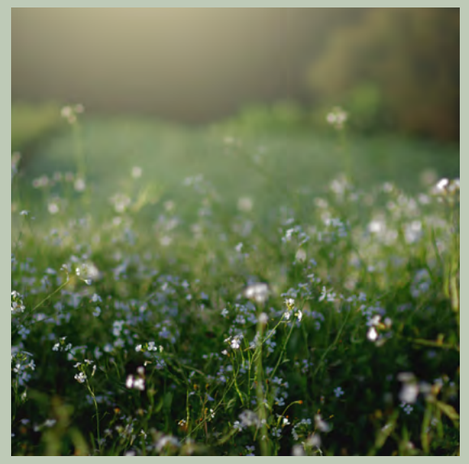
Bessborough, Cork

VOLUME II | EIAR

Environmental Impact Assessment Report



BESSBOROUGH, CORK

CHAPTER 1

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1.1 Background

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of Estuary View Enterprises 2020 Limited to assess the likely significant environmental effects of a proposed development comprising two strategic housing development [SHD] applications to An Bord Pleanála which include two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' at Bessborough, Ballinure, Blackrock, Cork. As set out in the submitted site masterplan, the applicant has intentions for a third follow-on phase of development to the west and south of Bessborough House, subject to zoning which is under consideration as part of the preparation of the Cork City Development Plan 2022-2028.

The EIAR has been completed in accordance with Directive 2011/92/EU (as amended by 2014/52/EU) and relevant Irish legislation as well as in conformity with guidance in the European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' (2017) and EPA's Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2017).

The proposed developments at 'The Meadows' (Phase 1) and 'The Farm' (Phase 2) in combination consist of the construction of 420 no. build to sell residential units with two creches, a café, tenant amenities, landscaping, pedestrian/ cycleway infrastructure and associated site development works. The proposed developments will be constructed on lands of circa 6.82 hectares (excluding duplicate areas) in area, to the west of the Mahon District Centre and Passage West Greenway, in lands which formed part of the former Bessborough Estate. The prepared masterplan provides for a further 200 no. apartments, records building and public parkland in a proposed follow-on phase of development at 'The North Fields' on circa 10.56 hectares of land. A full description of the proposed development is provided in Chapter 2 of this EIAR.

The sites' location within the wider settlement of Mahon is illustrated in Figure 1.1 as shown.

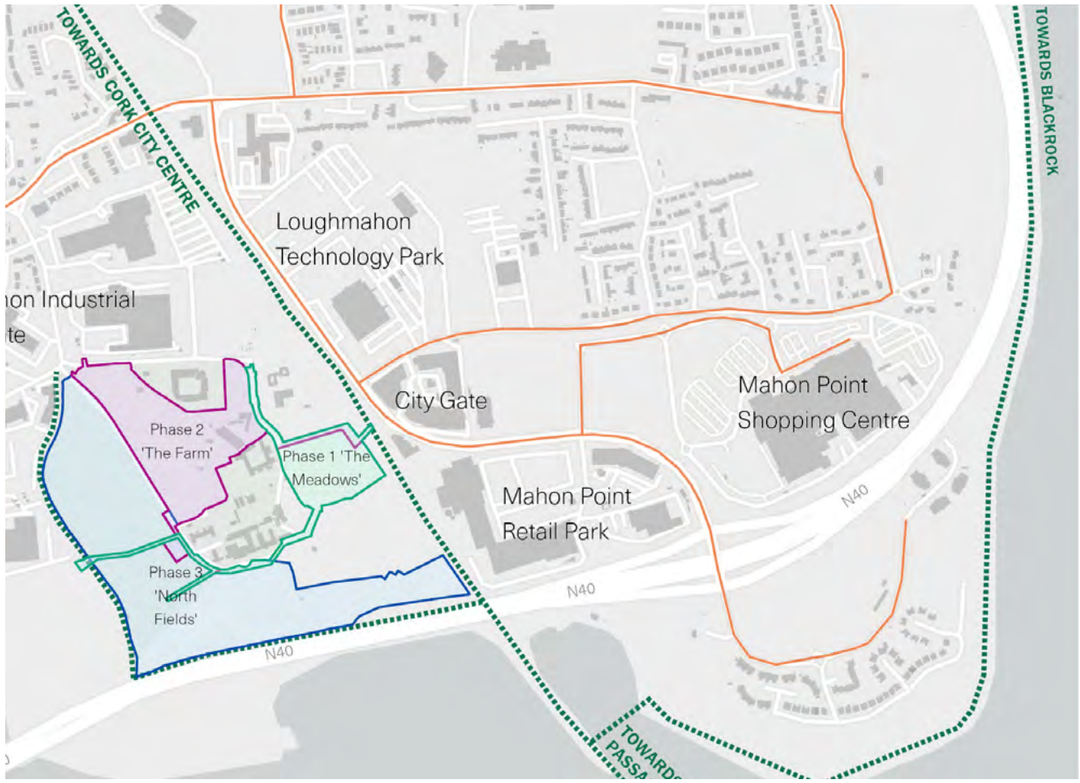


Figure 1.1 Site Location Map

1.2 Purpose of EIA

EIA requirements are now governed by Directive 2014/52/EU, which amends Directive 2011/92/EU ("the EIA Directive"). The primary function of the EIA Directive is to ensure that projects that are likely to have significant effects on the environment are subjected to an assessment of their likely impacts.

Ireland's obligations under the EIA Directive have been transposed into Irish law and, in particular, the planning consent process through the provisions of Part X of the Planning and Development Act 2000, as amended, and the Planning and Development Regulations, 2001, as amended.

Article 1(1)(g) of the 2014 EIA Directive (2014/52/EU) outlines the stages and steps taken when completing an EIA.

(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.

This is reflected in Article 171A of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which states that '*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;

This EIAR has been prepared in accordance with the relevant provisions of the EIA Directive, the Planning and Development Acts and Planning and Development Regulations. In addition, the EIAR conforms to the guidance contained in the relevant EU and Irish guidance in respect of the preparation of an EIAR.

The objective of the EIA Directive is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for EIA, prior to development consent being given, of developments that are likely to have significant effects on the environment.

In addition to the legislation and guidelines referenced above, the Department of Housing, Local Government and Heritage's 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (2018) provide practical guidance to An Bord Pleanála on procedural issues and the EIA process, and outline the key changes introduced by Directive 2014/52/EU.

The EPA guidelines 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 developments at Bessborough, Ballinure, Blackrock, Cork.

1.3 EIA Methodology

As per Article 5(1) of the 2014 Directive, an EIAR should provide the following information:

- Description of Project;
- Description of Baseline Scenario;
- Description of Likely Significant Effects;
- Description of Avoidance / Mitigation Measures;
- Description of Reasonable Alternatives (and rationale for chosen option); and
- A Non-Technical Summary.
- Annex IV of the Directive sets out a more detailed outline of the information required in an EIAR. The subject EIAR has been prepared in full accordance with these stated requirements of Annex IV.

In addition to the 2014 Directive, this EIAR has been informed by, but not limited to:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (Department of Housing, Local Government and Heritage, August 2018).
- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, August 2017);
- Environmental Impact Assessment of Projects: Guidance on Screening (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Advice Notes for Preparing Environmental Impact Statements, Draft, (EPA, September 2015);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union, 2013).
- 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).

We would also note that the pre-application discussions with the Planning Authority informed the content of the EIAR. The EIA process has been managed to ensure that the EIAR documentation and relevant analysis are confined to topics which are explicitly described in the legislation, and where environmental impacts may arise. Evaluation and analysis have been limited to topics where the indirect, secondary or cumulative impacts are either wholly or dominantly due to the project under consideration.

The EIA process can be broadly described as set out in figure 1.2 as shown.

Figure 1.2 EIA Process (Source: Page 12 of Preparation of guidance documents for the implementation of EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU).

1.4 EIA Screening & Scoping

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.

Article 93 of, and Schedule 5 to, the Planning and Development Regulations 2001 set out the classes of development for which a planning application must be accompanied by an environmental impact assessment report (EIAR).

Part 1 and Part 2 Schedule 5 of the Planning and Development Regulations, 2001 prescribes the categories of, and thresholds for, prescribed development requiring EIA.

The subject proposals for which planning consent is currently being sought does not come under any of the prescribed classes of development contained in Part 1 of Schedule 5.

By way of example, paragraph 10(b) of Part 2 of Schedule 5, which refers to Infrastructure Projects includes, includes:

(i) Construction of more than 500 dwellings

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

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

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

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

At a combined 420 no. residential units and a site area of 6.82 hectares (excluding duplicate areas), the proposed Phase 1 'The Meadows' and Phase 2 'The Farm' do not meet or exceed the unit or area-based thresholds prescribed under 10(b) of Part 2 of Schedule 5. However, when Phase 3 'North Fields' is considered as per the prepared masterplan, both of these thresholds are exceeded at a combined 620 no. residential units and site area of circa 16.61 hectares, respectively. Accordingly, the proposed development in its entirety exceeds the thresholds set out in paragraph 10(b)(i) and (iv) of Part 2 of Schedule 5 requiring EIA.

