). The initial stage of the invasion of the country was marked by the construction of motte and bailey castles, which were later replaced with stone fortifications.

The motte (RMP DU020-003001) at Newcastle, c. 184m north of the proposed development area, was built in the first phase of major castle building for the outer defences of the city of Dublin. This is supported by the absence of a bailey, which indicates that it was constructed within the initial stages of Norman settlement in the area when less emphasis was placed on security. A series of motte's were constructed by the Anglo-Normans, forming a large circle around the city curving north from Howth to Swords then south to Castleknock and finishing at Dun Laoghaire. Strategically placed some four miles apart, these primary castles date from the 1170s. The motte at Newcastle guarded the most important inland route to Naas and the south. This phase of building was followed in the 13th century by the construction of moated or ditched castles and in the 15th and 16th centuries by tower houses.

Newcastle was one of four royal manors together with Saggart, Esker and Crumlin, which meant it was a demesne manor in the hands of the English king. The manor came to constitute the parish of Newcastle which contained seven townlands covering c. 2000 acres (Civil Survey). The western end of present-day Newcastle reflects its history as a medieval manorial village. Visible at this end of the town is a motte (RMP DU020-003001), a medieval church (RMP DU020-003002) with a residential tower, and four tower houses (RMP DU020-003004/6/7, RMP DU021-017002) all in close proximity to each other. A substantially built wall, on the southwest side of the settlement, may represent the remains of the town walls. The basic plan of the medieval village must have been determined by the alignment of the motte, the church and the tower houses with thatched houses of the peasants lining the single road, which runs in a roughly east-west direction (Simms, 1983, 133-135). The dwelling houses of the medieval town would have fronted

the road and burgage plots would have stretched back perpendicularly from the road (Manning, 1998, 136). The location of some of these burgage plots has been supported by an excavation c. 171m to the northeast (Licence 13E348, Bennett 2014:143). The eastern end of the village, on the other hand, has been transformed by the construction of modern building estates.

The medieval church (RMP DU020-00302), c. 186m west of the proposed development area, was the church which the Anglo-Norman invaders found upon the lands of Newcastle and following their conquest it became the central church of the parish, having a chapel in Colmanstown subservient to it. It is dedicated to St. Finian and is an interesting medieval structure; there is a battlemented tower at its west end and a turret with a spiral staircase at its northwest corner. A carved head, locally identified as St Finian, is inserted high up near the east end of the south wall of the nave and may have been part of a Romanesque church which previously stood on the site. In the graveyard (RMP DU020-003010) to the south of the church is a medieval granite cross (RMP DU020-003003) with a ringed cross on one side and a simple cross on the other. St Finian's holy well (RMP DU020-003005) is located c. 100m west of the church (Harbison, 1970, 134).

Archaeological excavations within the proposed development area under licence 20E0024 revealed an area of archaeological features located in close proximity to tower-house DU020-003007. The features excavated in this area could be divided into two categories (medieval and post-medieval). The medieval features comprised a deep, circular pit that contained numerous sherds of medieval pottery in its fills, and the remains of two structures. One structure contained a cobbled surface on the interior while the second structure comprised the remains of a wall. These features all produced post-medieval pottery or red brick. Additional archaeological testing in this area in 2021 (Appendix A 13.2 Volume III of this EIAR) revealed multiple linear features and ditches, along with a possible post-medieval kiln and associated metalled surface. Medieval pottery was retrieved from a number of the features along with metallurgical waste in the form of slag.

Test trenching in 2019 under license 19E0116, c. 195m southeast of the proposed development area, revealed three charcoal-rich pits and three linear features. Following on from testing, full excavation at the location revealed evidence of probable industrial activity in the form of a kiln and a curvilinear slot (Bennett 2020:482). The kiln was interpreted as having served as a cereal-drying kiln. The curvilinear slot trench was located immediately to the south of the kiln and probably formed a wind-break type structure that provided shelter for the kiln.

13.4.1.4 Post-Medieval Period (AD 1600-1800)

In 1613 Newcastle was elevated to the status of a parliamentary borough by James I and was considered to be one of the best villages in Dublin. Like Rathcoole, it was ruled by a portreeve (chief magistrate). The portreeve was also clerk of the market. At this time there were markets held in Newcastle every Thursday and fairs took place on the feasts of St Swithin and All Saints the day after each, a licence had been granted in 1608 to hold weekly markets and these two fairs.

After the 1641 Rebellion Newcastle became the headquarters of the Irish forces in County Dublin. It is estimated that for some months there were about 5,000 armed men assembled there. The government was in a state of constant fear that the Irish forces would advance from Newcastle into Dublin city and attack. In January 1642 the government forces decided to assume the offensive and 2000 soldiers and 300 horses marched on Newcastle. On arrival, instead of the thousands of Irish troops that they had expected, they found that Newcastle had been evacuated and the inhabitants had taken their belongings with them. The government army went onwards to Naas but returned to Newcastle some days later and caught the returned inhabitants by surprise. The town was pillaged and six or seven villagers were hanged.

With the onset of the 18th century, the political climate settled and this saw a dramatic rise in the establishment of large residential houses around the country. This was largely due to the fact that after the turbulence of the preceding centuries, the success of the Protestant cause and the effective removal of any political opposition, the country was at peace. The large country house was only a small part of the overall estate of a large landowner and provided a base to manage often large areas of land that could be dispersed nationally. During the latter part of the 18th century, the establishment of a parkland context (or demesnes) for large houses was the fashion. Although the creation of a parkland landscape involved working with nature, rather than against it, considerable construction effort went into its creation. Major topographical features like rivers and mountains were desirable features for inclusion in, and as a setting, for the large house and parkland.

Multiple demesne landscapes and large houses were established throughout County Dublin during this period, due to the proximity of the city. A larger demesne, that of Newcastle House, survives c. 433m to the southwest of the

proposed development area. The house is a detached five bay, two stories over basement country house built in the early 1850s and is clearly visible on the first edition OS map. Following the famine period of the 1840s, many of the landowners of the county Dublin area were affected by the fall-off in rental incomes. A number of estates were sold under the terms of the Encumbered Estates Act of 1849, including Newcastle House.

13.4.2 Geophysical Survey and Archaeological Testing (2018 & 2021)

In 2018 a geophysical survey was carried out across all lands within the developer's ownership in order to assess the potential of archaeological remains (Licence Ref.: 18R0042). A number of potential archaeological anomalies were identified within the site (outside of the haul road and compound area that was subject to monitoring and excavation in 2020). Anomalies 8-14 were identified in the main northern field (Appendix A 13.1, Figure 13.2 Volume III of the EIAR).

These comprise remains of possible medieval burgage plots associated with the medieval settlement of Newcastle (8-10) and a number of discrete positive responses within the field that may represent the site of former dwellings (11-14).

A programme of archaeological testing (Licence Ref.: 20E0024ext, Bayley 2022), was conducted within the proposed development area in 2021 (Figure 13.3, Appendix A 13.2). This work was carried out following geophysical survey in 2018 (Licence Ref.: 18R0042). Four areas of archaeological significance were identified (AA1-AA4). The western part of the development area contained a number of features of probable archaeological origin, including an industrial kiln, walls, ditches, metalled surfaces and a pit collectively referred to as Archaeological Area 1 (AA1). Given the proximity of the test area to the tower house DU020-003007 and the recovery of a number of medieval pottery sherds, it is reasonable to assume that the majority of the features identified date from the medieval period and are associated with the tower house complex. In the northern area of the site, the most prominent feature identified was a cereal drying kiln (AA2). The linear field boundary ditches and cultivation furrows identified indicate the presence of a field system in this area. While some features produced some medieval pottery sherds the field system is thought to be post-medieval in date as pottery of that date and ceramic pipes were also identified. A pit of probable archaeological significance was identified in the centre of the site with a possible associated linear ditch of unknown date (AA3). In the eastern area, the only feature of archaeological significance identified was a large burnt mound spread (AA4).

Figure 13.3 - **Results of geophysical survey carried out within the proposed development area in 2018**

13.4.3 Summary of Previous Archaeological Fieldwork

A review of the Excavations Bulletin (1970–2021) has revealed that a number of additional investigations have been carried out within the proposed development area itself and the surrounding environs, which are summarised below.

Within the development area testing was previously undertaken (as part of an earlier proposed development) in order to establish the veracity of the results of a geophysical survey carried out in 2004 (licence 04R130). Works identified a series of potential archaeological features in the form of linear anomalies, which were interpreted as forming field divisions and agricultural activity. A topographical survey in the area surrounding the tower-house (DU020-003007) and within the development area, indicated a platform to the rear of the tower-house and field or plot divisions in the form of possible walls or ditches. Twelve features of archaeological significance and several drainage pipes were identified during the test excavation. Several anomalies, which had been interpreted as structural on the geophysical survey, were in fact the result of the insertion of drainage or land improvement. Activity on the site was categorised into three periods: Phase I: medieval - A ditch, which produced at least four sherds of medieval pottery. A deposit of undisturbed medieval origin produced several sherds of medieval pottery. A metalled surface was overlain by a cobbled surface datable to the post-medieval period, indicating continuity of user and a wall footing. Phase II: post-medieval - An occupation layer defined by a stone drain, a probable pit, a cobbled surface and associated drains. Phase III: modern - Associated with extensive drainage, including stone-filled, ceramic and plastic pipe drains. A preliminary spatial analysis indicated the continuity of use or reuse of several medieval features into the 18th and 19th centuries of what the evidence suggests was a primarily agrarian landscape (Licence 04E1426, Bennett 2004:0629).

Archaeological testing, excavation and monitoring, were carried out along a haul road and compound, within the proposed development area in 2020 (Figure 13.4; Licence Ref.: 20E0024). These works followed on from a geophysical survey (Licence Ref.: 18R0042) carried out in 2018. Four areas of archaeological potential were identified within the compound area during testing, which was then subject to preservation by record. Cluster A comprised a curvilinear ditch and the various pits, stake-holes and spreads. Remains of a possible trough and a spread of materials from which some lithics were recovered were also discovered. Cluster B revealed two kilns. The exact date and function of these kilns cannot be determined at this time and post-excavation analysis is ongoing. Cluster C consisted of a charcoal-production clamp and spread of materials, likely associated with metalworking activities. Cluster D revealed a small trough or ''potboiler'' type feature where small amounts of water could be heated quickly.

The second area of archaeological features was located in the northwest of the development area, in close proximity to tower-house (DU020-003007). The features excavated in this area could be divided into two categories (medieval and post-medieval). The medieval features comprised a deep, circular pit that contained numerous sherds of medieval pottery and the remains of two structures. One structure was sub-rectangular in plan with a cobbled surface. The second structure comprised the remains of a wall but was not possible to determine if this had been part of a larger structure. The post-medieval features in this area appear to have functioned as land drains with one probable former field boundary. These features all produced post-medieval pottery or red brick (Licence 20E0024, Bayley 2020:483). The haul road and compound area were archaeologically monitored during topsoil strip and no further archaeological remains were identified.

To the immediate east of the proposed development area, archaeological testing was undertaken in 2019, under licence 19E0116, which followed on from geophysical survey carried out in 2018 (Licence Ref.: 18R0042). Seven trenches were excavated across the site and identified one area of archaeological potential consisting of charcoal-rich pits and three linear features. These features were subject to archaeological excavation in 2020 under the same licence and evidence of probable industrial activity in the form of a kiln and a curvilinear slot trench were discovered. The kiln was interpreted as having served as a cereal-drying kiln. The curvilinear slot trench was located immediately to the south of the kiln and probably formed a wind-break type structure that provided shelter for the kiln. At the southern end of the cutting, a linear ditch was interpreted as a sub-division of a burgage plot, and six agricultural furrows were recorded. Nothing was recovered during the excavation to indicate a date for the activity (Licence 19E0116, Bayley 2020:482).

A test excavation was carried out on the site of The Thatch pub, located at the western end of the medieval village of Newcastle, c. 154m northwest of the development area. Four test-trenches were excavated across the site but only a single trench contained features of archaeological interest, consisting of poorly preserved foundations of a limestone wall. Cartographic evidence and local sources suggest that the remains formed part of a stable associated with the public house dated to the 19th century (Licence 06E0747, Bennett 2006:683).

Three burgage plots were tested to obtain additional information for an archaeological assessment in 2007, c. 206m to the southwest of the development area. Three ditches and two rubble drains were located; all artefactual evidence pointed to post-medieval dates for these features and indicated that they were agricultural in character. Two burgage divisions were visible on the ground as hedgerows were tested. These were consistent with medieval plot layouts but they did not yield any datable material to establish their medieval origin (Licence 07E0817, Bennett 2007:532).

An archaeological excavation took place in advance of groundworks at St. Finian's National School in 2014 c. 210m northeast of the development area. This followed programmes of test-trenching (Licence Ref.: 05E1376) and geophysical survey (Licence Ref.:03R003) that identified archaeological remains. The excavation identified a series of medieval burgage properties that would have fronted Newcastle Main Street. Three burgage plots were found, each measuring about 20m wide and 70m long. They appear to have been defined in and around the 13th century AD. Two of the plots contained medieval kilns used as a drying chamber, raking and firing surfaces, used for drying grain (Licence 13E348, Bennett 2014:143).

Testing was undertaken at the site of a proposed single residential development located in the north-eastern corner of Newcastle Demesne, c. 234m southwest of the development area. Test-trenching took place in 2007 and a total of four trenches were excavated revealing the presence of a number of furrows and linear features of possible medieval date. Within these features, a number of pottery sherds were discovered including possible Leinster ware, Ham Greenware, two undatable sherds and butchered animal bone (Licence Ref.: 07E0018, Bennett 2007:531).

In 2006 a targeted programme of archaeological testing was carried out c. 495m east of the proposed development area (Licence Ref.: 06E1137, Bennett 2007:430). A number of linear boundaries were identified during the course of the work, but the remains were not definitively dated to the medieval period. As such these features may or may not relate to burgage plots associated with the historic settlement. During the course of topsoil stripping works the remains of a middle Bronze Age enclosure were exposed and excavated within the eastern part of the proposed development area and a cereal drying kiln was identified and excavated c. 150m southwest of the eastern entrance from the main Newcastle Road. Topsoil stripping across the remainder of the site revealed ditches, field boundaries and field drains, some of which correlate to boundaries depicted on historic maps. No medieval finds were recovered from these ditches and the recovery of modern glass, metal and pottery would suggest that while the ditches may have originated in the medieval period, their continual maintenance throughout the post-medieval and modern periods resulted in the original fills being removed and subsequently replaced by modern fills (Tobin 2006, p.44).

Figure 13.4 - Excavation within the proposed development area, carried out in 2021

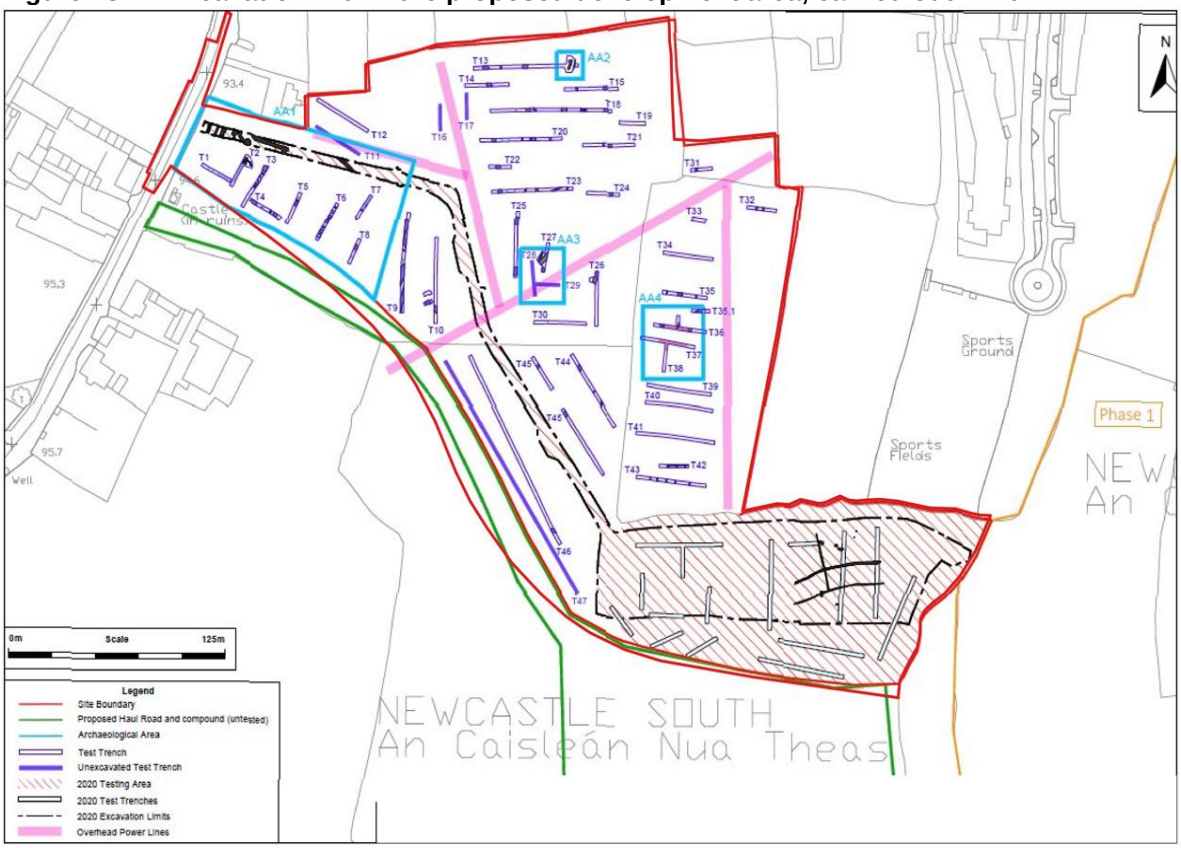
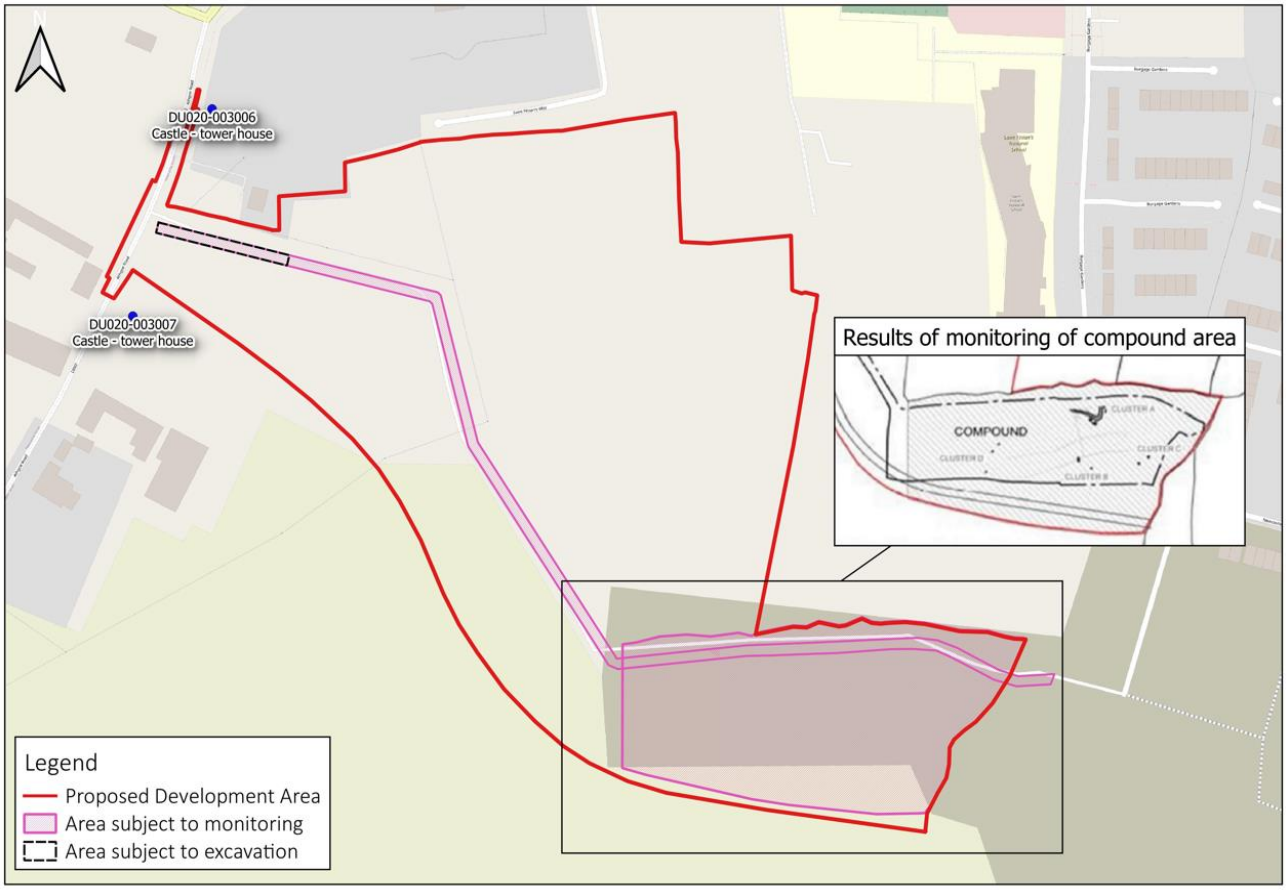