On this basis, the developer decided to prepare an EIAR in respect of the cumulative proposed development on these Masterplan lands, so as to enable the Competent Authority to carry out an Environmental Impact Assessment in respect of the proposed development.

Indeed, in circumstances where the application for permission relates to proposed strategic housing development, the provisions of Part 23 of the Planning and Development Regulations 2001, as amended, apply to the Board's consideration of the application. In this context, it is noted that in circumstances where, as in this case, a planning application for a sub-threshold development is accompanied by an EIAR and a request for a screening determination was not made, then the application shall be dealt with as if the EIAR had been submitted in accordance with section 172(1) of the Act.

EIA Scoping is the process of determining the content and extent of the matters which should be considered in the environmental information contained in an EIAR.

The Draft Guidelines on the information to be contained in environmental impact assessment reports, (EPA, August 2017) 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. Scoping is defined in the European Commission EIAR guidance (EC, 2017) as:

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

Whilst section 7(1)(b) of the Planning and Development (Housing) and Residential Tenancies Act 2016, as amended, enables a request for a scoping opinion to be submitted to An Bord Pleanála, such a scoping opinion is not mandatory and was not sought in this instance. Rather, in this case, the content of this EIAR was informed by an informal scoping process carried out by the applicant, the design team and appointed EIAR consultants to identify the core issues likely to be most important during the Environmental Impact Assessment process.

In determining the extent and content of this EIAR, the authors have carefully considered the applicable EU and Irish legislative requirements, relevant EU and Irish guidance and pre-planning consultation meetings held with Cork City Council in accordance with Section 247 of the Planning and Development Act 2000 in May and June 2021. In addition, the following prescribed bodies were notified of the extent of the proposed development and of the fact that an EIAR was being prepared:

1. Minister for Culture, Heritage and the Gaeltacht (Development Applications Unit)
2. The Heritage Council
3. An Taisce
4. An Chomhairle Ealaíon
5. Fáilte Ireland
6. Irish Water
7. Transport Infrastructure Ireland
8. National Transport Authority
9. Cork City Childcare Committee
10. Minister for Children, Equality, Disability, Integration and Youth
11. National Parks & Wildlife Service
12. Department of Housing, Local Government, and Heritage
13. Department of Education
14. Inland Fisheries Ireland (Southwest Region)
15. Office of Public Works

The particulars sent to the above bodies are contained in Appendix 1-1 with any responses received contained in Appendix 1-2.

1.5 Purpose & Structure of the EIAR

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

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

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

The EIAR document provides information on any identified effects arising as a consequence of the proposed development. The EIAR documents the manner in which the project design incorporated mitigation measures; including impact avoidance, reduction or amelioration; to explains the manner in which significant effects will be avoided.

The key purpose of this EIAR document is to enable the competent authority to to form a reasoned conclusion, in the context of the decision-making process, on the significant effects of the project on the environment, based on the examination of the EIA Report.

Pursuant to the provisions of Article 5(1) of the EIA Directive, where an environmental impact assessment is required, the developer shall prepare and submit an EIAR which 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.

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. In addition, the developer shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under European Union or national legislation, in preparing the EIAR.

The EIAR is divided into 3 volumes:

- the non-technical summary comprising a concise, but comprehensive description of the project, its
- environment, the effects of the project on the environment, the proposed mitigation measures, and the proposed monitoring arrangements;
- The main report consisting of 16 chapters as outlined in the table of contents;
- The Appendices numbered in accordance with the chapter they relate.

Each chapter includes the following elements:

Introduction and Methodology

Description of Existing Environment/Baseline Scenario

Impact Assessment which considers the following effects as necessary.

- Indirect Effects
- Cumulative Effects.
- Do-Nothing Effects
- Worst Case Effects
- Indeterminable Effects
- Synergistic Effects

Mitigation Measures (including Monitoring) – Description of mitigation measures proposed for both construction and operational phases of the proposed development.

Residual Impacts

Identify, and assess significance of, any residual impacts.

Difficulties in Compiling Information - Any difficulties/restrictions on gathering information if applicable is stated.

References - Any external references in the report cited and listed at the end of each chapter.

All impacts or effects are described in following terms as in accordance with the *"Description of Effects"* outlined in Table 3.3 of the *2017 Draft Guidelines on Information to be Contained in Environmental Impact Assessment Reports*.

Quality: Positive, Neutral, Negative

Significance: Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Extent and Context: Size of area, population etc.

Probability: Likely, unlikely

Duration: Momentary (seconds to minutes); Brief (less than a day), Temporary <1 yr; Short-term 1-7 yrs, Medium Term 7-15yrs, Long Term 15-60 yrs, Permanent >60 yrs, Reversible (can be undone), Frequency (once, rarely, occasionally, frequently, constantly or hourly, daily, weekly, monthly, annually).

A Natura Impact Statement has also been prepared regarding the proposed development. Following a comprehensive evaluation of the potential direct, indirect and cumulative impacts on the qualifying interests of the SPA and the implementation of the proposed mitigation measures, it has been concluded by the authors of this report that the project will not have any adverse effects on the integrity of the Cork Harbour Special Protection Area (SPA), or any European site.

1.6 EIAR Team & Qualifications

HW Planning have coordinated the subject EIAR. Environmental specialist consultants were also commissioned for the various technical chapters of the EIAR document which are mandatorily required as per the EIA Directive and Planning and Development Regulations 2018.

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"*

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.

In accordance with the EIA Directive 2014/52/EU, we confirm that the EIAR has been carried out by fully qualified and competent experts in their relevant fields as outlined in this chapter. A full list of all consultants and the corresponding chapters that have been prepared is detailed below.

Planning Consultants: HW Planning

Address: 5 Joyce House, Barrack Square, Ballincollig, Co. Cork

Chapters Prepared: Chapter 1 – Introduction, Chapter 2 - Project Description, Chapter 3 - Alternatives Considered (jointly with Shipsey Barry Architecture), Chapter 14 - Population & Human Health, Chapter 15 - Interaction of Impacts and Chapter 16 - Summary of Mitigation Measures.

Personnel: Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning. Harry has 22 years' experience in the planning profession comprising Local Authority roles and private practice. Harry has acted as planning lead on a wide variety of projects which have required EIAR's including the development of the 'Shannonpark Urban Expansion Area' in Carrigaline, Co. Cork and the proposed expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork on behalf of Irish Distillers Limited.

Landscape Architects: Macro Works Ltd.

Address: Cherrywood Business Park, Loughlinstown, Dublin 18

Chapters Prepared: Chapter 4 – Landscape & Visual

Personnel: Macro Works is a consultancy firm specialising in Landscape and Visual Assessment and associated maps, graphics and verified photomontages. Relevant experience includes a vast range of infrastructural, industrial and commercial projects since 1999, including numerous mixed-used development projects. This chapter has been authored by Jamie Ball, Senior Landscape Architect at Macro Works Ltd, who qualified with a BA Hons in Landscape Architect in 1998, and is a full member of the Irish Landscape institute (ILI).

Project Engineers/Traffic Consultants: MHL & Associates Consulting Engineers

Address: Carrig Mor House, 10 High Street, Douglas Road, Cork.

Chapters Prepared: Chapter 5 - Material Assets – Traffic & Transportation

Personnel: Ken Manley BE CEng MIEI HDip Envm Eng FConsEI of MHL Consulting Engineers. Ken has been involved in the preparation of Traffic & Transportation Schemes for over 20 years and is fully competent in the use of the traffic modelling software used as part of this assessment, namely Junctions 9: PICADY, LinSig (Traffic Signal Design) and TRICS. Ken has been involved in the preparation of Civil Engineering Schemes for over 20 years and is fully competent in the use of the civil engineering software.

Project Civil Engineers: JB Barry & Partners

Address: 3 Eastgate Road, Eastgate Business Park, Little Island, Co. Cor, T45 KH74

Chapters Prepared: Chapter 6 - Material Assets – Services, Infrastructure & Utilities, Chapter 7 – Land, Soils & Geology, Chapter 8 – Water (Hydrology & Hydrogeology).

Personnel: Ray Sheehan (Chapter 6) is a Chartered Civil Engineer and a Senior Engineer with J.B. Barry and Partners with over 20 years' experience in the private sector as a consulting engineer with particular experience in design and construction of infrastructure for residential developments.

John Fallon (Chapter 7 & 8) is a Senior Environmental Engineer with J.B Barry & Partners Consulting Engineers who has over 17 years' experience in the geotechnical / environmental sector. John has an honours Degree in Geology from University College Cork (1998), a MSc in Civil / Environmental Engineering from Trinity College Dublin (2005) and is a Chartered Environmentalist (CEnv) with the Institute of Environmental Science. John's experience includes the coordination and preparation of environmental impact assessment reports for residential, water and road infrastructure schemes.