Figure 13.5 - Excavation and monitoring within the proposed development area, carried out in 2019-2020



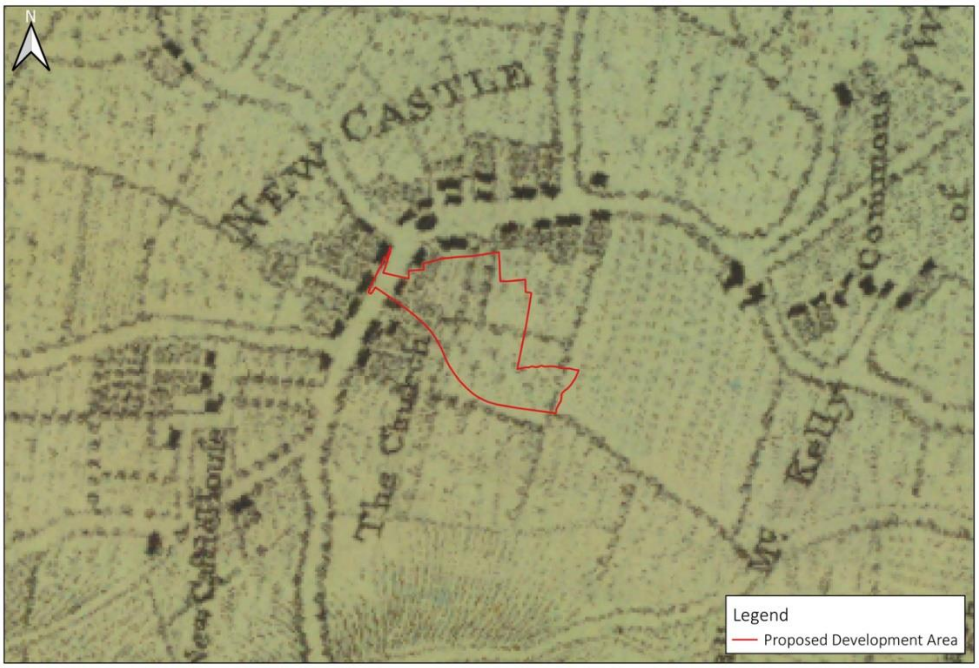
The following licences did not identify anything of archaeological significance within the area surrounding the proposed development: 15E0041, 09R0182, 15E0041, 05E0920.

13.4.4 Cartographic Analysis

William Petty's Down Survey Map, Barony and Parish of Newcastle, c. 1655
The Down Survey maps were compiled at a scale of 40 perches to one inch (the modern equivalent of 1:50,000) and represent the first systematic mapping of a large area on such a scale attempted anywhere. On Petty's map, the proposed development area is located to the east of Newcastle. The village is depicted with the annotation '7 old castles. The accompanying notes record '*Seaven old castles on New Castle Towne Land and the Ruines of a Church on the parcel of Glebe'*. Four of these tower houses are recorded within the RMP, as is St Finian's Church.

John Rocque's Map of the City and County of Dublin, 1760 (Figure 13.6)
Rocque's map depicts several buildings and plots lining the main street of Newcastle, these are focused around the church (RMP DU020-003001). Newcastle House is annotated to the west of the development and there are several features depicted in the approximate location of the later Ballynakelly House, east of the site.

Figure 13.6 - John Rocque's Map of the City and County of Dublin



John Taylor's Map of the Environs of Dublin 1816

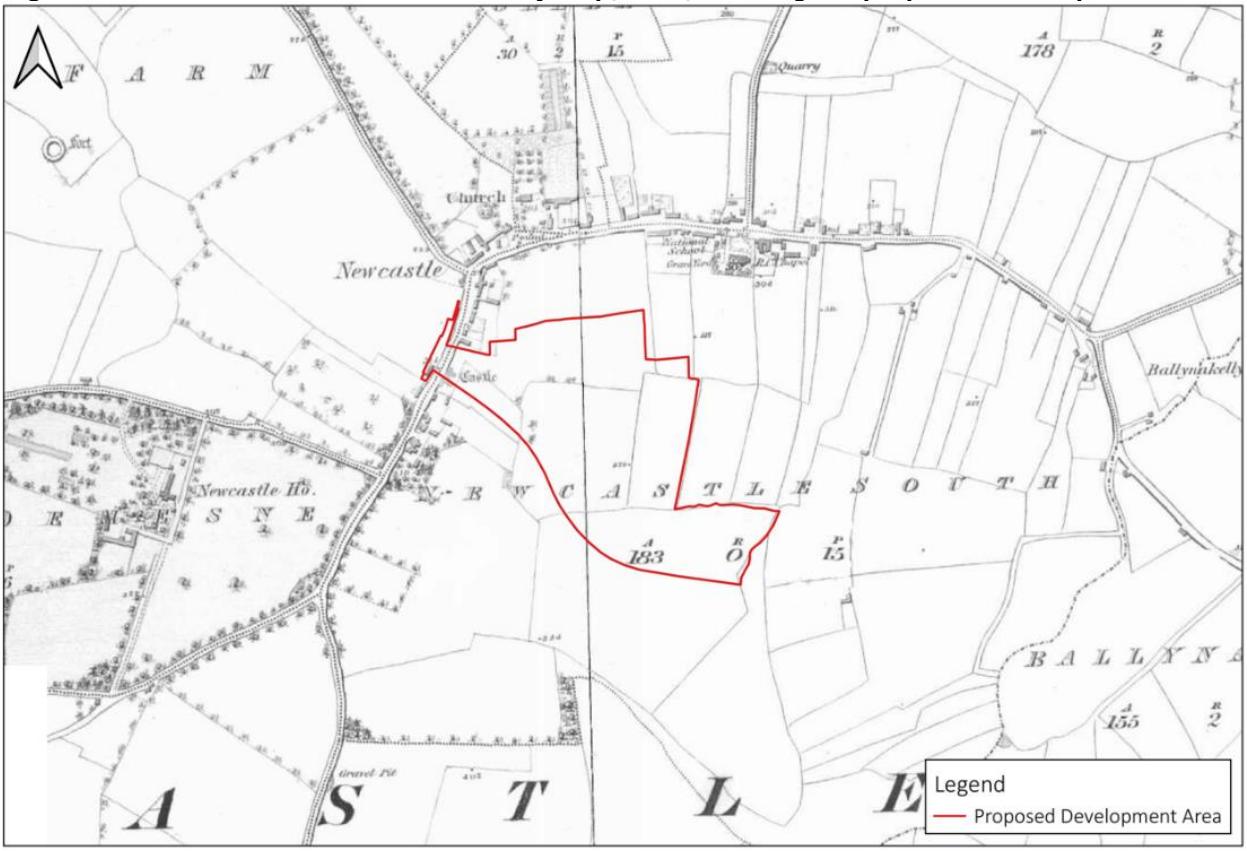
There are no significant changes of note on this map.

First Edition Ordnance Survey Map, 1837, scale 1:10,560 (Figure 13.7)
This is the first accurate historic mapping coverage of the area containing the proposed scheme. The map shows the village of Newcastle as a small settlement, with the majority of buildings clustered around the church (RMP DU020-003002) and motte (RMP DU020-003001) to the west of the village, and the school and Roman Catholic chapel, with graveyard, at the centre of the village, northeast of the development area. There are fewer buildings marked within the eastern portion of the village, while burgage plots can be seen to the north and south of the main road and within the proposed development. The castle (DU020-003007) is labelled and depicted at the site's western extent, with a number of unknown structures with burgage plots. The large demesne of Newcastle House is to the southwest, shown as a shaded area.

Second Edition Ordnance Survey Map, 1871, scale 1:10,560
There are no major changes to note within the cartography of this map that relate to the proposed development area.

Ordnance Survey Map, 1911, scale 1:2500
There has been relatively little change from the previous mapping within the development area. By the time of this edition of the OS map, the burgage plots seen on the first edition map have increased in number to the east, confirming that not all of these features are medieval in date. Newcastle now contains a post office and rectory and the castle - tower house (RMP DU020-003007), within the development area, is annotated as in ruins. The structure seen in the southern portion of the site on the first edition map is no longer depicted. The proposed development area remained undeveloped with the exception of a water channel running through the central portion of the site.

Figure 13.7 - First Edition Ordnance Survey Map, 1837, showing the proposed development area



13.4.5 County Development Plan

The South Dublin County Development Plan 2016–2022, South Dublin Draft County Development Plan 2022-2028 and Newcastle Local Area Plan 2012-2022 recognise the statutory protection afforded to all Record of Monuments and Places (RMP) sites under the National Monuments Legislation (1930–2014).

The 2016-2022 development plan lists a number of aims and objectives in relation to archaeological heritage (Appendix 13.4), including the following:

HCL2 Objective 3:
To protect and enhance sites listed in the Record of Monuments and Places and ensure that development in the vicinity of a Recorded Monument or Area of Archaeological Potential does not detract from the setting of the site, monument, feature or object and is sited and designed appropriately.

The northern two thirds of the main development area are located within the zone of archaeological potential associated with the medieval settlement of Newcastle (RMP DU020-003008). A further 10 archaeological sites are located within 500m within the townlands of Newcastle South, Newcastle North, Newcastle Farm, Glebe, and Grange. The closest of these consists of a tower-house (DU020-003007), located c. 22m to the southwest of the development area. All sites are scheduled for inclusion in the next revision of the RMP (Table 13.1; Figure 13.1; Appendix 13.3).

Table 13.1 – Recorded Archaeological Sites

RMP NO.	LOCATION	CLASSIFICATION	DISTANCE TO SITE
DU020-003008	Newcastle South, Cornerpark, Glebe Newcastle Demesne, Newcastle Farm	Settlement deserted – medieval	Within the site
DU020-003007	Newcastle South	Castle – tower house	c. 22m southwest
DU020-003006	Newcastle South	Castle – tower house	c. 55m northwest
DU021-017001	Newcastle South	Well	c. 113m north
DU020-003004	Glebe	Castle – tower house	c. 126m north

RMP NO.	LOCATION	CLASSIFICATION	DISTANCE TO SITE
DU020-003003	Glebe	Cross	c. 155m north
DU020-003010	Grange	Graveyard	c. 169m north
DU021-017002	Newcastle North	Castle – tower house	c. 173m northeast
DU020-003002	Newcastle North	Church	c. 184m north
DU020-003001	Newcastle North	Castle – motte	c. 185m north
DU020-003005	Newcastle Farm	Ritual site – holy well	c. 274m southwest

13.4.6 Topographical Files

Information on artefact finds from the study area in South Dublin County has been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area.

Two stray finds are recorded from within 500m of the development area.

MUSEUM NO	1948:71
FIND	Brass Shoe Buckle
FIND PLACE	Newcastle Farm
DESCRIPTION	-
REFERENCE	NMI Topographical Files

MUSEUM NO	Record only
FIND	Flint Axehead
FIND PLACE	Newcastle North
DESCRIPTION	-
REFERENCE	NMI Topographical Files

13.4.7 Aerial Photographic Analysis

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995–2013), Google Earth (2008–2021) and Bing Maps (2020) revealed that the proposed development area has been within open greenfield from 1995 to 2019. From the 2019 to the present-day, coverage shows the construction of the haul road and compound development. No other areas within site's footprint have been subject to disturbance and no previously unrecorded sites of archaeological potential were noted (Figure 13.7).

13.4.8 Cultural Heritage

The term 'cultural heritage' can be used as an over-arching term that can be applied to both archaeology and architectural sites; however, it also refers to more ephemeral aspects of the environment, which are often recorded in folklore or tradition or possibly date to a more recent period. The archaeological sites discussed above should also be considered cultural heritage and the townlands and placename analysis detailed below are also of cultural heritage significance.

Figure 13.7- Google Earth 2021 and field inspection areas

13.4.9 Place Name Analysis

Townland and topographic names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on history; archaeological monuments and folklore of an area. A place name may refer to a long-forgotten site and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830s and 1840s when the entire country was mapped for the first time. Some of the townland names in the study area are of Irish origin and through time have been anglicised. The main references used for the place name analysis are Irish Local Names Explained by P.W Joyce (1870) and www.logainm.ie.

A description and possible explanation of each townland name in the environs of the proposed development area is provided in Table 14.2.

Table 13.2 – Placename Analysis

NAME	DERIVATION	POSSIBLE MEANING
Newcastle South	*An Caisleán Nua Theas*	New Castle
Ballynakelly	*Baile na Coille*	Wood town
Highdownhill	*An Cnoc Ard*	High hill
Athgoe North	*Áth Gó Thuaidh*	North ford
Glebe	*An Ghléib*	A piece of land serving as part of clergyman's benefice and providing income
Cornerpark	*Páirc an Choirnéil*	Field on the corner
Rathcoole	*Ráth Cúil*	Ringfort corner
Newcastle	*Newcastle de Leuan*	New castle of Lyons

13.4.10 Cultural Heritage Sites

The term ‘cultural heritage’ can be used to refer to more ephemeral aspects of the environment, which are often recorded in folk law or tradition or possibly date to a more recent period. No specific cultural heritage features have been identified in relation to the proposed development area or its surrounding environs.

13.4.11 Field Inspection

The field inspection sought to assess the site, its previous and current land use, the topography and any additional information relevant to the report. During the course of the field investigation the proposed development area and its surrounding environs were inspected (Figure 13.7).

The western section of the development area (Area A) is formed by pasture that undulates gently. The remains of the overgrown tower house (DU020-003007) are located adjacent to the field, at its western extent (Plate 13.1). The field is bordered to the north by modern development and to the east by the remains of a possible burgage plot hedge line. Further greenfield expands to the south and the field is now traversed by a haul road associated with phase 1 development to the east.

Plate 13.1 – Proposed development area, prior to construction of the haul road, facing east (DU020-003007 to the right)

The eastern linear field (Area B) represents the remains of a possible burgage plot (aligned north-south) and is bordered by mature hedge lines on all sides (Plate 13.2). The site was waterlogged along the western boundary at the time of the inspection and some evidence of recent ground disturbance was noted in the southern part of the field.

Plate 13.2 – Eastern section of the proposed development area, facing south

The southern section of the proposed development (Area C) is formed by an area that has already been developed and contains modern buildings and a car park. The southernmost field has been developed as a compound and has been subject to archaeological testing, excavation and monitoring of topsoil stripping (Figure 13.4).

13.4.12 Conclusions

This assessment has been undertaken in order to assess the potential for the survival of archaeological and cultural heritage features in advance of the development of a proposed residential development in Newcastle, County Dublin, and to assess the effects of the proposed development during the construction and operational phases on archaeological and cultural heritage features. The northern two thirds of the development area are located within the zone of archaeological potential associated with the medieval settlement of Newcastle (RMP DU020-003008). A further 10 archaeological sites are located within 500m of the site with the nearest of these consisting of a castle tower-house (DU020-003007), located c. 22m to the southwest of the development area.

A review of the Excavations Bulletin (1970–2021) has revealed that a number of investigations have been carried out within the proposed development area itself and the surrounding environs. In 2018 the greenfield areas of the site were subject to geophysical survey. This was followed by phase 1 of archaeological testing, archaeological excavation and archaeological monitoring associated with the construction of a haul road and compound within the site (to service permitted residential development to the immediate east). Multi-period activity was identified as part of these works, including features adjacent to RMP DU020-003008 containing pottery, a metalled surface, wall footing and a number of features associated within drainage. Within the southern section of the site probable industrial activity was recorded in the form of two kilns and metalworking activities. Phase 2 revealed a number of features of probable archaeological origin, including an industrial kiln, walls, ditches, metalled surfaces and a pit collectively referred to as Archaeological Area 1 (AA1). Most of the features identified, date from the medieval period and are associated with the recorded tower house complex. In the northern area of the site, the most prominent feature identified was a cereal drying kiln (AA2). The linear field boundary ditches and cultivation furrows identified indicate the presence of a field system in this area. While some features produced some medieval pottery sherds the field system is thought to be post-medieval in date as pottery of that date and ceramic pipes were also identified. While some of these ditches have been manipulated in the recent past, with the insertion of ceramic drainage pipes, others may still maintain their original fabric. A pit of probable archaeological significance was identified in the centre of the site with a possible associated linear ditch of unknown date (AA3). In the eastern area, the only feature of archaeological significance identified was a large burnt mound spread (AA4).

Analysis of cartographic sources has revealed that the proposed development area itself has remained relatively unchanged from the post-medieval to modern periods. Historically the site is placed within undeveloped greenfield and burgage plots. The castle tower-house (DU020-003007) is labelled and depicted at the site's western extent, while burgage plots are situated to the north and south of the main road and within the proposed development. By the time of the later OS mapping the burgage plots seen on the first edition map have increased in number to the east, confirming that not all of these features are medieval in date.

Analysis of aerial photographic record available for the area failed to identify any previously unknown archaeological features. Analysis revealed that the proposed development area has been within open greenfield from 1995 to 2019. From the 2019 to the present-day, coverage shows the construction of the haul road and compound development. No other areas within site's footprint have been subject to disturbance and no previously unrecorded sites of archaeological potential were noted.

A field inspection has been carried out as part of the assessment, but failed to identify any further archaeological remains, in addition to those features identified during archaeological testing.

13.5 'DO-NOTHING' IMPACT

If the proposed development were not to proceed there would be no negative impact on the archaeological, or cultural heritage resource of the subject lands.

13.6 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will consist of the construction of 280 no. dwellings and associated ancillary infrastructure on lands of c. 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to permitted creche c. 0.07 ha. in 'Graydon') as follows:

a) 128 no. 2 storey houses (8 no. 2 bedroom houses, 94 no. 3 bedroom houses, 25 no. 4 bedroom houses and 1 no. 5 bedroom house;
b) 116 no. apartments in 2 no. 5 storey buildings comprising (54 no. 1 bedroom apartments & 62 no. 2 bedroom apartments, all with terrace or balcony)
c) 36 no. apartments/duplex apartments in 3 no. 3 storey buildings – (18 no. 2 bedroom apartments and 18 no. 3 bedroom duplex apartments) all with terrace;
d) Amendment to permitted Creche (c. 518sqm) in 'Graydon' (TA06S.305343) to now provide a Creche of c. 778 sq. m of 2 no. storeys;
e) Open space, hard and soft landscaping (including public lighting & boundary treatment), communal open space for duplex apartments and apartments; along with single storey bicycle/bin stores and ESB substation;
f) Vehicular access from the Athgoe Road from a new signalised junction along with upgrades to footpath and pedestrian crossing as well as provision of link to permitted 'Graydon' (TA06S.305343) 'Newcastle Boulevard' to the east, as well as 433 no. car parking spaces and 385 no. cycle spaces and all internal roads, cycleways, green routes and paths;
g) Attenuation, connection to water supply, and provision of foul drainage infrastructure as well as underground local pumping station to Irish Water specifications and all ancillary site development/construction/landscaping works.

13.7 POTENTIAL IMPACT (EFFECTS) OF THE PROPOSED DEVELOPMENT

13.7.1 Construction Phase

13.7.1.1 Archaeology

Four Archaeological Areas have been identified within the proposed development area. AA1 (medieval and post medieval remains adjacent to tower house DU020-003007), AA2 (Kiln), AA3 (undated linear feature) and AA4 (burnt mound) will be subject to direct, negative, significant effects due to ground disturbances associated with the construction of housing and the insertion of an attenuation area adjacent to the recorded tower house (Tower Park) and attenuation at Sean Feirm Park.

The recorded tower house is located c. 25m west of proposed houses and 22m from the excavation required for an attenuation area. It is possible that ground disturbances associated with the development may have a direct negative impact on the ruined structures due to associated vibration affects. Any such affects, prior to mitigation, have the potential to be very significant (negative).

Whilst the proposed development area has been subject to a detailed programme of archaeological testing, it is possible that small or isolated archaeological features may survive beneath the current ground level, outside of the footprint of the excavated test trenches. Groundworks associated with the development may have a direct negative impact on these remains. Impacts may range from moderate to significant, depending on the nature, extent and significance of the archaeological remains that may be present.

The south-eastern portion of the development area and current haulage road have been subject to archaeological assessment and a programme of archaeological excavation and monitoring. As such these areas have been fully investigated with regards to the archaeological resource and all remains preserved by record. As such no negative impacts are predicted as a result of the construction of the development.

13.7.1.2 Cultural Heritage

The eastern portion of the site is formed by a linear field that has the potential to represent the remains of a fossilized burgage plot, associated with the medieval settlement of Newcastle. It is proposed to retain the hedgerows of this field in order to preserve the outline of the plot. As such, no direct negative impacts are predicted on the boundaries of the plot during construction.

13.7.2 Operational Phase

13.7.2.1 Archaeology

Tower house DU020-003007 is located c 22m south of the proposed development area. A small park (Tower Park) will be established to the north of the tower house, adjacent to the access to the development, meaning the closest proposed structures will be located c. 25m to the east of the ruin. Attenuation will be constructed beneath the current

ground level within park. During the operation of the development there will be an indirect significant negative effect on the setting of the tower house, due to the erection of the setback residential units, park and access road.

13.7.2.2 Cultural Heritage

The operation of the proposed development will result in an indirect moderate positive impact on the fossilized burgage plot that is located within the proposed development area. This is due to the incorporation of the boundary in the development, which will lead to its ongoing conservation and protection as a cultural heritage site (and an ecological corridor).

13.8 AVOIDANCE, REMEDIAL, AND MITIGATION MEASURES

13.8.1 Construction Phase

13.8.1.1 Archaeology

Whilst it is acknowledged that the preservation in-situ of archaeological remains is considered the best practise with regards to conserving the archaeological resource, the required layout of the development (and the attenuation requirements located within greenfield areas) means that the archaeological features and deposits within AA1-4 will be subject to archaeological preservation by record (prior to the commencement of construction). This will be carried out under licence to the National Monuments Service of the DoHLGH. Full provision will be made available for the resolution of the archaeological remains, both on site and during the post-excavation process.

Chapter 8, Noise and Vibration, has predicted that the vibration levels during construction are not likely to be such that any damage would occur to built heritage structures, including the tower house. The Noise and Vibration chapter has proposed mitigation through monitoring in accordance with the relevant standards to ensure that vibration levels do not exceed acceptable levels in the vicinity of built heritage structures.

All topsoil stripping will be subject to archaeological monitoring by a suitably qualified archaeologist. Should any archaeological remains be identified, consultation will be required with the National Monuments Service of the DoHLGH as to whether preservation by record or in-situ is carried out.

No mitigation is required along the existing haulage road or within the south-eastern section of the development area as these areas have already been subject to full archaeological excavation and preservation by record.

13.8.1.2 Cultural Heritage

No mitigation is deemed necessary.

13.8.2 Operational Phase

13.8.2.1 Archaeology

A full landscape record of the tower house, which records its current condition and setting, adjacent to the proposed development, will be carried out prior to the commencement of construction and operation of the development.

13.8.2.2 Cultural Heritage

No mitigation is required.

13.8.3 'Worst-Case' Scenario

Under a worst-case scenario, the proposed development would disturb previously unrecorded and unidentified archaeological deposits and artefacts without proper excavation and recording being undertaken.

13.9 PREDICTED IMPACT OF THE PROPOSAL

13.9.1 Archaeology

Following implementation of mitigation measures, no significant negative impacts are predicted upon the archaeological resource. There will be a residual indirect moderate negative impact on the recorded tower house, due to the affects the development will have on the setting of the structure.

13.9.2 Cultural Heritage

As the townland boundary within the eastern portion of the development area will be incorporated into the development, this represents a residual indirect moderate positive impact on this cultural heritage site.

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13.10 REINSTATEMENT

The proposed development does not include a decommissioning or reinstatement phase. Therefore, reinstatement is not applicable to this assessment.

13.11 POTENTIAL CUMULATIVE IMPACTS

No cumulative impacts (from surrounding permitted or proposed developments) are predicted upon the archaeological or cultural heritage resource during the construction or operational phase as all archaeological remains will be preserved by record and the townland boundary will form part of the development.

13.12 INTERACTIONS

Architectural heritage impact assessment is included in Chapter 14. Due to the fact that there can often be a cross-over between archaeological, architectural and cultural heritage sites, this chapter has been fully reviewed and cross-referenced where applicable.

There are interactions between this chapter and the landscape and visual chapter in view of the visual impacts on the settings of archaeological and cultural heritage sites and the potential for landscaping to mitigate such impacts

13.13 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered during the compilation of this chapter.

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14.0 CULTURAL HERITAGE (ARCHITECTURAL HERITAGE)

14.1 INTRODUCTION

This chapter of the EIAR consists of an appraisal of a proposed development for Cairn Homes Properties Ltd at Newcastle South under the heading of architectural heritage. The chapter was written by Rob Goodbody of Historic Building Consultants (BA (MOD), DIP ENV P, DIPABRC, MUBC, MA). Since commencing practice as a consultant in 2003 he has worked on many environmental impact assessments for housing developments and for major road schemes and other elements of public infrastructure as well as the assessment of a significant number of housing developments that did not require EIAR. Prior to commencing private practice he spent many years as a planner in local authorities in London and Dublin.

14.2 LEGAL AND PLANNING FRAMEWORK

14.2.1 Legislation

The assessment of architectural heritage has been conducted under the relevant legislation and planning frameworks applicable to the Republic of Ireland. These include:

- The Planning and Development Act, 2000, as amended
- Heritage Act, 1995, as amended
- National Monuments Acts, 1930-2004
- The Planning and Development (Strategic Infrastructure) Act, 2006
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999.
- Directive 2011/92/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council.

14.2.2 Policy

The application site is within the administrative area of South Dublin County Council and the following plans have been considered in this study:

- South Dublin County Council Development Plan 2016-2022
- Draft South Dublin County Council Development Plan 2022-2028
- South Dublin 2022-2028 County Development Plan: Chief Executive's Report
- Newcastle Local Area Plan 2012, as extended

14.2.3 Guidance

A range of guidance has been published that is of relevance to the proposed development. This includes guidance on environmental impact assessment in general and guidance in relation to the protection of architectural heritage.

- Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA
- Draft Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2015, EPA
- Guidelines on the information to be contained in environmental impact assessment reports (May 2022), EPA
- Guidelines for the Assessment of Architectural Heritage Impacts on National Roads Schemes (2005).
- Architectural Heritage Protection Guidelines for Planning Authorities (2004 and 2011)

14.3 METHODOLOGY

This study determines, as far as reasonably possible from existing records and site inspection, the presence of structures of architectural heritage significance in the vicinity of the proposed development using appropriate methods of study and assesses the potential effects of the proposed development on this architectural heritage. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that

addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify heritage structures, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage structures. This leads to the following:

- Determining the baseline conditions of the site and its environs, including identification of known built heritage sites that may be affected by the proposed development.
- Identifying the sensitivity of the built heritage sites that may be affected by the proposed development
- Predicting the magnitude of likely changes to the baseline receiving environment, notably the identified built heritage sites
- Determining the significance of effects, taking into account the sensitivity of receptor and the magnitude of the effect, including the potential effects upon the setting of known architectural heritage sites in the surrounding area (receiving environment).
- Identifying and assessing appropriate mitigation measures based upon the results of the above research, including alternatives.
- Assessing the significance of residual effects, taking account any mitigation measures.

Research for the Architectural Heritage Chapter of this EIAR has been undertaken in two phases. The first phase comprised a paper survey of all available architectural, historical and cartographic sources. The second phase involved a field inspection of the site of the proposed development.

The study involved detailed examination of the historical and architectural nature of the receiving environment of the proposed development. This included information from the record of protected structures and development plan, draft development plan and Newcastle LAP, the National Inventory of Architectural Heritage (NIAH) and cartographic and documentary records. Aerial photographs of the study area were also consulted. Field inspection was carried out within the site and in its vicinity, as defined below in the following paragraph, in April 2022 to identify any known architectural heritage sites and previously unrecorded features and structures within the vicinity of the site. This included walking the site to establish whether there were any structures of architectural heritage significance within the site and to establish the degree to which sites in the vicinity of the site were visible from within the site. The roads in the vicinity of the site were walked to determine the nature of structures of architectural heritage significance and the extent to which they may be affected by the proposed development.

The Guidelines for the Assessment of Architectural Heritage Impacts on National Roads Schemes suggests that the appropriate study area for assessing potential impact on architectural heritage would be fifty metres from the centre line of the road and this distance is sometimes adopted as the appropriate study area for developments other than road schemes in the absence of any guidance for other types of development. This distance has not been adopted in the present study as it is considered that Newcastle has structures of considerable antiquity and other protected structures that could potentially be impacted by the proposed development although more than fifty metres from the application site. Accordingly, all buildings or other structures of heritage significance are included in this assessment if they are sufficiently close to the site that it may be possible to see the development from the heritage structure. It is accepted that the majority of heritage structures in the heart of the village, between the R405 Celbridge Road and the R120 Lucan Road, are at such a distance from the site, with significant screening by buildings and vegetation that there could be no possible effect on their character or setting arising from the proposed development and hence these structures are not included in the assessment. Only one building in the village is included for due to its visibility from the application site – St Finian's Roman Catholic Church can be seen from parts of the application site and hence is assessed for any potential impact.

The quality and type of a potential effect can vary to include the following, as per the Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes cited above, pages 34 and 21,modified to relate to the present proposal:

- Negative Effect: A change that damages or detracts from the setting of a structure of architectural heritage significance.
- Neutral Effect: A change that does not affect architectural heritage.
- Positive Effect: A change that improves or enhances the setting of a structure of architectural heritage significance.

- Direct Effect: Where an architectural feature or site is physically located within the [application site] and entails damage to or removal of the feature of architectural heritage significance.
- Indirect Effect: Where a feature or site of architectural heritage merit or its setting is located in close proximity to the [application site].
- No Predicted Effect: Where the [proposed development] does not adversely or positively affect an architectural heritage site.

The assessment being performed using this classification will be used to inform the assessment carried out under the EIA Directive, which will be performed using the descriptions of effects set out in the EIA 2022 Guidelines, i.e. positive/negative, significant/moderate etc.

It should be noted that whilst impact levels and definitions are applied consistently to built heritage, effects on sites that are subject to statutory protection are considered to be more significant than sites / structures not subject to statutory protection, as the statutory protection is an indicator that a structure has been identified by the planning authority as being of significant architectural heritage importance.

Definitions of effects (as outlined in the Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes), are included in Table 14.1 below. These have been supplemented with the additional definitions of effects as per the most recent EPA guidelines (2022).

Table 14.1 – Definition of levels of significance

Type of effect	Definitions relating to sites of architectural heritage significance
Profound	An effect that obliterates sensitive characteristics
Very Significant	Effects which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its or sensitivities. .
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Imperceptible	An effect capable of measurement but without significant consequences.

14.4 RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The application site is located to the south of the village of Newcastle, County Dublin and is a greenfield site under grass, through which an access road leads to a development site to the east. The site is bounded to the north by the rear of properties in the village of Newcastle, with the main street, which is the R405, at a minimum distance of 110 metres from the site boundary. On the western side is Athgoe Road, where the site has a frontage of approximately 45 metres. To the south the boundary is an undefined line through the fields, while to the east lies an architectural salvage yard, a field and a development site currently under construction. The greater parts of the northern boundary is marked by hedgerow trees. The exception is at the western end of the boundary, where an existing house and an adjacent yard are separated from the site by walls. The rest of the northern boundary is marked by hedges and trees except for a small section where there is a gap and the ground is open beyond the site as far as the road boundary in the village of Newcastle, where it is enclosed by a hedge. The eastern boundary is marked by hedges and trees.

The town of Newcastle, otherwise Newcastle Lyons, was founded in the wake of the Norman invasion of Ireland, probably at a pre-existing ecclesiastical site. A motte, located to the north of the street in the town, represents that early period, when the town became a royal manor. At some stage in the medieval period the town achieved borough status, though exactly how early is unknown – a borough being a legally defined town with an administration, as opposed to a collection of houses with no formal organisation. The significance of the town is suggested by the number of fortified houses known or thought to have been built by the seventeenth century. The Down Survey map of County Dublin, compiled in the mid-1650s, shows seven buildings at Newcastle, which is the largest concentration shown anywhere in the county on that map. The Down Survey barony map of Uppercross and Newcastle shows no less than nine large buildings and four smaller ones at Newcastle, with the note '*the towne of Newcastle – 7 old*

castle', while the Civil Survey, compiled at the same time as these maps states that there were '*seaven old Castles on New Castle Towne Land and the Ruins of a Church on the parcel of Glebe*'. Ball's *History* relates that in the sixteenth century there were six castles in the town.

The antiquarian, Austin Cooper, visited Newcastle in 1780 and his notes mentions only one castle, apparently the glebe house next to the churchyard. D'Alton in his history of the county, published in 1838, also mentions only one castle, though the context of both Cooper's and D'Alton's text would not preclude the existence of more than one. Lewis's *Topographical Dictionary of Ireland*, published in 1837, states that there were three castles in the village, and this statement remains unaltered in the second edition of this work ten years later. The first edition Ordnance Survey map, published in 1843, only labels one building as a castle, though the tower at the old glebe house is depicted, if unlabelled.

In the early modern period Newcastle retained its importance and in 1613 it was made a parliamentary borough by royal charter. The town continued to return two members to parliament until the Act of Union in 1800. However, the town declined over the years and by the mid-nineteenth century it had less than fifty houses, though it still retained a courthouse and a dispensary.

The core of the town of Newcastle remains, clearly identifiable as the town shown on earlier maps, with more recent developments clearly distinguished by their layout on roads leading off the main street and adjacent roads.

In the absence of the proposed development or a similar alternative proposal the baseline would remain as farmland with no effects, either positive or negative, on architectural heritage.

14.4.1 Designated Architectural Heritage Assets

There are nine protected structures in the village centre and in the vicinity of the site of the proposed development on Athgoe Road. Eight of these are also included in the National Inventory of Architectural Heritage (NIAH) and there are a further three structures listed in the NIAH that could be said to be in the curtilage of a protected structure that is included separately in the NIAH. Another structure listed in the NIAH is not a protected structure, though it is included in the Sites and Monuments Record. There are six upstanding structures within that area that are included in the Sites and Monuments Record, two of which are also protected structures. The protected structures (RPS) and structures on the National inventory of Architectural Heritage are listed in the table below.