Kieran O'Dwyer (Chapter 8) is an Associate Director with J. B. Barry and Partners and has over 40 years' experience in the field of environmental and hydrogeological consultancy. He was formerly a director with K. T. Cullen and Co. Ltd (Environmental Consultants) and a Regional Director with WYG Ireland. Kieran has been responsible for the Land Soils and Hydrogeology element of numerous Environmental Impact Assessments (including TII tranche 4 motorway service areas (3 No.), NRA Tranche 4 Motorway Service Areas (5 No. oral hearings) and Ringsend Wastewater Treatment Plant Upgrade Project) and has presented specialist evidence at numerous oral hearings.

Project Ecologist: Dixon Brosnan – Environmental Consultants

Address: Steam Packet House, 12 Railway St, Maulbaun, Passage West, Co. Cork, T12 CF90

Chapters Prepared: Chapter 9 - Biodiversity

Personnel: This report was prepared by Carl Dixon MSc (Ecological Monitoring) and Dr. Sorcha Sheehy PhD (Ecology/ ornithology). Fieldwork was conducted by Cian Gill MSc (Ecological Monitoring).

Carl Dixon holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist who has over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included REPS planning for landowners and ecological assessments.

Carl has particular experience in freshwater ecology including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to badgers and bats. Other competencies include surveys for invasive species and bird surveys.

Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has particular experience in large-scale industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries.

Sorcha Sheehy PhD (ecology/ornithology) is an ecologist and ornithologist who has worked for 13 years in environmental consultancy. She has worked on Screening/NISs for a range of small and large-scale projects with expertise in assessing impacts on birds.

Sorcha's PhD research focused on bird behaviour at airports, where she studied bird avoidance behaviour and collision risk to aircraft. Her research involved field observations, post-mortem analysis and radar surveys. Sorcha has worked on bird collision risk assessments at airports throughout Ireland including Dublin airport, Cork airport, Shannon airport and Kerry airport.

During her consultancy work Sorcha carried out field-based surveys and environmental reports including NIS, AA screening and EIARs. Notable projects include the Arklow Bank Wind Park, Indaver Ireland Waste Management Facility at Ringaskiddy, Irving Oil Whitegate Refinery (IOWR), Shannon LNG and Greenlink Interconnector.

Cian Gill MSc (Ecology) is a qualified ecologist with ten years' experience working with wildlife and ecology-based NGOs and public bodies in Ireland, the UK and the US. Past projects include invasive species planning for the city of Rosemount, Minnesota, and the Under The Sea project for Essex Wildlife Trust. Cian's core competencies include habitat mapping, mammal survey (including Badgers, Otters and bats), invasive species and bird surveys. Recent projects include ecological reports for Cork-based housing and private developments.

Environmental Consultant: DKPartnership

Address: 70 Main Street, Applewood , Swords, Co. Dublin, Ireland / Reen Kenmare Co. Kerry

Chapters Prepared: Chapter 11 – Noise & Vibration, Chapter 12 – Air Quality and Chapter 13 – Climate Change.

Personnel: DKPartnership (DKP) have been formally operating as an engineering and environmental consultancy since 1982, during which time the company has grown to a medium size consulting practice. DKP combine environmental engineering with building services and Infrastructure to give a one stop service from within our own departments. DKP strive to implement good, practical and value engineering and have acquired a reputation for modern solutions to complex technological problems and keep increasing this reputation with creativity based on vast experience and the use of new technologies,

Gerard van Deventer C.Eng. BE(Mech). HDip CIOB. (Chapters 10, 11 and 12) is a mechanical engineer with a Higher Diploma form the Chartered Institute of Building. He has experience in the measurement and assessment of environmental noise and air quality including the preparation of impact assessments and EIARs (Air Quality and Climate and Noise and Vibration chapters). Furthermore, he has experience in acoustic measurement relating to environmental projects, infrastructure projects and building acoustics.

Jasmine van Deventer BSc (Hons) (Chapter 11) is an honours science graduate with air quality analysis experience.

Built Heritage/Archaeology: John Cronin & Associates

Address: Unit 3a Westpoint Trade Centre, Ballincollig, Co. Cork.

Chapters Prepared: Chapter 10 - Cultural Heritage

Personnel: John Cronin of John Cronin and Associates. Mr Cronin holds qualifications in archaeology (B.A., University College Cork (UCC), 1991), regional and urban planning (MRUP (University College Dublin (UCD) 1993) and post-graduate qualifications in urban and building conservation (MUBC (UCD), 1999). He has accumulated over 25 years' experience in the compilation of archaeological, architectural and cultural heritage impact assessments.

Project Architects: Shipsey Barry Architecture

Address: 28 Richmond Hill, Cork

Chapters Prepared: Chapter 3 – Alternatives (in conjunction with HW Planning)

Personnel: Glen Barry, Director - Director at SHiPSEYBARRY and Principal Architectural lead over the Proposed Project at Bessborough.

Glen Barry is a registered Architect and member of the Royal Institute of Architects of Ireland (RIAI) and a member of the Royal institute of British Architects (RIBA), has over 25 years industry experience in masterplanning, design and delivery over a diverse range of site typologies and Building/program uses.

1.7 Cumulative Impacts

The potential environmental effects of the proposed development have not been assessed in isolation. The potential impacts of this project has been considered in combination with other relevant permitted or proposed projects in the vicinity of the site and Plans for the area, which may result in cumulative environmental impacts.

1.7.1 Projects

Each of the projects listed in table 1.1 have been assessed for potential cumulative impacts. These projects were identified by using Cork City Council's Planning Enquiry Systems and An Bord Pleanála's website.

Application Reference	Applicant(s)	Description	Outcome/Current Status
Cork City Council Ref: 17/37565	Denis O' Brien Developments (Cork) Ltd.	Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas.	Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction.
Cork City Council Ref: 18/37820	Bessboro Warehouse Holdings Ltd	The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three storey apartment block (comprising 20 no. apartments) and a four storey apartment block (comprising 27 no. apartments) and 1 no. creche.	Granted by way of Material Contravention of City Development Plan on 28/02/2019.
Cork City Council Ref: 21/40481	The Bessborough Centre Limited	Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works.	Conditional Grant on the 13/12/2021
Cork City Council Ref: 2140503	The Bessborough Centre Limited	Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure.	Conditional Grant on the 22/12/2021
Cork City Council Ref: 2140453	First Step Homes Ireland Ltd	Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works.	Conditional Grant on 17/1/2022
An Bord Pleanala Ref: ABP-308790-20	MWB Two Limited	Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 25/05/2021 on basis of prematurity related to resolution of matters concerning a potential burial ground on the site.
Cork City Council Ref: 2039705/ ABP-309560-1	MWB Two Limited	Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 15/07/2021 as would result in Haphazard form of Development. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential. At the time of writing this EIAR, the zoning in the operative CDP supports the principle of development on the ABP-308790-20 lands. It is included here on that basis.

Table 1.1 Cumulative Impacts – Projects Considered

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021

1.7.2 Plans

The zoning and policy objectives for the site are those in the Cork City Development Plan 2015. The 2014 Mahon Local Area Plan (LAP) has recently lapsed, but it is acknowledged in the Council Opinion of the 11/12/21 that it retains relevance as background information. As a reference document it outlines the City Council's recent more detailed policies and objectives for the subject lands and wider Bessborough Estate, with the Council's overall concept being to develop a residential neighbourhood at Bessboro.

Therefore, the Plans considered were the 2015 Cork City Development Plan and the 2014 Mahon Local Area Plan.

1.7.2.1 2015 Cork City Development Plan

The Cork City Development Plan (CDP) outlines policies and objectives for realising the vision for Cork City through a series of seven interconnected goals. These goals aim to increase population and households to create a compact sustainable city; to achieve a higher quality of life, promote social inclusion and make the city an attractive and healthy place to live, work, visit and invest in; to support the revitalisation of the economy; to promote sustainable modes of transport and integration of land use and transport; to maintain and capitalise on Cork's unique form and character; to tackle climate change through reducing energy usage, reducing emissions, adapt to climate change and mitigate against flood risk; to protect and expand the green infrastructure of the city.

The selected development scenario in the Core Strategy focuses development in the City Centre and selected Key Development/Regeneration Areas and Key Centres. The CDP identifies South Mahon as one such 'Key Development Area'.

Volume Four of the Cork City Development Plan 2015 contains the Strategic Environmental Assessment (SEA) Statement and Appropriate Assessment (AA) Screening Report. Section 4 of this SEA Statement describes the different development scenarios that were assessed by Cork City Council as part of the preparation of the Development Plan and the SEA process and the reasons for choosing the plan as adopted, in the light of the reasonable alternatives dealt with in accordance with Article 9 of the *European Directive (2001/42/EC) on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive)*.

Three alternative scenarios were considered during the preparation of the Cork City Development Plan 2015. The scenarios look at options for development within each Strategic Planning Area. Scenario 3 was identified as the preferred scenario following the evaluation of the three proposed alternative scenarios for their respective impacts on the environment was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four.