Table 14.2 – Architectural Heritage Assets

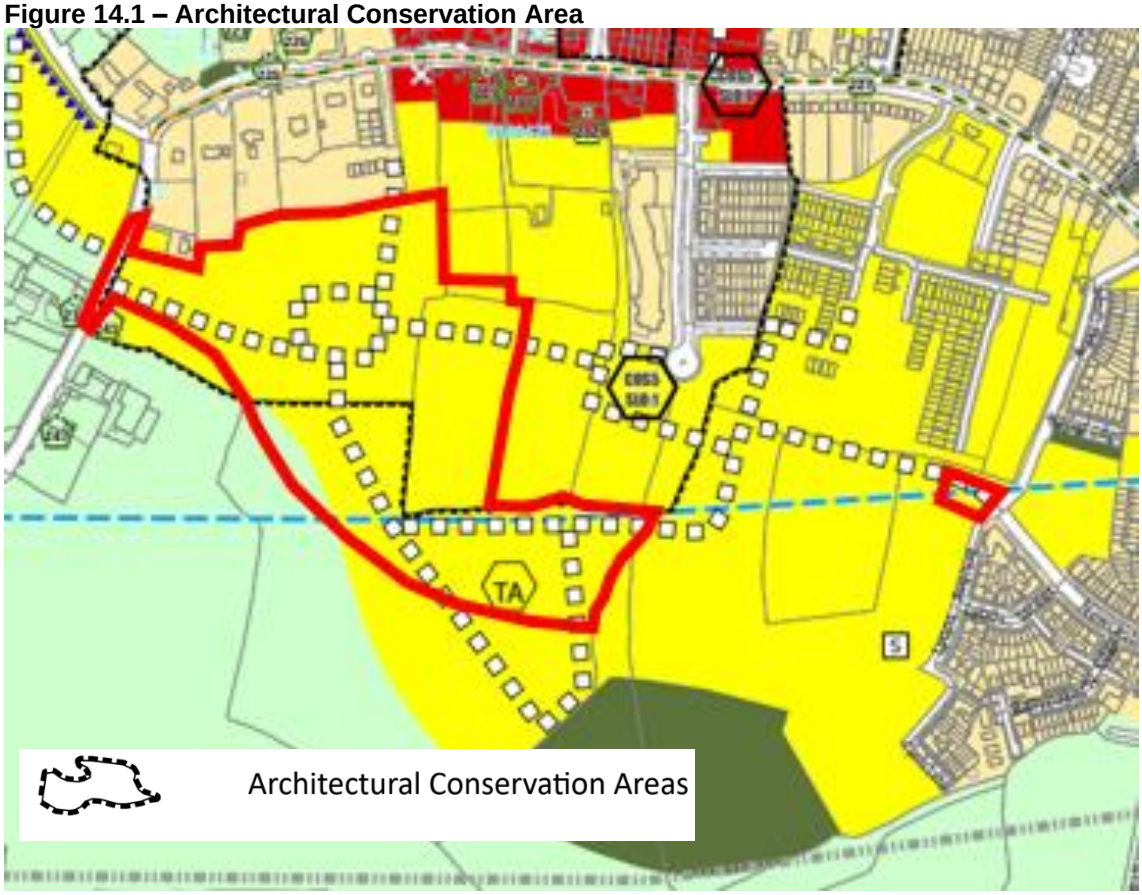
Description	RPS reference	NIAH reference	C
St Finian's Church of Ireland church	223	11212009	
The Old Glebe	225	11212008	
The Old Glebe	226	11212007	
Keogh family tomb	In the curtilage of 223	11212010	
Brian McEvoy licensed premises		11212011	
The Loft	229	11212005	
Newcastle National School	230	11212004	
St Finian's Roman Catholic church	166	11212002	
Newcastle Farm	238	11212012	
Outbuildings at Newcastle Farm	In the curtilage of 238	11212013	
Newcastle Lodge	247	11212015	
Outbuildings at Newcastle Lodge	In the curtilage of 247	11212014	
Tower house	241		

Each of the structures that is included in the record of protected structures, the NIAH or the SMR that are within the village or in the vicinity of the site are listed below with an assessment of the potential effects on each. The sequence runs clockwise, commencing on Athgoe Road to the south of the site entrance. In each case the structure is allocated a reference number commencing BH-, for Built Heritage and a photograph is provided. Reference numbers are given for the record of protected structures (RPS), National Inventory of Architectural Heritage (NIAH) and Sites and

Monuments Record (SMR). Where structures were clearly part of the same property, as at Newcastle Lodge and its outbuildings, they are included together, notwithstanding more than one entry in the NIAH. The locations of the BH-sites are shown on the map reproduced in Figure 14.2.

The northern part of the application site lies within the Newcastle Architectural Conservation Area. The map in Figure 14.1 below is an extract from maps 3 and 7 of the South Dublin County Council Development Plan, 2016-2022 on which the approximate extent of the application site boundary has been marked in a broken red line. The thinner broken black line indicates the boundary of the architectural conservation area. No change to this boundary is proposed in the Draft South Dublin County Development Plan 2022-2028.

Figure 14.1 – Architectural Conservation Area



Source Map 7 2022-2028 Draft South County Dublin Development Plan

Figure 14.2 – Locations of built heritage sites

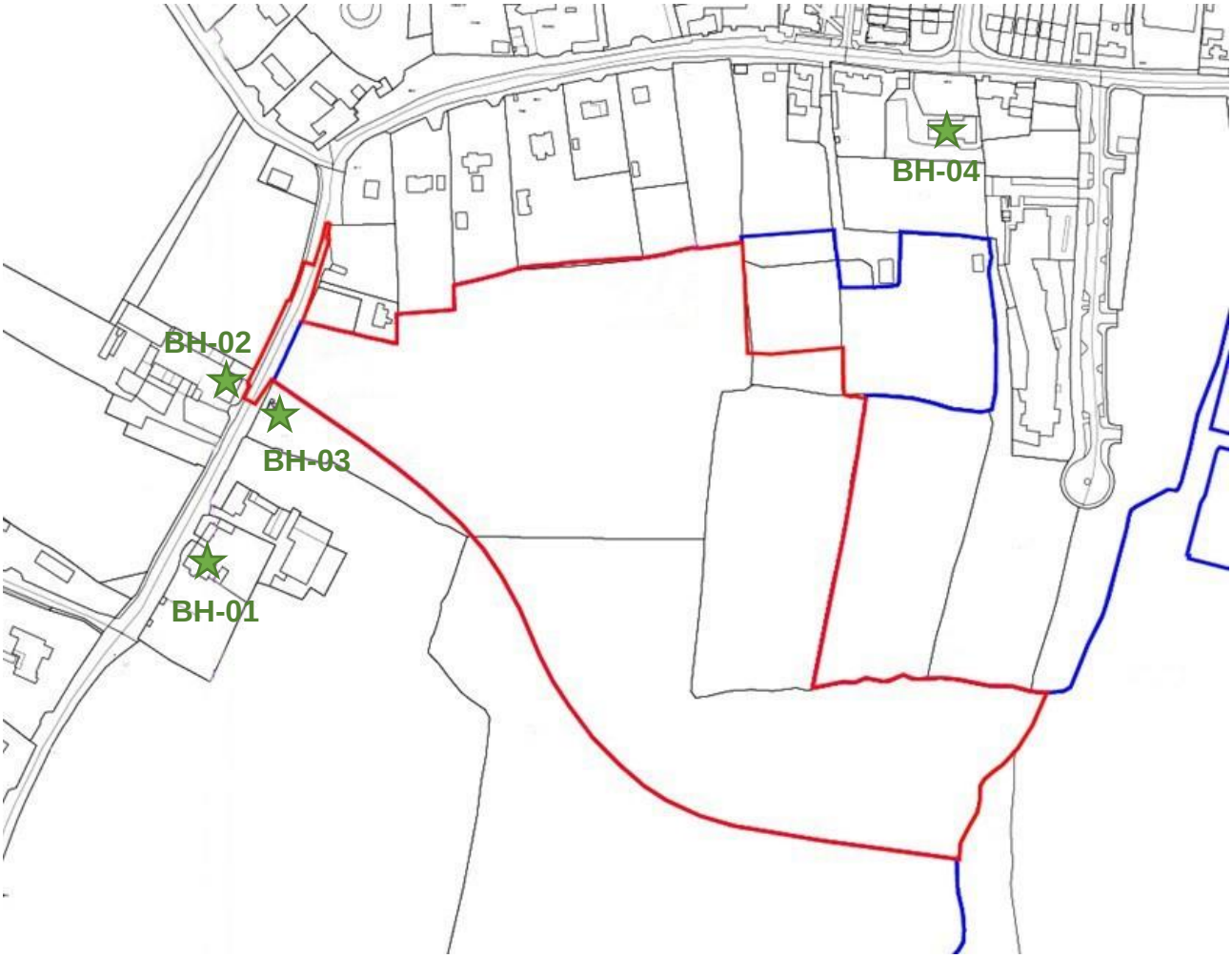


Figure 14.3 – Newcastle Lodge

Figure 14.4 – Outbuildings at Newcastle Lodge

Reference: BH-01

Name: Newcastle Lodge

RPS ref. 247

NIAH ref: 11212014 and 11212015

SMR ref: n/a

Distance from site: 110 metres to house, 80 metres to outbuildings.

Relationship to site: The property is screened from the application site by buildings and trees to the north and north-east, while to the east the site is more than 160 metres away and screened by trees at the rear of the protected structure and a field boundary marked by hedgerow trees.

Description of effects: None, due to distance and screening.

Figure 14.5 – Newcastle Farm

Figure 14.6 – Outbuildings at Newcastle Farm

Reference: BH-02

Name: Newcastle Farm and outbuildings

RPS ref. 238

NIAH ref: 11212012 and 11212013

SMR ref: n/a

Distance from site: 15 metres

Relationship to site: The buildings are on the western side of Athgoe Road, opposite the application site, though offset from it, the southern site boundary being in line with the northern side of the buildings.

Description of effect: There will be an indirect moderate effect on the setting of the protected structure through the provision of a signal-controlled junction to the north of the site. The nearest houses will be set back from the road boundary at a distance of approximately 50 metres from the protected structure and will not have an adverse effect over and above the effect of the traffic signals and site boundary.

Figure 14.7 – Tower house to south of site entrance

Reference: BH-03

Name: Tower house

RPS ref. 241

NIAH ref: n/a

SMR ref: DU020-003007-

Distance from site: 15 metres

Relationship to site: The tower house stands about 4 metres back from Athgoe Road and approximately 12 metres from the western end of the southern site boundary. The proposed houses in the vicinity of the tower house are to be set back approximately 25 metres from the road frontage and will be about 25 metres from the tower house at the nearest point.

Description of effect: It is proposed to excavate land within the development site less than 15 metres from the tower house which may cause a negative effect through vibration of sufficient magnitude to damage the masonry of the tower house, which is in poor condition. However, as noted in paragraph 8.5.1.2 of Chapter 8, Noise and Vibration, the predicted levels of vibration would be less than the levels at which any damage to the tower house would be expected to occur.

There will be an indirect significant effect on the setting of the tower house through the construction of the proposed development in its vicinity, due to the change in the setting of the tower house through the presence of buildings, roads and landscaping

Figure 14.8 – St Finian's Roman Catholic Church

Figure 14.9 – St Finian's Roman Catholic Church, seen from the site

Reference: BH-04

Name: St Finian's Roman Catholic Church

RPS ref. 232

NIAH ref: 11212002

SMR ref: n/a

Distance from site: 130 metres

Relationship to site: The church stands on high ground above the main street and to the south of it. It is separated from the nearest points of the application site by a distance of approximately 130 metres. From most angles the site is screened from the church by high trees, the exception being a gap to the west-south-west of the church, seen in the photograph above. In that direction the nearest proposed houses will be two-storey, with a height of approximately 10 metres to the ridge and it is not anticipated that these will impinge on the setting of the church due to the screening effect of the trees in the intervening space. To the south-south-west of the church there will be apartment blocks at a distance of approximately 175 metres and with a parapet height of 16.1 metres and in this direction the site is screened from the church by a field boundary of hedgerow trees and a line of high conifers.

Description of effect: It is not anticipated that there will be any adverse effect on the character and setting of the church arising from the proposed development due to the screening provided by the trees that lie between the church and the proposed development.

14.4.2 Undesignated Architectural Heritage Assets

No structures of architectural heritage significance that are not included in the record of protected structures, National Inventory of Architectural Heritage or the Sites and Monuments Record have been identified that could be affected by the proposed development.

14.5 "DO-NOTHING" SCENARIO

In the event of no development proceeding on the application site there would be no adverse effect arising in relation to architectural heritage. While permission has been granted and not yet implemented on a number of sites in the vicinity of the present application site, none of these lie between the proposed development and the four heritage buildings identified in this chapter as being in the vicinity of the application site.

14.6 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development will consist of 280 dwellings, including houses, duplexes (3 storeys) and apartments (2 five-storey buildings) together with a creche, access roads, open spaces, drainage and other ancillary infrastructure. The site measures approximately 8.47 hectares and lies to the south of the village of Newcastle.

The apartments are located within the burgage field boundaries[15] located centrally within the subject site some 285m to the east of the tower house and c.225m from the Newcastle Farm outbuildings and the duplex apartments (3 buildings) are located in the southern part of the application site c. 320m from the tower house and 300m from the Newcastle Farm outbuildings.

The dwellings in the vicinity of the tower house and Newcastle Farm are two-storey houses. The design of the proposed development includes an additional set back (park area) to that contained in the Newcastle LAP from the tower house.

14.7 POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

14.7.1 Construction Phase

There will be no potential direct effects to structures of architectural heritage significance arising from the proposed development.

Table 14.3 – Direct effects at construction phase (prior to mitigation)

BH- number	Site	Assessment of effects prior to mitigation
BH-01	Newcastle Lodge	None
BH-02	Newcastle Farm	None
BH-03	Tower house	None
BH-04	St Finian's RC church	None

[15] Burgage plots were areas of land granted to tenants in medieval times, usually with a narrow frontage to the street and stretching back a significant distance. The outlines of these plots frequently survive in property boundaries at the rear of houses within towns of medieval origin.

There will be indirect effects on the settings of some structures in the vicinity of the site as indicated in the site survey above, as indicated by the BH- numbers cited, and these are set down in the table below:

Table 14.4 – Indirect effects at construction phase (prior to mitigation)

BH- number	Site	Assessment of effects prior to mitigation
BH-01	Newcastle Lodge	None
BH-02	Newcastle Farm	Moderate effect on the setting of the farm and outbuildings due to the works to the road and boundary.
BH-03	Tower house	Significant effect on the setting of the tower house due to the construction of houses and other works such as the provision of roads and landscaping during the construction of the development.
BH-04	St Finian's RC church	None

14.7.2 Operational Phase

There will be no direct effect on architectural heritage during the operational phase as a direct effect indicates alterations to the structures and there will be no alterations to structures outside the site boundary.

There will be indirect effects on some structures of architectural heritage significance during the operational phase. These are set down in the table below.

Table 14.5 – Indirect effects at operational phase (prior to mitigation)

BH- number	Site	Assessment of effects prior to mitigation
BH-01	Newcastle Lodge	None
BH-02	Newcastle Farm	Moderate effect on the setting of the farm and outbuildings due to the works to the road and boundary.
BH-03	Tower house	Significant effect on the setting of the tower house due to the construction of houses and other works during the construction of the development.
BH-04	St Finian's RC church	None

It is noted that the inclusion of the 2 five-storey apartment buildings and the 3 three-storey duplex buildings, will not result in any additional negative indirect effects on the tower house, Newcastle Farm or the architectural conservation area over and above the potential operational phase effects arising from the development of the lands in accordance with the layouts and scale, massing etc, envisaged in the Newcastle LAP, as those heritage elements are at a distance from the proposed buildings, as outlined above in section 14.6.

It is also noted that the layout in the Newcastle LAP included the burgage hedgerow plots in the rear gardens of dwellings, which would have the potential to result in the degradation of the hedgerow plots through maintenance or lack thereof, as they would be in the ownership of residents rather than in the public realm. This is important as the boundaries of burgage plots are survivors from the medieval layout of the town. The inclusion of the apartment buildings enables the retention of the burgage plots in the public domain, allowing for appropriate maintenance.

14.8 MITIGATION MEASURES AND MONITORING

14.8.1 Construction Phase

To mitigate the potential direct effect on the tower house at BH-03 the means of excavation of the land within the site in the vicinity of the tower house should be designed so as to minimise any vibration at the tower that would be likely to cause damage to the building. Chapter 8, Noise and Vibration, has predicted that the vibration levels during construction are not likely to be such that any damage would occur to built heritage structures, notwithstanding the adoption of lower limits of vibration for the tower house and the protected structures. The Noise and Vibration chapter

has proposed mitigation through monitoring in accordance with the relevant standards to ensure that vibration levels do not exceed acceptable levels in the vicinity of built heritage structures.

No mitigation is possible to reduce the indirect effect on the settings of Newcastle Farm, BH-02, or the tower house, BH-03, during construction phase.

14.8.2 Operational Phase

No mitigation is required to reduce the indirect effect on the setting of Newcastle Farm at operational phase other than good quality design of the boundary to Athgoe Road.

No mitigation is possible to reduce the indirect effects of the proposed development on the setting of the tower house at BH-03 other than the designed layout of the proposed development to keep houses back from the area immediately to the front of the tower house. This has included a restriction in height of the proposed houses nearest to the tower house to two storeys in addition to setting the houses back from the street and from the vicinity of the tower house.

14.8.3 Cumulative Effects

Other developments have taken place in the vicinity of the application site and a development on land to the east is currently under construction. These developments are not adjacent to any of the structures of architectural heritage significance that would be affected by the present proposal and no cumulative effect on architectural heritage is predicted. Similarly, while a number of planning permissions have been granted in the Newcastle area and not yet implemented, none of these would lie between the application site and the four buildings of architectural heritage significance that have been identified in this chapter as being in the vicinity of the application site. None of the extant, but not implemented, planning permissions would add a cumulative effect to that of the present proposal.

14.9 RESIDUAL EFFECTS

14.9.1 Construction and Operational Phase

There will be a moderate residual indirect negative effect on the setting of BH-02, Newcastle Farm,

There will be a significant residual indirect negative effect on the setting of BH-03, the tower house.

14.10 MONITORING

14.10.1 Construction and Operational Phase

During the construction phase it will be necessary to monitor vibration levels at the tower house, BH-02, to ensure that no damage occurs to the tower house through vibration effects. Chapter 8, Noise and Vibration, sets down the criteria for monitoring during construction.

14.11 REINSTATEMENT

14.11.1 Construction and Operational Phase

No reinstatement works are necessary in relation to architectural heritage.

14.12 INTERACTIONS

There are interactions between this chapter and the archaeology chapter in view of the nature of the tower house, which is built heritage, but of archaeological significance.

There are interactions between this chapter and the landscape and visual chapter in view of the visual effects on the settings of structures of architectural heritage significance and the potential for landscaping to mitigate such effects

There are interactions between this chapter and the noise and vibration chapter in view of the proximity of the tower house near the western boundary of the site, the poor condition of the masonry of the tower house and the proposed works in close proximity to the tower.

14.13 DIFFICULTIES ENCOUNTERED IN COMPILING

No difficulties were encountered in compiling this chapter.

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15.0 RISK MANAGEMENT FOR MAJOR ACCIDENTS AND/OR DISASTERS

15.1 INTRODUCTION

The 2014 EIA Directive (2014/52/EU) has updated the list of topics to be addressed in an EIAR and has included 'Risk Management' as a new chapter to be addressed. Article 3 of the new EIA Directive requires that the EIA shall identify, describe and assess in the appropriate manner, the direct and indirect significant effects on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage, and landscape deriving from (amongst other things) the "vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned".

The chapter identifies and assesses the likelihood and potential significant adverse impacts on the environment arising from the vulnerability of the proposed development to risks of major accidents and / or natural disasters. It considers whether the proposed development is likely to cause accidents and / or disasters and its vulnerability to them.

The purpose of the chapter is to ensure that the safety and precautionary measures necessary to protect the proposed development in the event of a major accident and / or natural disaster are identified and that appropriate mitigation measures are provided that would protect the environment in the event of such occurrences.

This chapter will identify the types of major accidents / natural disasters that the project is vulnerable to; whether major accidents or natural disasters and the responses to these give rise to significant adverse environmental impacts; the nature of these impacts and the measures needed to prevent or mitigate the likely adverse impact of such events on the environment.

15.2 STUDY METHODOLOGY

The starting point for the scope and methodology of this assessment is that the proposed development has been designed and will be constructed in line with best practice described in the Preliminary Construction Environmental Management Plan and, as such, major accidents and / or natural disasters will be very unlikely. The identification, control, and management of risk is an integral part of the design and assessment process throughout all stages of a project lifecycle. For example, a Specific Site Flood Risk Assessment was carried out. Measures to control risks associated with Construction Phase activities are incorporated into the Preliminary Construction Environmental Management Plan.

The following sections set out the requirements as stated in the new EIA Directive, Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (August 2018) and in the EPA Guidelines on the information to be contained in an Environmental Impact Assessment Report (EIAR (May 2022)). The scope and methodology presented is based on the new EIA Directive, the draft EPA guidelines and professional judgement of the consultants with this responsibility in the construction and operation of the proposed development. A risk analysis-based approach methodology which covers the identification, likelihood and consequence of major accidents and / or natural disasters has been used for the assessment. This type of risk assessment approach is an accepted methodology.

Recital 15 of the EIA Directive states that:

"In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. In order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU."

The proposed development in this instance is residential development on a predominantly greenfield site which includes a construction access road traversing the site and a construction compound. The proposed creche is located on the previously permitted Graydon development. When the proposed development is completed, it will not give rise to ongoing significant risks in its operating environment.

The 2022 EPA Guidelines on the information to be contained in an EIAR refer to major accidents and/or disasters in a number of sections, AS FOLLOWS:

Characteristics of the Project – the draft guidelines state that the project characteristics should include *"a description of the Risk of Accidents – having regard to substances or technologies used."*

Impact assessment - the draft guidelines state that the impact assessment should include "the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)".

Likelihood of Impacts - the draft guidelines state the following:

"To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and / or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other regulations e.g. a COMAH assessment."

There are also a number of mechanisms which currently manage accidents outside of the EIA process. These would include the Preliminary Construction Environmental Management Plan, which would deal with pollution risks during construction (See Chapters 5, 6 and 7 on Land, Soils, Air and Water) and risk of accidents during construction, including traffic accidents. The risk of flooding is dealt with in Chapter 6; Water. The development within the subject site is in Flood Zone C which is low risk and is appropriate for residential development. Separately, the risk of fire is managed through the Fire Safety Certification process, which is an integral part of the design of the proposed development.

15.2.1 Site Specific Risk Assessment Methodology

This section identifies the potential of unplanned but potential events that could occur during construction and operation of the proposed development.

Risks are set out according to the classification of risk, taken from the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage & Local Government, 2010), as follows:

Table 15.1 – Risk Classification

Table 2 - Classification of Likelihood

Ranking	Classification	Likelihood
1	Extremely Unlikely	May occur only in exceptional circumstances; Once every 500 or more years
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communicates; and / or little opportunity, reason or means to occur; May occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

15.2.2 Hazard identification

The site is not in an area prone to natural disasters. Risks were reviewed through the identification of plausible risks in consultation with relevant specialists. Therefore, the risks set out below are considered the most relevant potential risks.

Table 15.2 – Risk Likelihood

Category	Risk Factor Type	Likelihood
Weather	Storms, snow	3
Hydrological	Risk from flooding	1
Excavation work	Collapse	3
Road	Traffic accident	4
Industrial accident	General housebuilding construction	1
Explosion	General Construction materials no explosive products used.	1
Fire	Hot works close to timber frame structures.	3
Building Collapse	Structural failure during construction.	1
Hazardous substance escape	General housebuilding construction products.	2
Pollution	Construction	3

The risks are then tested in terms of consequences (the most probable result of the potential incident). It should be noted that when categorising the Consequence Rating, the rating assigned assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

The impact ratings are taken from the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage & Local Government, 2010).

A risk matrix can be prepared against which the proposed development can be tested.

Table 15.3 – Risk Matrix

Likelihood Rating							
	Very likely	5					
	Likely	4					
	Unlikely	3					
	Very unlikely	2					
	Extremely Unlikely	1					
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

15.3 RECEIVING ENVIRONMENT

The subject site, of approximately 8.47 hectares (2 no. sites comprising main development site (8.4 ha.) and site relating to creche on a site of c. 0.07 ha), is located to the south of the R120/Main Street at Newcastle Village. The site is bounded by Graydon residential development to the east, the Athgoe Road to the west, by single dwellings to the north and existing agricultural lands to the south. The St Finian's National School and Church is located to the north of the site. The development lands form part of the South Dublin County Council Development Plan (2016-2022) and Draft South Dublin County Development Plan 2022-2028). The application site is zoned residential and open space and forms part of the Newcastle Local Area Plan 2012.

The existing site is predominantly greenfield and a construction compound has been constructed on the eastern area adjacent to Graydon residential development as well as a construction access across the site from the Athgoe Road

to the Graydon residential development lands. Existing boundaries within the site are predominantly hedgerows and fencing with some drainage ditches. The overall topography of the site falls from south to north toward Newcastle Village.

The surrounding context consists of a mix of residential and agricultural lands. It does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which might result in a risk to human health and safety. From a review of the South Dublin County Council Development Plan maps there are no SEVESO Site as defined by the Health and Safety Authority, on the subject site of the proposed development. Seveso sites in the wider locality comprise Benntag Chemicals located to the north west Unit 405, Greenouge Industrial Estate, Rathcoole, Dublin 24 and Johnston Logistics, Blackchurch Business Park, Naas Rd, Rathcoole, Co. Dublin.

15.4 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

15.4.1 Health & Safety/ Risks of Major Accidents and/or Disasters

Risk of falling from scaffolding, ladders or unprotected edges/open voids during the construction phase.

- Risk of falling into open excavations.
- Risk of burial under earthfalls in basement excavations.
- Risk of injury from falling tools / construction materials during construction phase.
- Risk of electrocution / flooding during the foundation works. Any work around existing services.
- Risk of injury during the assembly of precast columns, stairs, façade panels, etc.

15.4.1.1 Construction Phase

It is considered that the main risks associated with the proposed development will arise during the construction phase.

The construction phase of the proposed development may give rise to short-term impacts associated with construction traffic, migration of surface contaminants, dust, noise and littering. Secondary impacts may include resulting increased traffic arising from hauling building materials to and from the proposed development site which are likely to affect population and human health distant from the proposed development site, including adjacent to aggregate sources and landfill sites.

Construction impacts are likely to be short term and are dealt with separately in the relevant chapters of this EIAR document and will be subject to control through a Preliminary Construction Environmental Management Plan. The construction methods employed, and the hours of construction proposed will be designed to minimise potential impacts. The development will comply with all Health & Safety Regulations during the construction of the project. Where possible, potential risks will be omitted from the design so that the impact on the construction phase will be reduced.

15.4.2 Operational Phase

The main risk identified during operation is the risk of fire. It should be noted that the proposed uses are considered normal hazard fire risks as would be encountered in most residential developments and do not include any hazards which would be regarded as presenting an exceptional environmental fire hazard.

The fire risk mitigation for the project will comprise all fire safety measures necessary to comply with the requirements of Building Regulations. It is noted that these measures will be validated under the Building Control Act 1990-2007 through the obtaining, in due course, of statutory Fire Safety Certificates under Part III of the Building Control Regulations 1997-2018 from South Dublin County Council.

The measures will include inter alia:

- Provision of fire-rated materials in accordance with relevant building regulations.
- Provision of early warning fire detection systems where required under building regulations;
- Use of materials which do not support fire spread with particular reference, inter alia, to internal wall and ceiling linings and external wall cladding.
- Facilities to assist the fire service including fire tender access proximate to all units, dry rising mains, and external fire hydrants
- A bespoke Fire Emergency Evacuation Plan [FEEP] will be prepared by a fire consultant at detailed design stage.

15.4.3 *'Do Nothing'* Scenario

In the do-nothing scenario, the potential risk of the proposed development causing, or being affected by a disaster and / or accident would be low, given that the site is currently an undeveloped greenfield site.

15.5 MITIGATION MEASURES

The Construction Environmental Management Plan and the Health and Safety Plan will limit the risk of accidents during construction. Fire safety will be dealt with under the Fire Safety Code at design and construction stage. The estate management company will have responsibility for fire safety during operations.

The proposed development will involve ground works to facilitate the proposed development. Site investigations have been carried out (refer to Appendix D1. Volume III of this EIAR) and have not identified any hazardous material with the exception of TP54 at 1.00mBGL where the results indicate that the total organic carbon is above the inert limits (3.86% vs 3%l. Note TP 54 is within the subject site to the north west of the site. All spoil disposed of off-site will be sent to a suitably licensed facility Further site investigation and WAC (Waste Acceptance Criteria) testing will be carried out prior to construction to inform the detailed design. In the event that any hazardous material is identified the appropriate measures will be taken in accordance with the requirements of the EPA. The excavation and movement of soil from the site will be undertaken by a registered specialist contractor and removed to a licensed facility. The following are outlined:

- Hazardous materials used during construction will be appropriately stored so as not to give rise to a risk of pollution.

- In the event of storms or snow, construction activity can be halted and the site secured. The construction activity will involve a number of potential risks, as set out below. The risks identified include traffic management, and fire strategy.

- During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents.

- Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used.

- With reference to natural disasters (e.g. flooding), the proposed development has undergone a Site Specific Flood Risk Assessment, prepared by DBFL Consulting Engineers. The main area of the site where development is proposed is low risk of fluvial, pluvial or groundwater flooding.

- A Health and Safety Plan will be prepared (required by the *Safety, Health and Welfare at Work (Construction) Regulations 2013*) to address health and safety issues from the design stages through to the completion of the construction and maintenance phases. The Health and Safety Plan will comply with the requirements of the Regulations and will be reviewed as the development progresses.

- Safety on site will be of paramount importance. Only contractors with the highest safety standards and training will be selected. During the selection of the relevant contractor and the respective subcontractors their safety records will be investigated.

- Prior to working on site, each individual will receive a full safety briefing and will be provided with all of the safety equipment relevant to the tasks the individual will be required to perform during employment on site.

- Safety briefings will be held regularly and prior to any onerous or special task. *'Toolbox talks'* will be held to ensure all workers are fully aware of the tasks to be undertaken and the parameters required to ensure the task will be successfully and safely completed.

- All visitors will be required to wear appropriate personal protective equipment prior to going on to the site and will undergo a safety briefing by a member of the site safety team.

- Regular site safety audits will be carried out throughout the construction programme to ensure that the rules and regulations established for the site are complied with at all times.

Table 15.4 – Strategy for tackling potential risks

1. BASIC RISK INFORMATION			2. RISK ASSESSMENT INFORMATION		3. RISK RESPONSE INFORMATION
Risk Number	Risk Description / Risk Event Statement	Responsible	Impact H / M / L	Probability H / M / L	Actions
Provide a unique identifier for risk	A risk event statement states (I) what might happen in the future and (ii) its possible impact on the project.	Name or title of team member responsible for risk	Enter H (High); M (Medium) ; or L (Low) according to impact definitions	Enter H (High), M (Medium) or L (Low) according to probability definitions	List, by date, all actions taken to respond to the risk. This does not include assessing the risk
1	Work which puts persons at risk of:-burial under earth falls. Risk of burial under earthfalls in trenches.	Project Supervisor Construction Stage (PSCS)	H	M	Contractor to address requirement for trench support. Excavations are to be carried out at safe slope. Refer to site investigation for same and temporary works engineer to design.
2	Scaffolding Risk of falling from scaffolding, ladders or unprotected edges/open voids during the construction phase.	PSCS	H	M	Working at height required throughout the project. Installation of scaffolding for all working at height activities to be subject to a full temporary works design submission. In order to fully Co-Ordinate any temporary works submission the Project Supervisor for the Design Process must receive the following items before reviewing any submission; A full design submission, Calculations for the design, Design Risk Assessment, Copy of designer's PI insurances, Designers CV. This submission can then be reviewed by the Permanent Works Engineer to ensure the design will

1. BASIC RISK INFORMATION			2. RISK ASSESSMENT INFORMATION		3. RISK RESPONSE INFORMATION
					not impact on the permanent structure.
3	Fire Strategy Risk of fire damage to houses or to partially complete new apartment blocks from construction activities.	PSCS/ PSDP / Fire SC.	H	M	Fire strategy must be put in place in advance of start on site which must take into consideration the requirement for hot works and the provision of Hot Works Permit systems to manage Hot works when needed. A fire marshal will be required - full co-operation from site supervisors and contractors will be required.
4	Lifting Operations Work involving the assembly or dismantling of heavy pre-fabricated components. Risk of injury during the assembly of precast columns, stairs, façade panels, etc.	PSCS/PSDP	H	M	Lifting operations using cranes will be a requirement during the project. The PSDP must identify this as a risk factor ensuring the ground conditions are tested and appropriate to point loading from mobile cranes. The PSCS must ensure there is a fully risk assessed lift plan to manage all lifting operations on site.
5	Existing Utilities Work near overhead electric cables, risk of Electrocution	PSCS/PSDP	H	M	The PSDP must highlight the existence of live overhead ESB cables on site. The sequence of work to be planned to avoid working in close proximity to the lines. The PSCS to arrange for the relocation of the lines prior to working around them. The PSCS must follow the ESB code of practice and provide a risk assessed RAMS document to manage this hazard.

1. BASIC RISK INFORMATION			2. RISK ASSESSMENT INFORMATION		3. RISK RESPONSE INFORMATION
6.	Construction Traffic Working adjacent to live construction and normal traffic.	PSCS/PSDP	H	M	Contractor to prepare and implement a Construction Traffic Management Plan to be agreed with the design team to ensure public safety. The contractor is to supervise vehicle movements during construction and enforce the traffic management plan.

15.6 PREDICTED IMPACTS - RISK OF MAJOR ACCIDENTS AND/OR DISASTERS

15.6.1 Risk Analysis

Following identification of risks, the next stage is to analyse how likely this is to occur and the consequences, should the risk arise. This will provide a risk score, i.e., the consequences versus the likelihood of the event taking place.

Taking the above table, and applying it below, the red zone represents 'high risk scenarios', the amber zone represents 'medium risk scenarios' and the green zone represents 'low risk scenarios.'

Table 15.5 – Risk Evaluation

Likelihood Rating							
	Very Likely	5					
	Likely	4					
	Unlikely	3					
	Very Unlikely	2					
	Extremely Unlikely	1					
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

- Risk Number 1 = Likelihood rating 2 * Consequence rating 4 = Amber zone (Medium risk scenario)
- Risk Number 2 = Likelihood rating 2 * Consequence rating 4 = Amber zone (Medium risk scenario)
- Risk Number 3 = Likelihood rating 2 * Consequence rating 4 = Amber zone (Medium risk scenario)
- Risk Number 4 = Likelihood rating 2 * Consequence rating 4 = Amber zone (Medium risk scenario)
- Risk Number 5 = Likelihood rating 2 * Consequence rating 5 = Amber zone (Medium risk scenario)
- Risk Number 5 = Likelihood rating 2 * Consequence rating 4 = Amber zone (Medium risk scenario)

15.6.2 Main risks

The main risks arise during the construction period. Consequences may be limited but severe for the individuals concerned. Geographical widespread environmental consequences are not anticipated.

15.7 INTERACTIONS

There are interactions with Population and Human Health, Land, Soils, Geology and Hydrogeology, Surface Water, Noise, Climate and Air, Material Assets, Traffic and Transport, Landscape and Visual, and Cultural Heritage. However, subject to implementation of mitigation measures, good working practices and codes, the interactions

between these areas have been sufficiently considered in relation to risk management. Refer to chapter 15 for the anticipated interactions and interdependencies

15.8 RESIDUAL IMPACTS

Through the implementation of mitigation measures, there are no identified incidents or examples of major accidents and or natural disasters that present a sufficient combination of risk and consequence that would be likely to lead to significant residual impacts or environmental effects.

15.9 CUMULATIVE IMPACTS

Existing and permitted developments were identified through planning records. The cumulative effects include the recently constructed Graydon development scheme under planning reference ABP 305343-19 which compromises of 406 dwellings, a creche and associated site works, along with associated amendments as well as the subject Newcastle South which comprises of the construction of 280 no. dwellings along with open space and associated internal road infrastructure. In addition, there is a supermarket (PRR SD20A/0037) along with associated amendments located at the entrance to Graydon which is currently under construction.

The primary potential cumulative impact considered is the increase in construction traffic and construction of the creche within the previously permitted Graydon development. Overall, the cumulative impact of the construction of the proposed development, the Graydon development and the supermarket are predicted to be adverse and of an imperceptible significance (temporary in duration).

16.0 INTERACTIONS OF THE FORGOING

16.1 INTRODUCTION

'The purpose of this chapter is to highlight the significant interaction between environmental factors, and the cumulative impact this interaction and the proposed development has on the receiving environment. In preparing the EIAR each of the specialist consultants have and will continue to liaise with each other and will consider the likely interactions between effects predicted as a result of the proposed development during the preparation of the proposals for the subject site and this ensures that mitigation measures are incorporated into the design process.

This approach is considered to meet with the requirements of Part X of the Planning and Development Act 2000 and Part 10, and schedules 6 and 7 of the Planning and Development Regulations 2001 as amended.

Article 3(1) of the EIA Directive (2014/52/EU) states that:

The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: a) population and human health; b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; c) land, soil, water, air and climate; d) material assets, cultural heritage and the landscape; e) the interaction between the factors referred to in points (a) to (d).'

As this EIAR document has been prepared by a number of specialist consultants an important aspect of the EIA process is to ensure that interactions between the various disciplines have been taken into consideration.

Rory Kunz has a Masters in Environmental Resource Management and a Diploma in EIA Management (both from UCD) as well as a Masters in Town and Country Planning. In addition, Rory is a corporate member of the of the Irish Planning Institute and has 19 years of experience of Environmental Impact Assessment and urban development.

Having regard to the approach taken, the aspects of the environment likely to be significantly affected by the proposed development, during both the construction and operational phases, have been considered in detail in the relevant Chapters of this EIAR document.

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. As demonstrated throughout this EIAR, most inter-relationships are neutral in impact when the mitigation measures proposed are incorporated into the design, construction or operation of the proposed development.

16.2 INTERACTIONS

Section 3.7.2 of the EPA Guidelines 2022 states that the interactions between effects on different environmental factors should be addressed as relevant throughout the EIAR. The EPA Guidelines further note that:

"It is general practice to include a matrix to show where interactions between effects on different factors have been addressed. This is usually done using the actual headings used in the EIAR (which may differ from the factors contained in the Directive (ref section 3.3.6). This is typically accompanied by text describing the interactions."

Table 16.1 – Matrix of Summary of interactions between the environmental factors

Interaction	Population & Human Health	Biodiversity	Land and Soils	Water	Air Quality/Climate	Noise/Vibration	Landscape and Visual	MA-Traffic	MA-Waste/Utilities	Cultural Heritage	Risk Mgmt
Population & Human Health		✗	✗	✗	✓	✓	✓	✗	✓	✗	✗
Biodiversity	✗		✓	✓	✓	✓	✗	✓	✓	✗	✗
Land and Soils	✗	✓		✓	✓	✗	✗	✗	✓	✓	✗
Water	✓	✗	✓		✗	✗	✗	✗	✓	✗	✗
Air Quality/Climate	✓	✗	✗	✓		✗	✗	✓	✗	✗	✗
Noise/Vibration	✓	✗	✗	✗	✗		✗	✗	✗	✗	✗
Landscape and Visual	✓	✓	✗	✗	✗	✗		✗	✗	✗	✗
MA-Traffic	✓	✗	✗	✗	✓	✓	✗		✗	✗	✓
MA-Waste/Utilities	✗	✗	✓	✓	✗	✗	✗	✗		✗	✗
Cultural Heritage	✗	✗	✗	✗	✗	✗	✓	✗	✗	✓	✗
Risk Mgmt	✓	✗	✓	✓	✓	✓	✗	✓	✗	✗	

✓ Interaction ✗ No Interaction

The following provides the interactions anticipated from the proposed development:

16.2.1 Chapter 3 Population and Human Health

The potential significant impacts on population and human health arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

16.2.1.1 Population and Human Health (Ch 3) - Air Quality/Climate (Ch 7)

The completed development will generate additional emissions to the atmosphere associated with the development, and due to plant equipment within the development.