The potential impact on the environment of the Cork City Development Plan was assessed for cumulative impact and were considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1.

1.7.2.2 2014 Mahon Local Area Plan

The proposed new Bessboro Neighbourhood and Park are identified as key developments in the plan. A separate Environmental Report and its Proposed Alterations Addendum contains the Strategic Environmental Assessment (SEA) for the Plan. The Environmental Report highlights that alternative scenarios were considered and the potential impacts of the proposed strategic plan on the environment assessed, in accordance with SEA Directive (2001/42/EC) and consequent national guidance / planning regulations.

The potential impact on the environment of the Mahon Local Area Plan 2014 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-2 of Volume 4 of the City Development Plan 2015.

1.8 Difficulties Encountered

No particular difficulties were encountered in compiling any of the specified information contained in the EIAR, such that that the prediction of impacts has not been possible. The relevant chapters of the EIAR, identify any specific difficulties which were encountered during preparation of this EIAR.

1.9 Availability of EIAR Documentation

This EIAR will be available in printed form at the offices of Cork City Council (City Hall, Anglesea Street, Cork, T12 T997) and An Bord Pleanála (64 Marlborough St, Rotunda, Dublin 1, D01 V902).

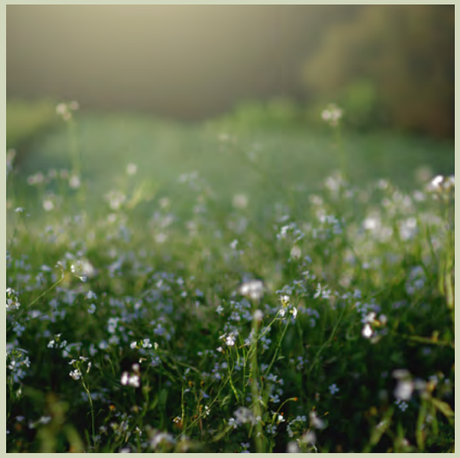
The EIAR will also be available to view electronically at the following websites: **www.thefarmshd.ie** and **www.the meadowsshd.ie**

1.10 EIAR Quality Control & Review

HW Planning oversaw the preparation of this EIAR. A key aspect of the EIAR has been to make the documentation as accessible and clear as possible to the public and other relevant stakeholders. This EIAR has been prepared in accordance with the relevant legislation regarding the preparation of EIARs including the 'Guidelines on the Information to be contained in an Environmental Impact Assessment Report, Environmental Protection Agency, 2017' and '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'.

1.11 Typographical Errors

Every effort has been made to ensure that the content and findings of this EIAR is consistent and error free. However, it is acknowledged that some minor grammatical/spelling and typographical errors may occur. These typographical minor inconsistencies are unlikely to result in any material impacts on the overall findings and conclusions of the EIAR.



BESSBOROUGH, CORK

CHAPTER 2

Project Description

VOLUME II | EIAR

BESSBOROUGH, CORK

CHAPTER 2

Project Description

CHAPTER 2

2 Project Description

2.1 Introduction

The EIA Directive requires that an EIAR should provide an overview of:

- the location, site, design, size, etc.;
- the physical characteristics of Project (including any demolition or land-use requirements);
- the characteristics of the operational phase of the Project;
- any residues, emissions, or waste expected during either the construction or the operational phase.

As the European Commission's EIAR Guidelines state, the requirement to include a description of the project in the EIA Report is not new, however, the key difference brought about by the 2014 amendments is the inclusion of relevant requisite demolition works during the construction and operational phases. In addition, an estimate of residues and emissions during the construction phase is to be included, where previously such estimates concerned only the operational phase. Article 5 requires other relevant features of the Project to be included. In addition, a description of the location of the Project is now specifically required by Annex IV. Finally, the operational phase of the Project is not limited to production processes, as it was previously.

In addition, the lists of characteristics given in Annex IV, have been expanded upon:

- any requisite demolition works must now be described, where relevant;
- energy demand and energy used should be described in context of the operational phase;
- natural resources must now be described in the context of the operational phase;
- the list of expected residue and emission estimates is no longer exhaustive, and subsoil has been added as type of pollution;
- estimates of quantities and types of waste produced must now be given.

This chapter describes the nature, location and specific characteristics of the proposed development during construction and operational phases in accordance with the 2014 Directive.

2.2 Description of the Project

The proposed development comprises two planning applications to An Bord Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm'.

Phase 1 'The Meadows'

The proposed development provides for the construction of a residential development of 280 no. residential apartment units with supporting tenant amenity facilities, cafe, crèche, and all ancillary site development works. The proposed development includes 280 no. apartments to be provided as follows: Block A (6 no. studio apartments, 14 no. 1-bedroom, 34 no. 2-bedroom & 1 no. 3-bedroom over 1-6 storeys), Block B (37 no. 1-bedroom & 49 no. 2-bedroom over 6-10 storeys), Block C (31 no. 1-bedroom, 36 no. 2-bedroom & 6 no. 3-bedroom over 5-9 storeys) and Block D (30 no. 1-bedroom, 31 no. 2-bedroom & 5 no. 3-bedroom over 6-7 storeys).

The proposal includes a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the east, connecting into the existing down ramp from Mahon providing direct access to the greenway and wider areas.

The proposed development provides for outdoor amenity areas, landscaping, under-podium and street car parking, bicycle parking, bin stores, 2 no. substations one of which is single storey free standing , a single storey carpark access building, public lighting, roof mounted solar panels, wastewater infrastructure including new inlet sewer to the Bessborough Wastewater Pumping Station to the west, surface water attenuation, water utility services and all ancillary site development works. Vehicular access to the proposed development will be provided via the existing access road off the Bessboro Road.

Phase 2 'The Farm'

The proposed development provides for the demolition of 10 no. existing agricultural buildings /sheds and log cabin residential structure and the construction of a residential development of 140 no. residential apartment units over 2 no. retained and repurposed farmyard buildings (A & B) with single storey extension and 3 no. new blocks of 3-5 storeys in height, with supporting resident amenity facilities, crèche, and all ancillary site development works. The proposed development includes 140 no. apartments to be provided as follows: Block C (9 no. 1-bedroom and 25 no. 2-bedroom over 3 storeys), Block D (34 no. 1-bedroom & 24 no. 2-bedroom over 3-4 storeys), Block E (27 no. 1-bedroom, 20 no. 2-bedroom & 1 no. 3-bedroom over 4-5 storeys). It is proposed to use retained Block A and Block B for resident amenities which include home workspace, library, lounge and function space.

The proposal includes a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the east, connecting into the existing down ramp from Mahon providing direct access to the greenway and wider areas, as well as new pedestrian access to Bessborough Estate to the north including upgrades to an existing pedestrian crossing on Bessboro Road.

The proposed development provides for outdoor amenity areas including publicly accessible parkland, landscaping, surface car parking, bicycle parking, bin stores, substation, public lighting, roof mounted solar panels, wastewater infrastructure including new inlet sewer to the Bessborough Wastewater Pumping Station to the west, surface water attenuation, water utility services and all ancillary site development works. Vehicular access to the proposed development will be provided via the existing access road off the Bessboro Road.

Other Planned Development

Phase 3 'The North Fields'

As set out in the submitted site masterplan, the applicant has intentions for a third follow-on phase of development to the west and south of Bessborough House, subject to zoning which is under consideration as part of the preparation of the Cork City Development Plan 2022-2028. The prepared masterplan provides for 200 no. apartments across 5 blocks ranging in height from 2-4 storeys as part of a landscaped parkland setting. The development will consist of 5 no. 3-bedroom apartments, 100 no. 2-bedroom apartments, 92 no. 1-bedroom apartments, and 3 no. studio apartments. The proposal includes a National Memorial and Archive Centre building and remembrance park to the south. Provision is made for a creche and shared communal facilities across the buildings comprising gym, lounges and home work areas. The development includes new pedestrian/cycle path infrastructure, including connections to the Passage West Greenway. Vehicular access to the proposed development will also be provided via the existing estate access road off the Bessborough Road, with the entrance subject to modification and upgrade works.

Phase 3 'The North Fields' will be subject to a separate planning consenting process, with the designed particulars of the proposal assessed as part of that application. Notwithstanding this, the EIAR considers the full combined development for the purposes of completing a robust assessment of the entire project and having regard to the outline level of design detail that presently exists for the North Fields.

The subject lands are situated within the Cork City boundary and both Phase 1 and Phase 2 comprise areas zoned for 'Residential, Local Services and Institutional Uses' and 'SE4 – Landscape Preservation Zone'. The governing site-specific objectives in relation to the latter allow for development on lands within the immediate environs to the north of Bessborough House, subject to it being consistent with the landscape and protected structure significance of the site.