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. However, dust control measures, as set out in the Dust Management Plan (Appendix C 7.2 Volume III of the EIAR) which includes a range of measures such as wheel washes and covering of fine materials will minimise the impact on air quality.

The effect of construction on air quality will not be significant following the implementation of the proposed mitigation measures. It is proposed to adhere to good working practices and dust mitigation measures to ensure that the levels of dust generated will be minimal and are unlikely to cause an environmental nuisance. There will be no significant impact from dust once the development is completed. Overall, it is envisaged that the proposed development will not have a significant impact on air quality. This is dealt with in Chapter 7.

16.2.1.2 Population and Human Health (Ch 3) - Noise/Vibration (Ch 8)

The greatest potential for noise and vibration impact arising from the proposed development will be in the construction phase. However, following the implementation of the proposed mitigation measures in relation to noise, the impact associated with the construction phase of the proposed development is predicted to be moderate, transient and temporary. No significant impacts on the local noise and vibration climate are predicted during the operational phase of the proposed development. This is dealt with in Chapter 8.

16.2.1.3 Population and Human Health (Ch 3) - Material Assets – Utilities (Ch 12)

The operational stage increased population will create greater demand on built services, placing greater demand on water requirements and the public sewer. Irish Water have confirmed capacity. This is dealt with in Chapter 12.

There are interactions with Population and Human Health, Land, Soils, Geology and Hydrogeology, Surface Water, Noise, Climate and Air, Material Assets, Traffic and Transport, Landscape and Visual, and Cultural Heritage. However, subject to implementation of mitigation measures, good working practices and codes, the interactions between these areas have been sufficiently considered in relation to risk management.

16.2.2 Chapter 4 Biodiversity (Ch 4)

The potential significant impacts on biodiversity arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation, there are expected to be no residual negative effects to biodiversity which can be considered to be significant.

16.2.2.1 Biodiversity (Ch 4) – Land and Soils (Ch 5)

The biodiversity elements of this report have involved consultation with a wide section of the Project Team particularly in relation to the Construction Management, design, drainage and landscape elements of the proposed development. There are numerous inter-related environmental topics described in detail throughout this report document which are of relevance to the biodiversity chapter. The biodiversity chapter of the report involves interactions with the Land, Soils and Ground Water, Hydrology (Surface Water and Waste Water), Air and Climate, Noise and Vibration, Traffic and Transportation, Material Assets-Waste and Material Assets-Utilities. It is considered that there is the potential for slight, temporary negative impacts on biodiversity due to dust (air), noise, emissions to water and construction

traffic associated with the Construction Phase of the proposed Project. These impacts are addressed in the relevant chapters of this EIAR.

16.2.3 Land and Soils (Ch 5) – Biodiversity (Ch 4)

Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the construction stage have the potential to cause impact on the biodiversity of the site, for example through disturbance of the available habitats, dust and noise. Mitigation has been incorporated to reduce impacts. This is dealt with in Chapter 5.

There are interactions between land and soils and water, with some surface water conveyed and stored in SuDS features such as soakaways and discharging to the ground where possible, replicating the existing greenfield site drainage as closely as possible. The likely impact will be permanent, slight and neutral. This is dealt with in Chapter 6.

The potential significant impacts on land and soils arising from these interactions in the construction and operational phases have been considered within the relevant discipline (biodiversity and soils/water) and mitigation measures outlined where required. With mitigation measures in place, no significant temporary or permanent residual negative impacts will occur.

16.2.3.1 Land and Soils (Ch 5) – Air Quality (Ch 7)

Excavation works and exposure of soil during the construction phase can influence the microclimate in an area. The construction phase may result in the spread of dust onto surrounding land uses and public roads. The air quality assessment indicates that there is no significant impact associated with these matters. 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. This is dealt with in Chapter 7.

The potential significant impacts on land and soils arising from these interactions with air quality/climate have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant temporary or permanent residual negative impacts will occur.

16.2.3.2 Land and Soils (Ch 5) – Material Assets – Utilities (Ch 12)

There are interactions between lands and soils and material assets, with the construction of drainage and utilities impacting the soil and subsoil as these materials will be removed to facilitate construction. The likely impact will be permanent slight, and negative.

There are interactions between lands and soils and material assets, with the delivery of stone fill under buildings and roads and footpaths resulting in additional construction vehicles on roads adjacent to the site. The likely impact will be negative, temporary and slight.

16.2.4 Water, Surface Water / Groundwater (Chapter 6) & Human Health (Chapter 3)

Risks to human health include the accidental spills/ leaks of hydrocarbons/ oils entering the groundwater/surface water or potable water system. This impact following mitigation measures outlined in section 6.6 will result in an imperceptible impact to human health.

16.2.5 Air Quality & Climate (Ch 7)

16.2.5.1 Air Quality & Climate (Ch 7) - Population and Human Health (Ch 3)

The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the demolition, construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted

impact is short-term, negative and imperceptible with respect to the construction phase and long-term, neutral and imperceptible with respect to the operational phase.

With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality have been identified.

16.2.6 Noise/Vibration (Chapter 7) & Material Assets – Traffic (Ch 10)

In compiling this environmental impact assessment, reference has been made to the project description provided by the project co-ordinators, project drawings provided by the project architects and information relating to construction activities provided by the engineers. Noise emission sources from the proposed development during the construction and operational phases will be from construction plant and activity, building services and traffic accessing the development. The noise impact assessment has been prepared in consultation with the design team and traffic engineers. Reference can be made to the relevant chapters for additional information.

16.2.7 Landscape and Visual (Ch 9)

The assessment of the landscape impacts associated with the proposed development has a number of interactions with other parameters of the assessment. In summary, these are as follows:

- Population and Human Health
- Biodiversity

The interactions of landscape with these parameters were as follows:

16.2.7.1 Landscape and Visual (Ch 9) & Population and Human Health (Ch 3)

The landscape and visual impact associated with human beings focuses on the effects to dwellings. The proposed development generates visual effects; the effects and associated amelioration of these effects is discussed in the impact section of the chapter.

16.2.7.2 Landscape and Visual (Ch 9) & Biodiversity (Ch 4)

As detailed in Chapter 9, the long-term effects of the proposed development will have a positive effect on the tree cover associated with the development. Extensive native wildflower meadow areas are proposed that further add to the diversity of native flora. Further consultation with the Ecological Consultant will take place at detailed design, implementation and monitoring stages to ensure adherence to best practice and sound ecological principles.

16.2.8 Material Assets – Traffic and Transportation (Chapter 10) & Risk Management (Ch 15)

During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. Measures (as described in the mitigation measures above in Section 10.7.1) will be put in place to minimise the risk of road traffic accidents during the construction phase. Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used and no unusual or hazardous substances or underground tunnelling works required or predicted.

During the operational phase, it is anticipated that the risk of accidents will be influenced by the additional traffic generated by the proposed development. The potential likelihood of any incidents and the severity of such incidents is minimised due to the appropriate segregation of vulnerable road users through the development as a result of the new dedicated infrastructure proposals the design of which advocates self-regulating low speed streets and dedicated pedestrian / cycle linkages.

16.2.9 Material Assets – Waste Management (Chapter 11)

16.2.9.1 Material Assets – Waste Management (Ch 11) & Water, Hydrogeology & Hydrology (Ch 6)

Should waste be incorrectly handled or stored at the development site during construction works, it has the potential to cause an adverse impact upon water quality in the area through leaching of materials to groundwater or surface water. However, as mentioned above, waste will be segregated and stored in suitably contained waste receptacles at the site compound, considerably reducing the potential risk of pollution to water. It is not considered that there would be any significant risk to water quality as a result of waste management during the operational phase, given that waste will be collected by private, licensed waste contractors and recovered, recycled or disposed of at appropriately licenced waste facilities, which would have environmental controls in place as standard. This is dealt with in Chapter 11.

Should waste be incorrectly handled or stored at the development site, it has the potential to cause an adverse impact upon human beings through nuisance, including visual, odour and pests, and pollution to soils and water.

During the operational phase, suitably contained wheelie bins / waste receptacles will be provided to the residential area and childcare facility by private waste contractors, thus there would be no significant risk of pollution to soils. Waste will be collected on a regular basis. Therefore, waste would not be envisaged to accumulate to high enough volumes to cause nuisance. This is dealt with in Chapter 11.

16.2.10 Material Assets – Utilities (Chapter 12) & Land and Soils (Ch 5)

The potential significant impacts on Material Assets – Utilities arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant temporary or permanent residual negative impacts will occur.

There are interactions between utilities and lands and soils, with the construction of drainage and utilities impacting the quantity of soil and subsoil as these materials will be removed to facilitate construction. The likely impact will be permanent slight, permanent and negative.

16.2.11 Cultural Heritage (Chapter 13 and Chapter 14)

Architectural heritage impact assessment is included in Chapter 14. Due to the fact that there can often be a cross-over between archaeological, architectural and cultural heritage sites, this chapter has been fully reviewed and cross-referenced where applicable.

There are interactions between this chapter and the landscape and visual chapter in view of the visual impacts on the settings of archaeological and cultural heritage sites and the potential for landscaping to mitigate such impacts

There are interactions between Cultural Heritage - Architectural heritage and the archaeology chapter in view of the nature of the tower house, which is built heritage, but of archaeological significance.

16.2.12 Cultural Heritage (Chapter 13 and Chapter 14) & Landscape and Visual (Chapter 9)

There are interactions between this chapter and the landscape and visual chapter in view of the visual impacts on the settings of structures of architectural heritage significance and the potential for landscaping to mitigate such impacts

There are interactions between this chapter and the noise and vibration chapter in view of the proximity of the tower house near the western boundary of the site, the poor condition of the masonry of the tower house and the proposed works in close proximity to the tower.

16.2.13 Risk Management (Chapter 15)

There are interactions with Population and Human Health, Land, Soils, Geology and Hydrogeology, Surface Water, Noise, Climate and Air, Material Assets, Traffic and Transport, Landscape and Visual, and Cultural Heritage.

However, subject to implementation of mitigation measures, good working practices and codes, the interactions between these areas have been sufficiently considered in relation to risk management.

The potential significant impacts on risk management arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant temporary or permanent residual negative impacts will occur.

16.2.14 Interactions & Cumulative Impacts

Each Chapter of the EIAR includes a cumulative impact assessment of the proposed development with other relevant existing and/or approved projects in the area.

The potential cumulative impacts primarily relate to traffic, dust, noise and other nuisances from the construction of the development, with other planned or existing projects, and each of the EIAR chapters has regard to these in the assessment and mitigation measures proposed.

The potential cumulative significant effects through interactions have been considered and there are no significant potential for cumulative significant effects to arise from multiple non-significant effects. In respect of the project.

17.0 SUMMARY OF EIA MITIGATION AND MONITORING MEASURES

17.1 INTRODUCTION

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 has been prepared by John Spain Associates and sets out a summary of the range of methods described within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring. 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. This chapter of the EIAR was prepared by Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates.

EIA related conditions are normally imposed by the competent/consent authority as part of conditions of planning consent and form a key part of the Impact Anticipation and Avoidance strategy. Conditions are principally used to ensure that undertakings to mitigate are secured by explicitly stating the location, quality, character, duration and timing of the measures to be implemented. A secondary role of EIA related conditions is to ensure that resources e.g. bonds / insurances will be available and properly directed for mitigation, monitoring or remedial action, in the event that the impacts exceed the predicted levels.

Monitoring of the effectiveness of mitigation measures put forward in the EIAR document, both by the competent authorities and the developer, is also an integral part of the process. Monitoring of environmental media and indicators arise either from undertakings or from conditions.

In the case of mitigation and monitoring measures it is important for all parties to be aware of the administrative, technical, legal and financial burdens that can accompany the measures proposed. It is also important to ensure that, where monitoring is provided for, it is clearly related to thresholds, which if exceeded cause a clearly defined set of actions to be implemented.

17.2 MITIGATION STRATEGIES

17.2.1 Introduction

There are three established strategies for impact mitigation - avoidance, reduction and remedy. The efficacy of each is directly dependent on the stage in the design process at which environmental considerations are taken into account (i.e. impact avoidance can only be considered at the earliest stage, while remedy may be the only option available to fully designed projects).

17.2.2 Mitigation by Avoidance

Avoidance is generally the fastest, cheapest and most effective form of impact mitigation. Environmental effects and consideration of alternatives have been taken into account at the earliest stage in the project design processes. The consideration of alternatives with respect to the development of the subject lands has been described in Chapter 2.

17.2.3 Mitigation by Reduction

This is a common strategy for dealing with effects which cannot be avoided. It concentrates on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the "end of pipe" approach because it does not seek to affect the source of the problems (as do avoidance strategies above). As such this is regarded as a less sustainable, though still effective, approach.

17.2.4 Reducing the Effect

This strategy seeks to intercept emissions, effects and wastes before they enter the environment. It monitors and controls them so that acceptable standards are not exceeded. Examples include wastewater treatment, filtration of air emissions and noise attenuation measures.

17.2.5 Reducing Exposure to the Impact

This strategy is used for impacts which occur over an extensive and undefined area. Such impacts may include noise, visual impacts or exposure to hazard. The mitigation is effected by installing barriers between the location(s) of likely receptors and source of the impact (e.g. sound barriers, tree screens or security fences).

17.2.6 Mitigation by Remedy

This is a strategy used for dealing with residual impacts which cannot be prevented from entering the environment and causing adverse effects. Remedy serves to improve adverse conditions which exist by carrying out further works which seek to restore the environment to an approximation of its previous condition or a new equilibrium.

17.2.7 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.

17.3 PROJECT DESCRIPTION & ALTERNATIVES EXAMINED

17.3.1 Construction Management Strategy

It is envisaged that the development of the lands subject of the proposed development will occur over a 48-54 month period (of up to 7 years to allow for the potential for some pauses to allow for flexibility). Given the nature of the project and the need for flexibility to respond to market demand, the development phases are indicative. A Preliminary Construction Environment Plan has been prepared by DBFL Consulting Engineers, has been reviewed by the relevant EIAR consultants and is included in Appendix D. This PCEMP will be developed by the Contractor to include the mitigation contained in the EIAR.

Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) will be prepared by the main contractor and agreed with the Planning Authority prior to commencement of development in the event of a grant of permission. It will contain the mitigation in the EIAR.

17.4 POPULATION AND HUMAN HEALTH

POP & HH CONST 1:

In order to protect the amenities enjoyed by nearby residents, premises and employees a Construction Environment Management Plan will be submitted by the contractor and implemented during the construction phase and it will contain the mitigation measures in this EIAR.

With reference to the construction phase of the proposed development, the objectives of the Construction Waste By Products Management Plan prepared by AWN (and also Chapter 11 of the EIAR) is to ensure that waste generated during the proposed construction and operation phases will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts 1996 - 2013 are complied with.

17.4.1 Operational Phase

The operational phase is considered to have likely positive impacts on population in relation to the provision of additional residential units, open space, childcare provision, to cater for the demands of a growing population in accordance with the residential zoning objectives pertaining to the site.

During the operational phase of the development the design of the scheme has undergone a Road Safety Audit and has had regard to Design Manual for Urban Roads and Streets (DMURS) during its design. This will promote a pedestrian friendly environment, promoting sustainable development and reducing the influence of cars. This has the potential to reduce accidents within the proposed development.

No further specific mitigation is required having regard to the mitigation included within the other chapters of this EIAR.

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in this EIAR in regard to the other environmental topics such as water, air quality and climate and noise and vibration sufficiently address monitoring requirements.

17.5 BIODIVERSITY

17.5.1 Mitigation Measures & Monitoring

Construction and operational controls will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (ZoI). These measures are outlined in detail in Table 4.9.

Designated Conservation sites within 15km
No specific measures are required to protect designated sites. However, the project must comply with Water Pollution legislation to ensure that there are no contaminated discharges from the site including surface runoff leading to the marine environment. However, these measures are not necessary for the protection of designated sites.

Development Construction
Contamination of watercourses could potentially occur from silt, runoff and dust. As an existing road surface water network is located at Athgoe Road (to the North West of the site), the Griffeen River is located to the East of the site, and substantial works are proposed, a robust surface water runoff prevention strategy will be in place. All mitigation measures outlined in Table 4.9 will be carried out in consultation with and to the satisfaction of the project ecologist.

All works on site will have sufficient mitigation measures to prevent silt from runoff during works (Table 4.9). This will include measures outlined by the project ecologist including silt fences, phasing of the project and landscaping at early stage of the project to limit surface runoff. These measures are not necessary for the protection of designated sites.

Table 17.1 - Sensitive Receptors/effects and mitigation measures.

Sensitive Receptors	**Potential Effects**	**Designed-in Mitigation**
Downstream impacts on watercourses .	• Habitat degradation • Dust deposition • Pollution • Silt ingress from site runoff • Downstream impacts • Negative impacts on aquatic and bird fauna • Impacts from concrete works	• Appointment of a project ecologist to oversee works. • Local silt traps established throughout site. • Mitigation measures on site include dust control, stockpiling away from drains • Stockpiling of loose materials will be kept to a minimum of 20m from drains. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system. • Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches, excavations and other locations where it may cause pollution. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, including the attenuation tank during construction, that require pumping will not directly discharge to the surface water network. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. • Concrete works will be mitigated to prevent concrete or cement from entering drains or pathways to watercourses/marine environment. • Mitigation measures on site include dust control, stockpiling away from drains • During the construction works silt traps will be put in place in the vicinity of all runoff channels to prevent sediment entering the surface water network.

Sensitive Receptors	**Potential Effects**	**Designed-in Mitigation**
		• Petrochemical interception and bunds in refuelling area • Maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network. • No entry of solids to the drainage network during the connection of pipework to the public water system • Dewatering of excavations may be necessary. Appropriate monitoring of groundwater levels during site works will be undertaken. Construction phase filtering of surface water for suspended solids will be carried out in compliance with Water Pollution legislation. • Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out area greater than 50m from sensitive receptors including drains and stream.
Biodiversity	• Habitat Degradation and removal • Dust deposition • Pollution • Silt ingress • Potential downstream impacts.	**Air & Dust** Mitigation measures will be carried out reduce dust emissions to a level that avoids the possibility of adverse effects. The main activities that may give rise to dust emissions during construction include the following: • Excavation of material; • Materials handling and storage; • Movement of vehicles (particularly HGV's) and mobile plant. • Contaminated surface runoff *Mitigation measures to be in place:* • Maintain a 10m buffer from drains with a double layer of silt fences • Road sweeping to clean roads proximate to the site • Wheel wash on site. • Consultation will be carried with an ecologist throughout the construction phase; • Trucks leaving the site with excavated material will be covered so as to avoid dust emissions along the haulage routes. • Speed limits on site (15kmh) to reduce dust generation and mobilisation. *Site Management* • Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked.

Sensitive Receptors	**Potential Effects**	**Designed-in Mitigation**
		• Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book. *Monitoring* • Undertake daily on-site and off-site inspection. This should include regular dust soiling checks of surfaces within 100 m of site boundary, integrity of the silt control measures, with cleaning and / or repair to be provided if necessary. *Preparing and Maintaining the Site* • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Cover, seed or fence stockpiles to prevent wind whipping. • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. • Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions. *Waste* • Avoid bonfires and burning of waste materials. *Measures Specific to Earthworks* • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. • Only remove the cover in small areas during work and not all at once. • During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. *Storage/Use of Materials, Plant & Equipment* • Materials, plant and equipment shall be stored in the proposed site compound location;

Sensitive Receptors	**Potential Effects**	**Designed-in Mitigation**
		• Plant and equipment will not be parked within 50m of the Dawson's Demesne Stream at the end of the working day; • Hazardous liquid materials or materials with potential to generate run-off shall not be stored within 50m of the drains. • All oils, fuels and other hazardous liquid materials shall be clearly labelled and stored in an upright position in an enclosed bunded area within the proposed development site compound. The capacity of the bunded area shall conform with EPA Guidelines – hold 110% of the contents or 110% of the largest container whichever is greater; • Drip trays will be turned upside down if not in use to prevent the collection of rainwater; • Waters collected in drip trays must be assessed prior to discharge. If classified as contaminated, they shall be disposed by a permitted waste contractor in accordance with current waste management legal and regulatory requirements; • Plant and equipment to be used during works, will be in good working order, fit for purpose, regularly serviced/maintained and have no evidence of leaks or drips; • No plant used shall cause a public nuisance due to fumes, noise, and leakage or by causing an obstruction; • Re-fuelling of machinery, plant or equipment will be carried out in the site compound as per the appointed Construction Contractor re-fuelling controls;
Birds (National Protection)	• Removal nesting habitat. • Removal foraging habitat. • Destruction and/or disturbance to nests (injury/death). • Predation • Disturbance	• Removal of potential nesting habitats outside of bird breeding season (March to August inclusive). Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. If nesting birds are present a derogation licence will be sought from NPWS. If this is not forthcoming works to remove the nesting habitats will not commence within bird nesting season. • An ecologist will be on site during site clearance to minimise impact on foraging/roosting bird species. The ecologist will have the ability to cease works on site that could cause disturbance, in the event of significant disturbance impacts being possible.
Bats	• Loss of commuting habitat. • Injury/death during construction and operation	• No roosts or potential roosts will be impacted. The foraging areas for bats along hedgerows will be temporarily lost until the trees within the green link area become mature and allow for insects to swarm. A post construction assessment will be carried out in the open space areas to ensure compliance with Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers.

17.6 LAND AND SOILS

17.6.1 Incorporated Design Mitigation

Mitigation included in the design of the proposed development include:

- Proposed development levels are designed to minimise cut/fill type earthworks and volume of material to be disposed off-site where possible.
- Landscaping works for the development when incorporated into the scheme are designed to protect the soils again from weathering and erosion.
- Design of site services / drainage works are in accordance with the relevant design guidance such as the GDSDS, The SUDS Manual (CIRIA C753) and the Irish Water Code of Practice (IW-CDS-5030-03 Revision 2).
- Excavated material to be removed off-site is undertaken to the relevant EPA licensing requirements.
- Landscaping works for the development when incorporated into the scheme are designed to protect the soils again from weathering and erosion.
- Appropriately designed site services / drainage / sewers will protect the soils and geology from risk of contamination arising from the development such as light liquids separator or SuDS treatment train approach.

17.6.2 Construction Phase Mitigation

A Construction Environmental Management Plan (PCEMP) is included with the planning application. This plan will be developed further by the contractor into a Construction Environmental Management Plan for the construction phase, which will include the mitigation measures contained in the EIAR. The PCEMP includes a range of site specific measures which will include the following mitigation measures in relation to soils:

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development.
- Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter watercourses.
- Topsoil stockpiles will be located on site so as not to necessitate double handling.
- Topsoil to be re-used throughout the development in landscaping and public open spaces / linear park.
- Disturbed subsoil layers to be stabilised as soon as practicable - backfilling of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping, to be carried out promptly to minimise the duration that subsoil layers are exposed to the effects of weather and construction vehicles.
- Stockpiles of excavated subsoil material to be protected for the duration of the works and located separate to the topsoil stockpiles.
- Construction site mitigation such as wheel wash and dust suppression measures to be implemented.
- Measures to capture and treat sediment laden surface water runoff especially from excavations and stripped land to be implemented (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches).
- Where feasible, excavated subsoil material to be reused as part of the site development works (e.g. for landscaping works and for backfill to trenches under non-trafficked areas).
- Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes on the site and entering the site.
- All oils, fuels, paints and other chemicals to be stored in a secure bunded hardstanding area.
- Refuelling and servicing of construction machinery to take place in a designated hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site).
- Good housekeeping (site clean-ups, use of disposal bins, etc.) on the site project.
- Any material removed from site shall be classified before removal to ensure it is disposed of to an appropriately licensed landfill or recovery facility in accordance with The Waste Management (Hazardous Waste) Regulations 1998. Unsuitable material that cannot be reused on site to be disposed off-site under license.

- Where bedrock / boulders are encountered in excavations, option to crush and reuse to be considered depending on quantity of material excavated. Screened material may be reused as a fill material e.g. in road construction and backfill to service trenches.

- Where feasible, excavated material will be reused as part of the site development works (e.g. use as fill material beneath roads) however, unsuitable excavated subsoil is expected and will have to be removed to an approved landfill.

All fill and aggregate imported for use on the proposed development site will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the project;
- Environmental Management status;
- Regulatory and Legal Compliance status of the Company.

17.6.3 Operational Phase

Mitigation measures envisaged during the operational phase comprise;

- Ensuring regular maintenance of site services, SuDS features and attenuation systems such that they operate as designed.

- Emptying oil separators as per manufacturer's operation and maintenance recommendations to mitigate against risk of spillage / leaks into the soils.

17.6.4 Monitoring

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above in section 5.6 including the PCEMP contained in Appendix D2 Volume III of this EIAR. Soil removed during the construction phase is to be monitored to maximise potential for re-use on site. Monitoring of any hazardous material stored on-site forms part of the Resource & Waste Management Plan (Appendix E Volume III of the EIAR), and Chapter 11 of this EIAR Material Assets Waste Management. A dust management/monitoring programme is included in Appendix C 7.2 Volume III of the EIAR.

17.6.4.1 Monitoring measures – construction

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

- Contractors will adhere to the mitigation in this EIAR and PCEMP in Appendix D2 Volume III of this EIAR.
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road sub-formation level in advance of placing capping material, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.)
- Soil removed during the construction phase will be monitored to maximise potential for re-use on site. Any contaminated soil encountered and not identified on site investigations will be analysed and disposed off-site at a suitable licensed facility.
- The quantities of topsoil, subsoil and rock removed off site will be recorded.

17.7 WATER, HYDROLOGY, HYDROGEOLOGY

17.7.1 Incorporated Design Mitigation

- Excavated material to be contained to ensure excavated material (from earthworks) does not enter a drainage ditch or watercourse.
- Any in-situ concrete work to be lined and areas bunded (where possible) to stop any accidental spillage entering the watercourse.
- Design of site services / drainage works are in accordance with the relevant design guidance.
- Appropriately designed site services / drainage / sewers will protect the water, hydrogeology and hydrology from risk of contamination arising from the development such as light liquids separator or SuDS treatment train. Features such as green roofs, permeable paving, swales, tree pits and above ground and open-bottom attenuation are proposed to intercept pollutants and promote groundwater recharge where possible. A bypass separator is proposed prior to any surface water discharging to drainage ditches.
- Design and layout of the scheme is aimed at maximising SuDS features and protect watercourses in accordance with guidance from Inland Fisheries Ireland on the Planning for Watercourses in the Urban Environment.
- Surface water drainage for the development has been designed in accordance with the GDSDS and the SUDS Manual to avoid risk to human health.

17.7.2 Construction Phase Mitigation

To minimise the impact of the construction phase on the water environment mitigation measures included in section 6.6.2 and the PCEMP (contained in Appendix D2 Volume II of this EIAR) will be implemented.

General site works

- A Site-Specific Construction and Environment Management Plan be developed and implemented during the construction phase. Site inductions to include reference to the procedures and best practice as outlined in the PCEMP, prepared by DBFL Consulting Engineers, submitted with the SHD application and will include mitigation measures contained in the EIAR.
- Measures will be implemented to capture and treat sediment laden surface water runoff from excavated trenches and stripped land (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches).
- Weather conditions and seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations, with an objective of minimizing soil erosion.
- The extent of sub-soil and topsoil stripping will be minimised to reduce the rate and volume of the run-off during construction until the topsoil and vegetation are replaced.
- Concrete batching will take place off site or in a designed area with an impermeable surface.
- Concrete wash down and wash out of concrete trucks will take place on-site into an appropriate washout facility.
- Discharge from any vehicle wheel wash areas will be directed to on-site settlement tanks/ponds.
- Oil and fuel stored on site for construction will be stored in designated areas. These areas will be bunded and should be located away from surface water drainage and features.
- Refuelling and servicing of construction machinery to take place in a designated hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site).
- Any hazardous materials to be stored within secondary containment designed to retain at least 110% of the storage contents - to prevent the accidental release (fuels, paints, cleaning agents, etc.) with bunds for oil/diesel storage tanks.

- Spill kits will be kept in designated areas for re-fuelling of construction machinery.
- Dewatering measures will only be employed where necessary.

17.7.3 Operational Phase

Operational phase mitigation measures are noted below:

- The design of proposed site levels (roads, FFL etc.) has been carried out to replicate existing surface contours, break lines etc. and therefore replicating existing overland flow paths, and not concentrating additional surface water flow in a particular location.
- Surface water runoff from the site will be attenuated to the greenfield runoff rate as recommended in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled by a Hydrobrake flow control device, with a combination of above detention basins, low flow channels and underground attenuation tanks, swales provided to store runoff from a 1 in 100-year return period event. SUDs features are implemented in the surface water drainage network to reduce the rate of runoff form hard standing area sand to improve the quality of surface water runoff. For detailed information refer to DBFL Report number 210026-DBFL-CS-SP-RP-C-1001, "Infrastructure Design Report".
- Surface water runoff from the development will be collected by an appropriately designed system with contaminants removed prior to discharge i.e. petrol interceptor.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies, petrol interceptor and foul pumping station will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.
- Waste generated by the everyday operation of the development should be securely stored within designated collection areas with positive drainage collection systems to collect potential runoff.
- Operational waste will be removed from site using licensed waste management contractors.

17.7.4 Monitoring

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above in section 6.6 including the Preliminary Construction Environmental Management Plan (PCEMP) (see Appendix D2 Volume III of the EIAR). It is recommended that any monitoring of any hazardous material stored on-site be carried out in accordance with the CEMP.

17.7.4.1 Construction Phase

- Contractors will adhere to the PCEMP and Mitigation Measures contained in this EIAR.
- Construction monitoring of the works (e.g. inspection of services and SUDS installation and backfill, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site)
- Monitoring sediment control measures (sediment retention tanks, surface water inlet protection etc.)

17.7.4.2 Operational Phase

Proposed monitoring during the operational phase in relation to the water and hydrogeological environment are as follows:

- The taking in charge of the water infrastructure will ensure the system is regularly inspected and maintained.

- The performance of all SuDS features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed hydrobrake, interceptor and gullies and all other SUDs features will be carried out to prevent contamination and increased runoff from the site.
- Monitoring of installed Foul

17.8 AIR QUALITY AND CLIMATE

17.8.1 Construction Phase

The proactive control of fugitive dust will ensure the prevention of significant emissions. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix C 7.2 Volume III of the EIAR. These measures have been incorporated into the overall Construction Environmental Management Plan (CEMP) prepared in respect of the proposed development.

In summary the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed by a suitable person appointed by the successful construction contractor. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Impacts to climate during the construction stage are predicted to be imperceptible however, good practice measures will be incorporated to ensure potential impacts are lessened. These include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

17.8.2 Operational Phase

The impact of the operational traffic associated with proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required other than those set out in Section 0 in relation to operational phase energy usage.

17.8.3 Monitoring

17.8.3.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development will be completed 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 2 m above ground level. The TA Luft limit value is 350 mg/(m^2*day) during the monitoring period between 28 - 32 days.

17.8.3.2 Operational Phase

There is no required monitoring during the operational phase as there are no significant potential impacts.

17.9 NOISE AND VIBRATION

17.9.1 Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2*. Whilst construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

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

Detailed comment is offered below on these items. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

17.9.1.1 Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

17.9.1.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant should be switched off when not in use and not left idling.

- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

17.9.1.3 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound attenuation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

17.9.1.4 Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

17.9.1.5 Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During periods when high noise generating works such as demolition are in progress at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

17.9.1.6 Vibration

The vibration from construction activities will be limited to the values set out in Section 8.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties and will be adhered to as follows:

Table 17.2 – Recommended Vibration Criteria During Construction Phase

Building Category	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
Structurally sound and non-protected buildings	12 mm/s	20 mm/s	50 mm/s
Protected and /or potentially vulnerable buildings	6 mm/s	10 mm/s	25 mm/s

Limits have been recommended above for protected structures. Where vibration-heavy works are proposed near protected structures the relevant engineer or conservation expert should be consulted in advance of works adjacent.

17.9.2 Operational Phase – Noise

17.9.2.1 Mechanical Services Plant

Plant items will be designed and selected so that cumulative noise emissions are within the recommended noise criteria. Therefore no mitigation is required.

17.9.2.2 Additional Traffic on Surrounding Roads

During the operational phase of the development the change in noise level associated with development traffic is predicted to be negligible and therefore, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary.

Internal Underground Waste Water Pumping Station

The development will include a waste water pumping station located at the northern site boundary. To ensure that this item of site infrastructure does not have an adverse noise impact on the receiving environment, noise generated by its operation shall be non-tonal, non-impulsive and be no greater than 60dB(A) when measured at a reference distance of 1m. The commissioning phase of the station will include the measurement of operational noise levels by an experienced acoustic consultant to verify that the operational noise achieves its acoustic performance design criteria and will not be audible at the closest residential receptors at St. Finian's Way.

17.9.3 Monitoring

17.9.3.1 Construction Phase

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

Vibration monitoring should be conducted in accordance with BS 6472:2008 Guide to evaluation of human exposure to vibration in buildings - Vibration sources other than blasting (human disturbance) and BS ISO 4866:2010 Mechanical vibration and shock - Vibration of fixed structures- Guidelines for the measurement of vibrations and evaluation of their effects on structures (building damage).

17.10 LANDSCAPE AND VISUAL

17.10.1 Construction Phase

During the construction phase, site hoarding will be erected to restrict views of the site during construction. Hours of construction activity will be as set out in the Preliminary Construction Environment Management Plan and as set out in Chapter 2 of the EIAR.

17.10.2 Operational Phase

A comprehensive landscape architectural design for the entire site is proposed, integrating mitigation measures that are required to avoid or reduce potential negative effects of the development. Please see the landscape plans and reports by Murray & Associates, Landscape Architecture as submitted with the planning application for full details of the extensive landscape proposals. The primary measures of note are as follows:

- Retention of existing hedgerows associated with the historic landscape and burgage pattern
- Extensive tree planting to screen and soften the proposed development, create structure in the streetscapes, impart character to the proposed development and
- Extensive native shrub and hedgerow planting, as well as wildflower and perennial plantations to encourage pollinators and native wildlife. Planting is in accordance with the All-Ireland Pollinator Plan.
- Three new public parks with recreational space, habitat plantation and integrated Sustainable Drainage measures.
- Extensive areas of greenway and streetscape for walking and cycling.

The existing boundary hedges around the site to the east and north are to be retained. In areas where these existing boundaries need rehabilitation and filling in, semi-mature native tree planting, bare-root tree planting and native shrub planting is proposed as part of the planning application. This will create a landscape buffer space that will reduce the views into the site from adjacent properties to the east and south-east. The south-eastern edge of the site contains

an open space that will have semi-mature tree planting, contributing to screening the development from properties to the south and south-east.

Native trees, shrubs and wildflowers will be used where possible, particularly in the buffer spaces surrounding the development site.

Internal streets within the development will also contain a substantial amount street tree planting that will continue to soften and screen the development over the medium to long-term as the trees and planting mature.

Mitigation measures are shown on the submitted landscape drawings. At time of planting, the proposed standard trees in the landscaped buffer zones will be at least 3.0m in height. The trees will reach a mature height of at least 7 to 15 metres, dependent on species within the medium term.

17.10.3 Monitoring

17.10.3.1 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 planting season after completion of the main civil engineering and building work.

17.10.3.2 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. A landscape management plan accompanies the planning application.

17.10.3.3 Summary of Mitigation & Monitoring

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

Table 17.3 – Construction: Mitigation & Monitoring Measures

Likely Significant Effect	Mitigation	Monitoring
Visual: - Construction Traffic/Cranes	Site Hoarding	Regular site visits as per the Inspection Plan
Landscape: Site Clearance, Change from agricultural landscape to residential	Mitigation measures for landscape only applicable in operational phase	Inspection of tree and hedge protection measures to southern boundary

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

Table 17.4 – Operation: Mitigation & Monitoring Measures

Likely Significant Effect	Mitigation	Monitoring
Visual: Negative effect on adjacent visual receptors	Proposed tree planting will mature over time, contributing to the visual softening of the development.	Initial Defects period applicable as per regular planning grant. Landscape Management plan detailing maintenance of trees etc included as part of planning application.
Landscape: Change in landscape character	Retention of existing boundary hedgerows. Proposed planting within development of new native standard trees, native woodland, native wildflower meadow.	Regular maintenance regime by experienced landscape contractor

17.11 MATERIAL ASSETS – TRAFFIC AND TRANSPORTATION

17.11.1.1 Construction phase

A Preliminary Construction Environmental Management Plan accompanies this application and sets out the measures to mitigate the impact on the local environment during the construction phase. A Construction Traffic Management Plan (CTMP) will be developed by the appointed contractor and submitted to South Dublin County Council for approval prior to commencement of work. It will implement the relevant Mitigation Measures in this EIAR including the PCEMP accompanying this planning application (contained in Appendix D2 Volume III of this EIAR.

In general, the impact of the construction period will be short-term in nature and less significant than the operational stage of the proposed development due to the reduced traffic volumes generated during the construction stage compared to the operational stage. In addition, the peak construction arrivals / departures will be outside of the road network peak hours and therefore will not exacerbate any existing delays encountered during peak times. It is anticipated that the generation of HGV's during the construction period will be evenly spread throughout the day and such will not impact significantly during the peak traffic period.

The main construction access will be via the existing construction access located on Athgoe Road which currently facilitates access to construction vehicles at the adjacent Graydon residential development currently under construction as introduced in Section 10.6.1.

Construction traffic will continue to enter the site via the Athgoe Road for the construction phase of the development with construction traffic diverted to internal, temporary haul routes to access construction areas.

All construction related parking will be provided on site. Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff. As introduced in Section 10.6.1, there is predicted to be 40 no. staff car trips daily. The proposed on-site car parking area will be designed to have the capacity to accommodate this parking demand in addition to an element of visitor parking spaces.
- Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

It is anticipated that the generation of HGV's during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods.

On-site employees will generally arrive before 08:00, thus avoiding morning peak hour traffic. These employees will generally depart after 18:00 and avoid the PM peak hour.

To minimise disruption to the surrounding environment, the following mitigation measures will be implemented:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- A dedicated 'construction' site access / egress junction will be provided during all construction phases. This will be via the existing accesses constructed on Athgoe Road as introduced in Section 10.6.1.
- Provision of sufficient on-site parking for staff and visitors (as described above) and compounding through the construction of temporary hardstanding areas to ensure no potential overflow of construction generated traffic onto the local network.
- A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.
- A series of 'way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.
- A dedicated construction haul route has been identified and will be agreed with the local authority prior to the commencement of constructions activities on-site.
- Truck wheel washes will be installed at construction and discharge from wheel wash area will be directed to on-site settlement ponds.