2.3 Existing Environment/Baseline Scenario

2.3.1 Locational Context

The subject lands are located in Mahon, within the South-eastern Suburbs of Cork City, which is designated in the Cork City Development Plan 2015 as a 'Key Development Area'. The site is strategically located beside the Passage West Greenway and benefits from excellent walking and cycling links to the adjacent Mahon District Centre, and key strategic employment areas to the north, east and west.

Phase 1 – 'The Meadows' and Phase 2 – 'The Farm' lands form a combined area of 6.82 hectares (excluding duplicate areas), with the overall masterplan area equating to 16.61 hectares. The lands previously formed part of the Bessborough Farm and parkland in the Bessborough Demesne. The farm element includes a cluster of much-altered farm buildings which in recent decades was the home of 'Cork Heritage Park' which is now closed. The Phase 1 and Phase 2 lands are located to the north and east of the estate house and historic core. As Chapter 4 notes, the original demesne encompassed over 200 acres (80 hectares prior to Cork City Council obtaining c. 140 acres (57 hectares) by compulsory purchase in the 190s. Those lands have subsequently been substantially developed to accommodate multi-storey mixed-use development including Mahon Industrial Estate, Loughmahon Technology Park, City Gate, Mahon Point Retail Park amongst others.

This area was among Cork's strongest performing areas in terms of population and employment growth during the last two intercensal periods 2006-2016. It is an area earmarked for considerable growth and investment in the coming years. The Cork Metropolitan Area Transport Strategy (CMATS) makes provision for new BusConnects routes next to the subject lands, and longer term, provision of a high frequency light rail network.

Figure 2.1 Masterplan Areas

2.3.1.1 Phase 1 'The Meadows'

As detailed in Chapter 4 of this EIAR, the Phase 1 'The Meadows' lands are located between Bessborough house and the Passage West Greenway and are low-lying and marginally sloping towards the Douglas River Estuary located approx. 250m to the south. They can be broadly described as a greenfield area characterised by unmanaged, regenerating scrub mostly consisting of rough grass and briars, along with shrubs and young trees averaging 1-2m height, with a pronounced treeline of mature and semi-mature trees aligning the area's eastern boundary. Along the area's western and south-western boundaries there is a road that is currently closed off to vehicular traffic and that was constructed within the last 20 years to facilitate future development (Cork City Council Planning Register 03/27028). Chapter 4 also notes that this manmade, modified landscape is also marked by some low-level dilapidation and dumping, with evidence of anti-social behaviour along the disused road alignment. The area is considered to be *'at a considerable aesthetic, naturalistic and functional disconnect to that of the wider Bessborough grounds'*.

As detailed in EIAR Chapter 7, the predominant land-use is 'discontinuous urban fabric' (based on Corine 2018 mapping) which comprises of artificial surfaces. The dominant soil type of the site and immediate area is 'made ground' derived from man-made or artificial materials (Made). 'Made Ground' indicates the deposits associated with anthropogenic action. Generally, where made ground is present it is associated with urban developments within the vicinity of the site. The geological formation underlying the lands comprises Waulsortian Limestones. No bedrock outcrop was identified on the site.

The proposed development site does not contain any mapped watercourse, with the River Douglas estuary being the nearest watercourse located approximately 180m to the south. The lands are not identified as an area susceptible to flood risk with no historic data indicating flooding occurrences. A 'Regionally Important Aquifer' underlies the area which is Karstified bedrock dominated by diffuse flow (Rkd). An east west trending Bedrock fault is noted crossing the northern extent. According to the GSI the groundwater vulnerability classification for the proposed development site is 'High (H)' likely based on the presence of high permeability sand and gravel subsoils.

Chapter 8 notes the presence of an existing 750mm diameter surface water sewer with a connection to the 1350mm diameter surface water pipe which discharges to the Douglas Estuary south of the N40. A legal wayleave is in place across the Bessborough lands to facilitate connection to this infrastructure. Irish Water have a number of ductile Iron watermains in the vicinity of the proposed development area, with a 150mm diameter ductile iron watermain being located in the existing road alignment within the lands. The Bessborough wastewater pumping station is located at the south-west of the site, with a legal wayleave is in place across the Bessborough lands to facilitate connection.

The subject lands are not directly connected with, or necessary to the conservation management of any Natura 2000 sites. The Cork Harbour Special Protection Area (SPA) is located approximately 70m from the study area. Terrestrial habitats within the site range from low to high local value, the latter in relation to the mature trees along the western and eastern boundary, with one annex I plant species recorded (Bee Orchid). Mammal studies indicate that Hedgehog, Pygmy Shrew, Irish Stoat and Red Squirrel could potentially use this site and a small numbers of common bat species were recorded. However, no mature trees or buildings, with the potential to be used as significant bat roosting sites, were recorded within the study area. The study area is not of significant value for birds.

Chapter 10 indicates that there are five recorded archaeological sites located within 500m from the Masterplan boundary. One of these, Bessborough House, is also a listed as a Protected Structure in the Cork City Development Plan 2014-2021. The NIAH also lists a number of architectural heritage features within the study area, and two of these are also curtilage features associated with Bessborough House, namely the farm complex to the north of the house and a folly structure to the south-west. In addition, the house grounds are also listed in the NIAH Survey of Historic Gardens and Landscapes (NIAH Garden ID 3423).

As detailed in EIAR Chapter 11, the primary existing noise sources at the site are mainly general traffic noise with occasional lorry for construction site local estate road. Chapter 12 indicates that the existing ambient air quality in the vicinity of the masterplan area is typical of an urban location. Domestic heating sources and road traffic are identified as the main contributors to emissions to ambient air quality. The baseline air quality at the site can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values of individual pollutants.

The site is situated proximate to several key strategic employment areas, local services and amenities, including Mahon District Centre which includes a wide retail offer and extensive services. Chapter 14 identifies 7 no. existing creches/ childcare facilities, 2 no. primary schools and 1 no. secondary school within the Mahon neighbourhood. The Passage West Greenway runs centrally through the area, which is well served by a mix of open spaces, recreational and sporting amenities. The site is also situated adjacent to an existing bus stop serving the No. 215/215A Cloghroe – Mahon Point/ Jacobs Island to Churchyard Lane bus route providing a combined c 10 – 15 minute peak service to the City Centre, Blackpool and Blarney.

Mahon is amongst Cork's strongest performing areas in terms of population and employment growth during the last two intercensal periods 2006-2016. The Mahon Neighbourhood Study Area accounted for 3% or 6,421 persons of the extended Cork City population of 210,853 persons. The worker:job ratio of 3.294, compares very favourably with the ratios of Cork City and Suburbs at 1.169. However, only 6.8% of these jobs are held by local workers, resulting in large outward and inward commuting flows which seem to indicate a mismatch between the local jobs available in Mahon and the skills of the resident workforce.

2.3.1.2 Phase 2 'The Farm'

Chapter 4 notes that Phase 2 'The Farm' is low lying and marginally sloping westward and bounded by the historic entrance to the estate to the west and an access road to the east, constructed within the last 20 years to facilitate the future development of the lands (Cork City Council Planning Register 03/27028). While the land includes a variety of land uses, including brownfield uses to the east, it is predominated by a mature parkland landscape, dotted with small, single-storey buildings, including remnants of the original Bessborough farmyard and more recent sheds, which previously operated as a Heritage Centre. The eastern portion of the Phase 2 'The Farm' lands is fenced-off and of a modified character, showing signs of at least three centuries of settlement and cultivation.

As detailed in EIAR Chapter 7, the predominant land-use is 'discontinuous urban fabric' (based on Corine 2018 mapping) which comprises of artificial surfaces. The dominant soil type of the site and immediate area is 'made ground' derived from man-made or artificial materials (Made). 'Made Ground' indicates the deposits associated with anthropogenic action. Generally, where made ground is present it is associated with urban developments within the vicinity of the site. The geological formation underlying the lands comprises Waulsortian Limestones. No bedrock outcrop was identified on the site.

The proposed development site does not contain any mapped watercourse, with the River Douglas estuary being the nearest watercourse located approximately 220m to the south. The lands are not identified as an area susceptible to flood risk with not historic data indicating flooding occurrences. A 'Regionally Important Aquifer' underlies the area which is Karstified bedrock dominated by diffuse flow (Rkd). An east west trending Bedrock fault is noted crossing the northern extent. According to the GSI the groundwater vulnerability classification for the proposed development site is 'High (H)' likely based on the presence of high permeability sand and gravel subsoils.

Chapter 8 notes the presence of an existing 750mm diameter surface water sewer with a connection to the 1350mm diameter surface water pipe which discharges to the Douglas Estuary south of the N40. A legal wayleave is in place across the Bessborough lands to facilitate connection to this infrastructure. Irish Water have a number of ductile Iron watermains in the vicinity of the proposed development area, with a 150mm diameter ductile iron watermain being located in the existing road alignment within the lands. The Bessborough wastewater pumping station is located at the south-west of the site, with a legal wayleave is in place across the Bessborough lands to facilitate connection.