- On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.
- Measures will be put in place to minimise the risk of road traffic accidents during the construction phase including;
    - appropriate temporary traffic management as required,
    - strict adherence to the proposed construction vehicle haul route, and
    - Wayfinding signage so all visitors can navigate to the designated visitor parking and sign in areas.

17.11.1.2 Operational phase

A package of integrated mitigation measures has been identified and will be implemented to off-set the additional local demand that the proposed development on the subject zoned lands could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures are summarised below:

- Management – A Mobility Management Plan (MMP) is included with the application (Appendix H Volume III of this EIAR). The measures identified in the MMP form part of the specific mitigation of this EIAR and a dedicated resident specific Mobility Management Plan (MMP) is to be compiled with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor. Resident specific MMPs include specialised plans and associated implementation strategies for the subject development proposals. The MMP ultimately seeks to encourage sustainable travel practices for all journeys by residents and visitors traveling to and from the proposed development. It involves the incorporation of a wide range of possible “hard” and “soft” tools from which to choose from with the objective of influencing travel choices. The measures in the MMP comprise a number of different categories including;

    - Management & Monitoring
    - Walking Strategy
    - Cycling Strategy
    - Public Transport Strategy
    - Private Car Strategy
    - Marketing & Promotion Strategy.

- Infrastructure (Through Road) – The delivery of a through route between the eastern access point at Burgage Crescent and the western access location on Athgoe Road will provide an alternative routing option between origins / destinations to the east / west negating the need to travel via Newcastle Town Centre. This will help improve the operational performance of junctions along Main Street and create a more pedestrian / cyclist friendly environment in the Town Centre.

- Infrastructure (Permeability) – The subject development will be highly accessible to both pedestrians and cyclists via a range of convenient connection points and internal linkages. New dedicated pedestrian / bicycle facilities have been provided as part of the aforementioned new road infrastructure through the site. Pedestrians and cyclists will also be well provided for through the provision of dedicated (i.e., non-vehicular) connections onto Newcastle Main Street. Furthermore, the design of the proposed development has sought to provide for the opportunity for pedestrian / cycle connection to be provided in the future to adjoining third party lands. The provision of these internal linkages safeguards the ability for the local authority to deliver in the future a viable, convenient and permeable network of cycle / pedestrian links thereby increasing the attractiveness of these modes of travel for all local trips. Furthermore, the proposals also provide for the provision of a total of 370 no. bicycle parking spaces on-site comprising 112 no. short stay spaces and 258 no. long stay spaces. This level of cycle parking provision is 321 no. spaces higher than the current development plan requirement and 140 no. spaces higher than the draft development plan requirement.

- Service (Car Sharing) – 5 no. Car Share spaces are proposed within the development site boundary including 2no. located in close proximity to the houses, 1 no. located at the apartment blocks, 1 no. located at the duplex units and 1 no. located at the creche. GoCar members can book cars online or via the app for as little as an hour, then unlock with their phone or GoCar; the keys are in the car, with fuel, insurance and city parking all included. The benefits of such car sharing services include, (i) the reduction of the number of cars on the road and therefore traffic congestion, noise and air pollution; (ii) frees up land traditionally used for

private parking spaces but which may not be used, (iii) increases use of public transport, walking and cycling as the need for car ownership is reduced and (iv) Car sharing allows those who cannot afford a car the opportunity to drive, encouraging social inclusivity.

17.11.2 Monitoring

The mobility management plan of the development will be monitored and updated every two years over a period of 10 years from the initial occupancy of the units. This will allow the progress made towards achieving mode split targets to be tracked and updated as necessary. These modal split targets include the reduction in vehicular trips by 15% with reassignment onto more sustainable modes of travel as outlined earlier in this Chapter, . The information obtained from the monitoring surveys will be used to identify ways in which the MMP initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics. A specific aim of the MMP is to reduce the number of trips by private car. Accordingly, an objective of the MMP is to reduce travel by private car by 15% compared to the Opening Year mode share. The 15% reduction in car travel amongst residents shall reassign to more sustainable modes of travel including walking, cycling and public transport through the successful implementation of the mobility management plan measures.

17.12 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. The concept of the 'waste hierarchy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

17.12.1 Construction Phase Waste Management Plan

The following mitigation measures will be implemented during the construction phase of the Proposed Development:

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of the Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects (EPA, 2021), and is included as Appendix E 11.1 Volume III of this EIAR. The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this RWMP 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, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix E 11.1 Volume III of this EIAR) in agreement with SDCC and in compliance with any planning conditions, or submit an addendum to the RWMP to SDCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed construction phase.

A quantity of topsoil and sub soil will need to be excavated to facilitate the Proposed Development. The Project Engineers have estimated that 45,000m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. 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 (alternatively the waste will be sorted for recycling, recovery or disposal);
- 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 Resource 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 suitably 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). 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 Proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and 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 promote more sustainable consumption of resources.

17.12.2 Operational Phase Waste Management Plan

As previously stated, a project specific OWMP has been prepared and is included as Appendix E 11.2 Volume III of this EIAR. The mitigation measures outlined in the OWMP will be implemented in full and form part of mitigation strategy for the site. 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, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland and the SDCC waste bye-laws.

- The residents / crèche staff / facilities management company will be responsible for ensuring
    - allocating personnel and resources, as needed;
    - the ongoing implementation of this OWMP; and
    - ensuring a high level of recycling, reuse and recovery at the site of the Proposed Development.

The following mitigation measures will be implemented:

- The residents / crèche staff / facilities management company will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Cardboard (for bailing);
    - Plastic (for bailing);
    - Glass;
    - Waste Oil;
    - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
    - Batteries (non-hazardous and hazardous);
    - Light bulbs; and
    - Cleaning and Farming chemicals (pesticides, paints, adhesives, resins, detergents, etc.).

The residents / crèche staff / facilities management company for the site will ensure that 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;

The residents / crèche staff / facilities management company will ensure that all waste collected from the site of the Proposed Development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and

The residents / crèche staff / facilities management company will ensure that 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 Proposed Development during the operational phase 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 SDCC Waste Management Bye-Laws 2020. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

17.13 MONITORING

The management of waste during the construction phase will be monitored by the contactor's appointed Resource Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

The management of waste during the operational phase will be monitored by the residents / crèche staff / facilities management company to ensure effective implementation of the OWMP internally and by the nominated waste contractor(s).

17.13.1 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 excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The RWMP specifies the need for a Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. If targets are not being met, the Resource Manager will identify the reasons for this and then work to resolve any issues. Recording of waste generation during the construction phase of the Proposed Development will enable better management of waste contractor requirements and identify trends. The data will be maintained to advise on future developments.

17.13.2 Operational Phase

During the operational phase, waste generation volumes will be monitored by the facilities management company against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the waste storage areas (WSAs), where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency by reducing the required for the storage area of waste receptacles and by reducing the time spent managing waste by facilities management and the waste contractor.

Table 17.5 - Monitoring Proposals

Likely Significant Effect	Monitoring Proposals
Litter Pollution	The Contractor will review and maintain waste records and site audits
Unlicensed Waste Collection (Illegal Dumping)	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Insufficient Waste Facilities	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.

Lack of waste Classification	An appointed Resource Manager will monitor all on-site waste segregation and classification
Unlicensed Waste Collection (Illegal Dumping)	The Residents / Commercial Tenants / Facilities Manager will maintain waste receipts on-site for a period of 7 years and make available to DCC as requested.
Poor Waste Segregation	Waste generation volumes will be monitored by the Residents / Commercial Tenants / Facilities Manager
Litter Pollution	Waste storage areas will be monitored by the Residents / Commercial Tenants / Facilities Manager

17.14 MATERIAL ASSETS – UTILITIES

17.14.1 Construction Mitigation

Mitigation measures proposed in relation to the drainage and water infrastructure include the following:

Stormwater Infrastructure
A detailed "Construction Environmental Management Plan" will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the "Construction Environmental Management Plan".

Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement tanks where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.

In the event of groundwater being encountered during the construction phase, mitigation measures will include dewatering by pumping to an appropriate settlement pond/tank prior to discharge. Other measures would include excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.

Foul Infrastructure
In order to reduce the risk of defective or leaking sewers, all new sewers will be laid in accordance with Irish Water standards, pressure tested and CCTV surveyed to ascertain any possible defects.

The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established.

Potable Water Infrastructure
The construction compound's potable water supply shall be protected from contamination by any construction activities or materials by constructing it to Irish Water standards with appropriate cover.

Please also refer to Chapter 6.0 – Water for mitigation measures.

Power, Gas & Telecommunications

The relocation or diversions of the existing overhead ESB lines may lead to loss of connectivity to and / or interruption of the supply from the electrical grid to the surrounding areas. Any loss of supply will be managed by ESB Networks to minimise impact on neighbouring properties.

Any loss of supply will be managed by Eir / Virgin Media to minimise impact on neighbouring properties.

17.14.2 Operational Mitigation

Where possible backup network supply to any services will be provided should the need for relocation or diversion or existing services be required otherwise relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.

Please refer to Chapter 6.0 Water for further operational mitigations.

Please refer to Chapter 6.0 – Water and Chapter 4.0 Biodiversity for the proposed monitoring in relation to the surface water during the construction phase. There is no specific monitoring is proposed in relation to the remaining material assets infrastructure during the construction phase.

17.14.3 Monitoring

Proposed monitoring during the operational phase in relation to the water infrastructure are as follows:

- All drainage works will be approved by South Dublin County Council, Sanitary Services Division, and will be carried out in accordance with the GDRCOP (Greater Dublin Regional Code of Practice for Drainage Works).
- The surface water and foul drainage systems will be monitored by way of observation of any flooding events if such occur and the establishment of a proper maintenance programme for all sewers / Suds features etc.
- Regular cleaning of pipe networks within the development taken in charge will ensure no blockage will obstruct any flow from surface and foul networks.
- On-going water usage within the proposed development will be monitored by bulk water meters. Water usage will be monitored by the relevant authority to avoid waste and leaks etc.
- All drainage works will be approved by South Dublin County Council and will be carried out in accordance with the GDRCOP (Greater Dublin Regional Code of Practice for Drainage Works).
- All foul and surface water sewers will be CCTV surveyed prior to being 'taken in charge' by South Dublin County Council.

17.15 CULTURAL HERITAGE – ARCHAEOLOGY

17.15.1 Construction Phase

17.15.1.1 Archaeology

Whilst it is acknowledged that the preservation in-situ of archaeological remains is considered the best practise with regards to conserving the archaeological resource, the required layout of the development (and the attenuation requirements located within greenfield areas) means that the archaeological features and deposits within AA1-4 will be subject to archaeological preservation by record (prior to the commencement of construction). This will be carried out under licence to the National Monuments Service of the DoHLGH. Full provision will be made available for the resolution of the archaeological remains, both on site and during the post-excavation process.

Chapter 8, Noise and Vibration, has predicted that the vibration levels during construction are not likely to be such that any damage would occur to built heritage structures, including the tower house. The Noise and Vibration chapter has proposed mitigation through monitoring in accordance with the relevant standards to ensure that vibration levels do not exceed acceptable levels in the vicinity of built heritage structures.

All topsoil stripping will be subject to archaeological monitoring by a suitably qualified archaeologist. Should any archaeological remains be identified, consultation will be required with the National Monuments Service of the DoHLGH as to whether preservation by record or in-situ is carried out.

No mitigation is required along the existing haulage road or within the south-eastern section of the development area as these areas have already been subject to full archaeological excavation and preservation by record.

17.15.2 Operational Phase

17.15.2.1 Archaeology

A full landscape record of the tower house, which records its current condition and setting, adjacent to the proposed development, will be carried out prior to the commencement of construction and operation of the development.

17.15.3 Monitoring

The mitigation measures detailed above would also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the mitigation measures.

17.16 CULTURAL HERITAGE – ARCHITECTURAL HERITAGE

17.16.1 Construction Phase

To mitigate the potential direct effect on the tower house at BH-03 the means of excavation of the land within the site in the vicinity of the tower house should be designed so as to minimise any vibration at the tower that would be likely to cause damage to the building. Chapter 8, Noise and Vibration, has predicted that the vibration levels during construction are not likely to be such that any damage would occur to built heritage structures, notwithstanding the adoption of lower limits of vibration for the tower house and the protected structures. The Noise and Vibration chapter has proposed mitigation through monitoring in accordance with the relevant standards to ensure that vibration levels do not exceed acceptable levels in the vicinity of built heritage structures.

No mitigation is possible to reduce the indirect effect on the settings of Newcastle Farm, BH-02, or the tower house, BH-03, during construction phase.

17.16.2 Operational Phase

No mitigation is required to reduce the indirect effect on the setting of Newcastle Farm at operational phase other than good quality design of the boundary to Athgoe Road.

No mitigation is possible to reduce the indirect effects of the proposed development on the setting of the tower house at BH-03 other than the designed layout of the proposed development to keep houses back from the area immediately to the front of the tower house. This has included a restriction in height of the proposed houses nearest to the tower house to two storeys in addition to setting the houses back from the street and from the vicinity of the tower house.

17.16.3 Monitoring

17.16.3.1 Construction and Operational Phase

During the construction phase it will be necessary to monitor vibration levels at the tower house, BH-02, to ensure that no damage occurs to the tower house through vibration effects. Chapter 8, Noise and Vibration, sets down the criteria for monitoring during construction.

17.17 RISK MANAGEMENT FOR MAJOR ACCIDENTS

The Construction Environmental Management Plan and the Health and Safety Plan will limit the risk of accidents during construction. Fire safety will be dealt with under the Fire Safety Code at design and construction stage. The estate management company will have responsibility for fire safety during operations.

The proposed development will involve ground works to facilitate the proposed development. Site investigations have been carried out (refer to Appendix D1. Volume III of this EIAR) and have not identified any hazardous material with the exception of TP54 at 1.00mBGL where the results indicate that the total organic carbon is above the inert limits (3.86% vs 3%l. Note TP 54 is within the subject site to the north west of the site. All spoil disposed of off-site will be sent to a suitably licensed facility Further site investigation and WAC (Waste Acceptance Criteria) testing will be carried out prior to construction to inform the detailed design. In the event that any hazardous material is identified the appropriate measures will be taken in accordance with the requirements of the EPA. The excavation and movement of soil from the site will be undertaken by a registered specialist contractor and removed to a licensed facility. The following are outlined:

- Hazardous materials used during construction will be appropriately stored so as not to give rise to a risk of pollution.

- In the event of storms or snow, construction activity can be halted and the site secured. The construction activity will involve a number of potential risks, as set out below. The risks identified include traffic management, and fire strategy.

- During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents.

- Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used.

- With reference to natural disasters (e.g. flooding), the proposed development has undergone a Site Specific Flood Risk Assessment, prepared by DBFL Consulting Engineers. The main area of the site where development is proposed is low risk of fluvial, pluvial or groundwater flooding.

- A Health and Safety Plan will be prepared (required by the *Safety, Health and Welfare at Work (Construction) Regulations 2013*) to address health and safety issues from the design stages through to the completion of the construction and maintenance phases. The Health and Safety Plan will comply with the requirements of the Regulations and will be reviewed as the development progresses.

- Safety on site will be of paramount importance. Only contractors with the highest safety standards and training will be selected. During the selection of the relevant contractor and the respective subcontractors their safety records will be investigated.

- Prior to working on site, each individual will receive a full safety briefing and will be provided with all of the safety equipment relevant to the tasks the individual will be required to perform during employment on site.

- Safety briefings will be held regularly and prior to any onerous or special task. *'Toolbox talks'* will be held to ensure all workers are fully aware of the tasks to be undertaken and the parameters required to ensure the task will be successfully and safely completed.

- All visitors will be required to wear appropriate personal protective equipment prior to going on to the site and will undergo a safety briefing by a member of the site safety team.

- Regular site safety audits will be carried out throughout the construction programme to ensure that the rules and regulations established for the site are complied with at all times.

Table 17.6 – Strategy for tackling potential risks

1. BASIC RISK INFORMATION			**2. RISK ASSESSMENT INFORMATION**		**3. RISK RESPONSE INFORMATION**
Risk Number	Risk Description / Risk Event Statement	Responsible	Impact H / M / L	Probability H / M / L	Actions
Provide a unique identifier for risk	A risk event statement states (I) what might happen in the future and (ii) its possible impact on the project.	Name or title of team member responsible for risk	Enter H (High); M (Medium) ; or L (Low) according to impact definitions	Enter H (High), M (Medium) or L (Low) according to probability definitions	List, by date, all actions taken to respond to the risk. This does not include assessing the risk
1	Work which puts persons at risk of:-burial under earth falls. Risk of burial under earthfalls in trenches.	Project Supervisor Construction Stage (PSCS)	H	M	Contractor to address requirement for trench support. Excavations are to be carried out at safe slope. Refer to site investigation for same and temporary works engineer to design.

1. BASIC RISK INFORMATION			2. RISK ASSESSMENT INFORMATION		3. RISK RESPONSE INFORMATION
2	Scaffolding Risk of falling from scaffolding, ladders or unprotected edges/open voids during the construction phase.	PSCS	H	M	Working at height required throughout the project. Installation of scaffolding for all working at height activities to be subject to a full temporary works design submission. In order to fully Co-Ordinate any temporary works submission the Project Supervisor for the Design Process must receive the following items before reviewing any submission; A full design submission, Calculations for the design, Design Risk Assessment, Copy of designer's PI insurances, Designers CV. This submission can then be reviewed by the Permanent Works Engineer to ensure the design will not impact on the permanent structure.
3	Fire Strategy Risk of fire damage to houses or to partially complete new apartment blocks from construction activities.	PSCS/ PSDP / Fire SC.	H	M	Fire strategy must be put in place in advance of start on site which must take into consideration the requirement for hot works and the provision of Hot Works Permit systems to manage Hot works when needed. A fire marshal will be required - full co-operation from site supervisors and contractors will be required.
4	Lifting Operations Work involving the assembly or dismantling of heavy pre-fabricated components. Risk of injury during the assembly of precast columns, stairs, façade panels, etc.	PSCS/PSDP	H	M	Lifting operations using cranes will be a requirement during the project. The PSDP must identify this as a risk factor ensuring the ground conditions are tested and appropriate to point loading from mobile cranes.

1. BASIC RISK INFORMATION			2. RISK ASSESSMENT INFORMATION		3. RISK RESPONSE INFORMATION
					The PSCS must ensure there is a fully risk assessed lift plan to manage all lifting operations on site.
5	Existing Utilities Work near overhead electric cables, risk of Electrocution	PSCS/PSDP	H	M	The PSDP must highlight the existence of live overhead ESB cables on site. The sequence of work to be planned to avoid working in close proximity to the lines. The PSCS to arrange for the relocation of the lines prior to working around them. The PSCS must follow the ESB code of practice and provide a risk assessed RAMS document to manage this hazard.
6.	Construction Traffic Working adjacent to live construction and normal traffic.	PSCS/PSDP	H	M	Contractor to prepare and implement a Construction Traffic Management Plan to be agreed with the design team to ensure public safety. The contractor is to supervise vehicle movements during construction and enforce the traffic management plan.