The subject lands are not directly connected with, or necessary to the conservation management of any Natura 2000 sites. The Cork Harbour Special Protection Area (SPA) is located approximately 70m from the study area. Terrestrial habitats within the site range from low to high local value, the latter in relation to the mature trees along the western and eastern boundary, with one annex I plant species recorded (Bee Orchid). Mammal studies indicate that Hedgehog, Pygmy Shrew, Irish Stoat and Red Squirrel could potentially use this site and a small numbers of common bat species were recorded. However, no mature trees or buildings, with the potential to be used as significant bat roosting sites, were recorded within the study area. The study area is not of significant value for birds.

Chapter 10 indicates that there are five recorded archaeological sites located within 500m from the Masterplan boundary. One of these, Bessborough House, is also a listed as a Protected Structure in the Cork City Development Plan 2014-2021. The NIAH also lists a number of architectural heritage features within the study area, and two of these are also curtilage features associated with Bessborough House, namely the farm complex to the north of the house and a folly structure to the south-west. In addition, the house grounds are also listed in the NIAH Survey of Historic Gardens and Landscapes (NIAH Garden ID 3423).

As detailed in EIAR Chapter 11, the primary existing noise sources at the site are mainly general traffic noise with occasional lorry for construction site local estate road. Chapter 12 indicates that the existing ambient air quality in the vicinity of the masterplan area is typical of an urban location. Domestic heating sources and road traffic are identified as the main contributors to emissions to ambient air quality. The baseline air quality at the site can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values of individual pollutants.

The site is situated proximate to several key strategic employment areas, local services and amenities, including Mahon District Centre which includes a wide retail offer and extensive services. Chapter 14 identifies 7 no. existing creches/ childcare facilities, 2 no. primary schools and 1 no. secondary school within the Mahon neighbourhood. The Passage West Greenway runs centrally through the area, which is well served by a mix of open spaces, recreational and sporting amenities. The site is also situated adjacent to an existing bus stop serving the No. 215/215A Cloghroe – Mahon Point/ Jacobs Island to Churchyard Lane bus route providing a combined c 10 – 15 minute peak service to the City Centre, Blackpool and Blarney.

Mahon is amongst Cork's strongest performing areas in terms of population and employment growth during the last two intercensal periods 2006-2016. The Mahon Neighbourhood Study Area accounted for 3% or 6,421 persons of the extended Cork City population of 210,853 persons. The worker:job ratio of 3.294, compares very favourably with the ratios of Cork City and Suburbs at 1.169. However, only 6.8% of these jobs are held by local workers, resulting in large outward and inward commuting flows which seem to indicate a mismatch between the local jobs available in Mahon and the skills of the resident workforce.

2.3.1.3 Phase 3 'The North Fields'

The Phase 3 'The North Fields' lands are located west of the main access gate to Bessborough Estate and are dominated by a large pastoral field. Three smaller fields in the central-southern area reflect the demesne landscape design of the 19th Century. The lands are bounded to the west and south by a mature thicket of woodland.

As noted above the predominant land-use is 'discontinuous urban fabric' and the dominant soil type is 'made ground' derived from man-made or artificial materials (Made). The geological formation underlying the lands comprises Waulsortian Limestones, with no bedrock outcrops identified.

The River Douglas estuary is the nearest watercourse, located to the south of the site. No susceptible to flood risk has been identified. A 'Regionally Important Aquifer' underlies the area, and an east west trending Bedrock fault is noted crossing the northern extent. The groundwater vulnerability is 'High (H)' likely based on the presence of high permeability sand and gravel subsoils.

Chapter 8 notes the presence of an existing 750mm diameter surface water sewer with a connection to the 1350mm diameter surface water pipe which discharges to the Douglas Estuary south of the N40. A legal wayleave is in place across the Bessborough lands to facilitate connection to this infrastructure. Irish Water have a number of ductile Iron watermains in the vicinity of the proposed development area, with a 150mm diameter ductile iron watermain being located in the existing road alignment within the lands. The Bessborough wastewater pumping station is located at the south-west of the site, with a legal wayleave is in place across the Bessborough lands to facilitate connection.

The subject lands are not directly connected with, or necessary to the conservation management of any Natura 2000 sites. The Cork Harbour Special Protection Area (SPA) is located approximately 70m from the study area. Terrestrial habitats within the site range from low to high local value, the latter in relation to the mature trees along the western and eastern boundary, with one annex I plant species recorded (Bee Orchid). Mammal studies indicate that Hedgehog, Pygmy Shrew, Irish Stoat and Red Squirrel could potentially use this site and a small numbers of common bat species were recorded. However, no mature trees or buildings, with the potential to be used as significant bat roosting sites, were recorded within the study area. Meadow Pipit, a Red List bird of conservation concern, was recorded within the Phase 3 development site.

Chapter 10 indicates that there are five recorded archaeological sites located within 500m from the Masterplan boundary. One of these, Bessborough House, is also a listed as a Protected Structure in the Cork City Development Plan 2014-2021. The NIAH also lists a number of architectural heritage features within the study area, and two of these are also curtilage features associated with Bessborough House, namely the farm complex to the north of the house and a folly structure to the south-west. In addition, the house grounds are also listed in the NIAH Survey of Historic Gardens and Landscapes (NIAH Garden ID 3423).

As detailed in EIAR Chapter 11, the primary existing noise sources at the site are mainly general traffic noise with occasional lorry for construction site local estate road. Chapter 12 indicates that the existing ambient air quality in the vicinity of the masterplan area is typical of an urban location. Domestic heating sources and road traffic are identified as the main contributors to emissions to ambient air quality. The baseline air quality at the site can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values of individual pollutants.

The site is situated proximate to several key strategic employment areas, local services and amenities, including Mahon District Centre which includes a wide retail offer and extensive services. Chapter 14 identifies 7 no. existing creches/ childcare facilities, 2 no. primary schools and 1 no. secondary school within the Mahon neighbourhood. The Passage West Greenway runs centrally through the area, which is well served by a mix of open spaces, recreational and sporting amenities. The site is also situated adjacent to an existing bus stop serving the No. 215/215A Cloghroe – Mahon Point/ Jacobs Island to Churchyard Lane bus route providing a combined c 10 – 15 minute peak service to the City Centre, Blackpool and Blarney.

Mahon is amongst Cork's strongest performing areas in terms of population and employment growth during the last two intercensal periods 2006-2016. The Mahon Neighbourhood Study Area accounted for 3% or 6,421 persons of the extended Cork City population of 210,853 persons. The worker:job ratio of 3.294, compares very favourably with the ratios of Cork City and Suburbs at 1.169. However, only 6.8% of these jobs are held by local workers, resulting in large outward and inward commuting flows which seem to indicate a mismatch between the local jobs available in Mahon and the skills of the resident workforce.

2.3.1.4

A summary of all significant permitted developments in the area, some of which are currently under construction is provided in Table 2.1 below. The locations of these applications are illustrated on the accompanying Figure 2.2.

Application Reference	Applicant(s)	Description	Outcome/Current Status
Cork City Council Ref: 17/37565	Denis O' Brien Developments (Cork) Ltd.	Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas.	Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction.
Cork City Council Ref: 18/37820	Bessboro Warehouse Holdings Ltd	The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three storey apartment block (comprising 20 no. apartments) and a four storey apartment block (comprising 27 no. apartments) and 1 no. creche.	Granted by way of Material Contravention of City Development Plan on 28/02/2019.
Cork City Council Ref: 21/40481	The Bessborough Centre Limited	Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works.	Conditional Grant on the 13/12/2021
Cork City Council Ref: 21/40503	The Bessborough Centre Limited	Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure.	Conditional Grant on the 22/12/2021
Cork City Council Ref: 2140453	First Step Homes Ireland Ltd	Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works.	Conditional Grant on 17/1/2022

Table 2.1 Other recently permitted residential developments in Vicinity.

In addition, Table 2.2 identifies development opportunity that remains in the nearby site where the following planning applications were refused in 2021

Application Reference	Applicant(s)	Description	Outcome/Current Status
An Bord Pleanala Ref: ABP-308790-20	MWB Two Limited	Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 25/05/2021 on basis of prematurity related to resolution of matters concerning a potential burial ground on the site.
Cork City Council Ref: 2039705/ABP-309560-1	MWB Two Limited	Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 15/07/2021 as would result in Haphazard form of Development. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential. At the time of writing this EIAR, the zoning in the operative CDP supports the principle of development on the ABP-308790-20 lands. It is included here on that basis.

Table 2.2 Other Recent planning Activity Indicating Development Potential in Vicinity.

Figure 2.2 Recent Planning Activity in Vicinity

Mahon is identified as forming part of Cork's BusConnects Network in the Cork Metropolitan Area Transport Strategy (CMATS). It is envisaged that CMATS and BusConnects will significantly improve the bus services and public transport opportunities of the area into the future, in particular with the proposed development of the Light Rail Transit (LRT) serving the area.

2.4 Construction Phase

This section provides an overview of the construction phases of the proposed development for both Phase 1 'The Meadows' and Phase 2 'The Farm' and the demolition phase in relation to the latter. In addition, 2 no. '*Construction and Environmental Management Plans'* (CEMPs) prepared by JB Barry and Partners for Phase 1 'The Meadows' and Phase 2 'The Farm' are included as Appendix 2-1 and 2-2 of this EIAR. All measures set out in this section of the EIAR and the CEMPs will be implemented during both project's construction phases.

2.4.1 Construction Programme and Phasing

Construction access to the site for Phase 1 'The Meadows' and Phase 2 'The Farm' will be provided from the access road off the Bessboro Road which serves existing buildings including the Bessboro Day Care Centre and the Cork Community Mediation Service. The proposed development of Phase 1 'The Meadows' will be constructed in a single phase which it is estimated will take 24 months to complete. The construction of Phase 2 'The Farm' will comprise a separate phase of development also with an estimated duration of 24 months. Both phases will involve the carrying out of the following works as set out in the indicative construction sequence in the CEMPs :

- Provision of a temporary construction access from the existing Bessborough Road into the site (at the location of the proposed permanent entrance), safe and secure site compound including welfare facilities for workers and the erection of temporary boundary fencing.
- Measures to reduce the potential risk of impacts to retained trees.
- Creation of a storage area for surplus plant and materials.
- Creation of a site batch concrete area.
- Creation of silt traps at the low point to the south of the construction site to prevent construction runoff towards natural vegetation and Cork Harbour estuary watercourse.
- Trenching for underground services including foul sewer, surface water drainage including attenuation, water mains, gas, telecommunications, electricity and lighting.
- Construction of a new pedestrian/cycle bridge over the existing Passage/Blackrock Greenway and linking to the existing down ramp from Mahon to the Blackrock greenway.
- Construction and connection of underground services to existing underground services. Foul sewer connection will be made across the Ballinure walkway to the west of the site to connect to the existing wastewater pumping station close to the western boundary of the site. Surface water connection will be made to an existing surface water sewer in the south-western area of the site. Watermain connections will be made to the existing watermain in Bessborough Road. (No dwelling unit will be occupied prior to the completion of an approved foul sewer outfall and no hard-standing area will be completed without an approved storm outfall).
- Excavation and concrete works for strip and pad footing foundations.
- Piling to some blocks, likely to be bored piles with in-situ concrete and rebar infilling.
- Construction of the apartment buildings, plant and storage areas, likely to be constructed in reinforced-concrete frames.
- Construction of ancillary site works including substations, outdoor amenity area, landscaping, car parking spaces, motorbike spaces, bicycle parking spaces, bin stores, public lighting and all supporting site development works.
- Erection of permanent boundary fencing, landscaping and lighting.

In addition, Phase 2 'The Farm' will also include the demolition of existing farm buildings/sheds and a log cabin residential structure.

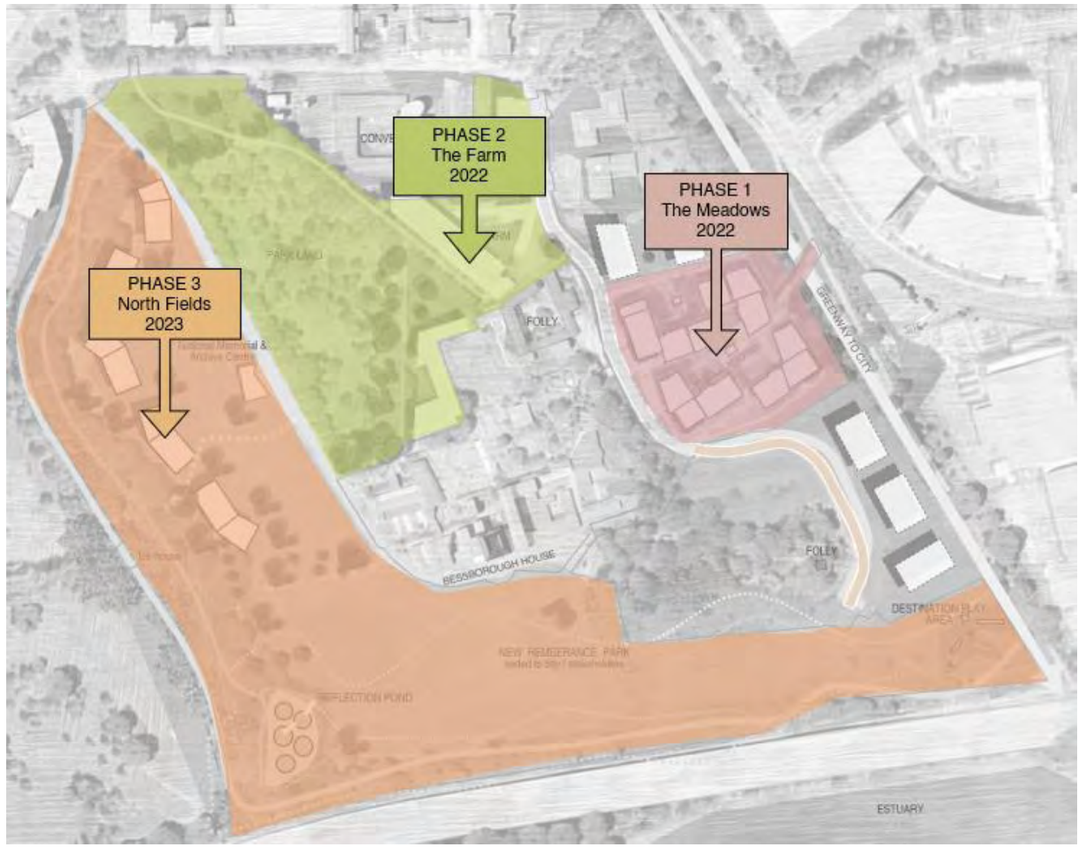


Figure 2.3 Construction Phasing Plan

The Phase 1 'The Meadows' and the Phase 2 'The Farm' developments are planned to be constructed sequentially. It is envisaged that the combined construction of both phases of the proposed development will last for approximately 48 months (4 years) in total.

In relation to Phase 1 'The Meadows' the likely location of the temporary construction compound will be to the north of the site. (refer Figure 2.4). In relation to Phase 2 'The Farm', figure 2.5 indicates the approximate location where the site compounds will be located. In both phases the site staff parking area may be located off-site and away from the site compound, in which case appropriate pedestrian access measures will be put in place.

The compound will contain:

- Site offices, canteen and toilet / changing facilities c/w temporary water supplies and wastewater treatment unit.
- Secure compound and containers for storage of materials and plant.
- Contained area for machinery refuelling and construction chemical storage.
- Contained area for washing out of concrete and mortar trucks.

An automatic wheel-washing unit shall be installed and maintained at the entrance to the site. This will be available for use at all times. Maintenance will include for cleaning out of the equipment and disposal of any material gathered within. The required equipment for supplying water and power to the wheel washing facility shall be made available and maintained in good working order. At the end of the construction phase, the wheel washing facilities shall be removed from site.

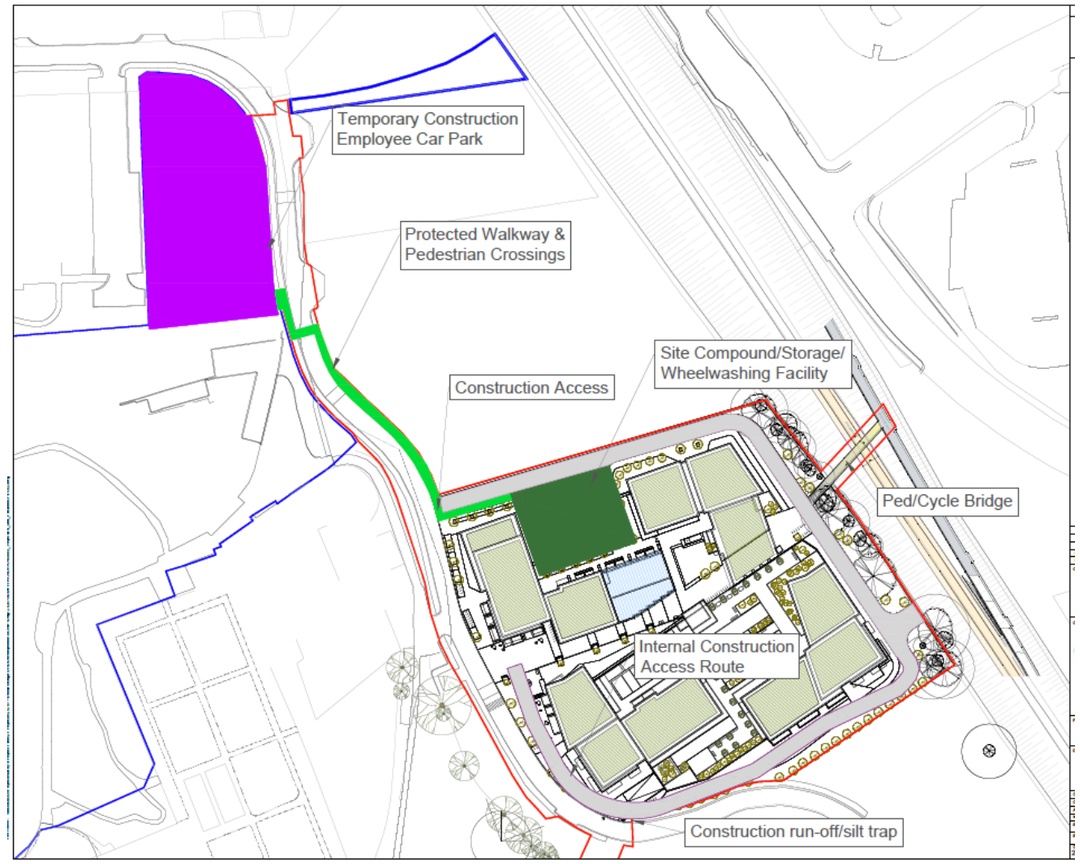


Figure 2.4 Phase 1 'The Meadows' - Compound Plan Compound Plan

Figure 2.5 Phase 2 'The Farm' - Compound Plan Compound Plan

Site security fencing and solid hoarding will be erected to delineate all site works and separate same from the surrounding public areas located adjacent to the development. Site entry will be restricted to personnel solely involved in the construction process during working hours and unauthorised access out of hours will be prevented.

Water supply for the construction facilities will be taken from the mains supply which is adjacent the site.

2.4.2 Construction Stage Methodology

2.4.2.1 Pre-commencement Activities

Before works commences, several preparatory activities will be carried out. Prior to construction, all specified archaeological and heritage assessments and surveys will be carried out. This allows for informed decisions to be made as to how best to progress with construction works and deal with any discovered archaeological finds should they arise.

2.4.2.2 Enabling Works

- The initial enabling works, as described in the CEMPs, will enable the provision of a temporary construction access from the existing Bessborough Road into the site, (at the location of the proposed permanent entrance), safe and secure site compound including welfare facilities for workers and the erection of temporary boundary fencing.
- In relation to Phase 2 'The Meadows' the demolition of 10 no. existing agricultural structures (with a total area of c. 1,083m^2) to the east of the site shall be completed with generated waste to be disposed of as described in Section 10 '*Waste Management*' of the CEMP. Surveys to date have established that there is no asbestos materials in these existing buildings and this will be confirmed at pre-demolition stage. In the unlikely event asbestos is uncovered on site (waste classification code 17 06 05), the asbestos containing materials (ACM) will be double-bagged and removed from the site by a competent contractor and disposed of in accordance with the relevant policies and legislation.
- In both Phase 1 'The Meadows' and the Phase 2 'The Farm' developments this will be followed by site clearance and earthworks in order to clear and grade the sites. These works will include the creation of level platforms, accessible from the main access road, upon which the site compound(s) and materials storage area(s) will be constructed.
- Once the site compounds are established, measures to reduce the potential risk of impacts to retained trees will be put in place in line with the Arboricultural Method Statement included as Section 2 of Appendix 3.3a and 3.3b. This will be followed by the creation of silt traps to prevent construction run-off.

2.4.2.3 Phased Based Construction

The following processes will be repeated for both Phase 1 'The Meadows' and the Phase 2 'The Farm' developments and will be carried out in accordance with the requirements of the CEMPs.

Trenching for Underground Services

To including foul sewer, surface water drainage including attenuation, water mains, gas, telecommunications, electricity and lighting.

Pedestrian Bridge Construction

It is proposed to construct the pedestrian bridge structure which will link the site to the Passage West Greenway as part of the Phase 1 'The Meadows' works. These works are also included the Phase 2 'The Farm' works to ensure their completion in the event that either phase does not proceed. This would enable a connection for construction workers to use active travel or public transport during future phases of development, reducing the requirement for dedicated parking spaces for some workers.

Construction and Connection of Underground Services

- Surface Water - The proposed surface water network will include a drainage pipe network, attenuation storage and SuDS features. The restricted discharge from the site will be conveyed in a new surface water pipe laid from the western boundary of the site in a westerly direction across the Bessborough site to connect to an existing 750mm diameter surface water sewer upstream of its connection to the 1350mm diameter surface water pipe which discharges to the Douglas Estuary south of the N40. A legal wayleave is in place across the Bessborough lands to facilitate this connection.
- Foul Drainage - Wastewater collection within the proposed development will be via a network of 150mm and 225mm diameter gravity sewers, which will direct the flows to the southwest corner of the site. A new gravity sewer will then convey the flows in a westerly direction and will connect directly to the Bessborough wastewater pumping station. A legal wayleave is in place across the Bessborough lands to facilitate this connection.

- Potable Water - A 150mm diameter ductile iron watermain is located in the existing road that forms the eastern boundary of the site. Irish Water have advised that the connection to serve the development is to be made to this existing main.

Bulk Excavation and Piling Works

During the construction phase, the estimated breakdown of materials to be generated are as follows.

Item	Excavate	Reuse	Export
Topsoil Strip	4860m3		
Topsoil Reuse		1000m3	
Topsoil for Export			3860m3
Subsoil from Excavation	7670m3		
Fill Required		1200m3	
Subsoil Excess for Export			6470m3
Total Surplus for Export off- site			10,330m3

Table 2.3 Phase 1 'The Meadows' Breakdown of Materials to be Generated

Item	Excavate	Reuse	Export
Topsoil Strip	2,950m3		
Topsoil Reuse		1,500m3	
Topsoil for Export			1,450m3
Subsoil from Excavation	7,900m3		
Fill Required		3,170m3	
Subsoil Excess for Export			4,730m3
Total Surplus for Export off- site			6,180m3

Table 2.4 Phase 2 'The Farm' Breakdown of Materials to be Generated

- The highest volume of materials generated will be topsoil and subsoil/stones from site clearance to accommodate access routes, bridge construction, footpaths, services, and foundation excavation to enable construction of the apartment blocks. Some of the material will be re-used on site for the car park podium and landscaping, however, some will be removed off-site.
- Having established the desired site levels during the early works, the next phase of construction will involve the digging of the foundations for each of the buildings. Where piling is required, it is likely to be bored piles with in-situ concrete and rebar infilling. The civil and structural design for each building will confirm the precise location and extent of foundations that are required to support each of the buildings. The foundations for each building will be excavated to the desired size and depth in preparation for the pouring of concrete.

Civil Works

- The initial civil concrete works will involve the pouring of the foundations for each of the prepared buildings in this phase. Once the foundations are poured and have cured it will allow the building envelope to be erected.
- The proposed build method for the apartment blocks is likely to be as a reinforced concrete (RC) frame. Tower cranes and concrete placing booms will be required to erect the RC frame. A combination of goods hoists and telehandlers will offload and distribute materials for the construction and finishing trades. Craneage will be required for the installation of the main structure of the pedestrian/cyclist bridge. All lifting equipment and appliances will carry current test certificates and be inspected prior to use. Trained and competent bankmen will attend the cranes. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The appropriate approvals and permits for any road closures will be applied for and agreed with Cork City Council. All relevant stakeholders will be kept informed of any such closures.
- Works on external services including water mains, foul sewers, storm sewers, roads, footpaths, electricity to include public lighting will be carried out in conjunction with the completion of the units.
- All buildings will be constructed in accordance with current Building Regulations and certified by an appropriately qualified engineer during and after construction.

Landscaping

As outlined in Section 8 of the CEMPs, in tandem with the other construction activities being carried out on the buildings, tree protection measures will be employed during construction works to minimise impacts on areas of existing vegetation/trees. The formation of hard and soft landscape features will take place in parallel to the early works, utilising material excavated during the cut and fill exercise. As the site build progresses the landscape works will begin to focus on the landscaping aspects such as establishment of landscaped areas and walkways, as well as planting of trees and shrubs in designated areas (ref. Appendix 2-5 and 2-6 Phase 1 'The Meadows' and Phase 2 'The Farm' Primary Planting Plans prepared Ilsa Rutgers Landscape Architecture).

Phase 1 'The Meadows'	
Trees removed (in wayleave)	10
Trees removed due to water services	0
Trees removed due to bridge	3 *
Trees proposed	108
Phase 2 'The Farm'	
Trees Removed	51
Trees Removed Due To Water Services	0
Trees Removed Due To Bridge	3 *
Trees proposed	116
Phase 1 TREE LOSS (10+3)	13
Phase 2 TREE LOSS (51+3)	54
Phase 1 and Phase 2 COMBINED TREE LOSS (10 + 51 + 3)	64

*3 trees to be removed in total between Phase 1 and Phase 2.

Table 2.5 Trees Removal and Planting for Phase 1 'The Meadows' and Phase 2 'The Farm'

2.4.3 Working Hours

Construction works will occur within the hours outlined below.

- 07.00am – 06.00pm* (Monday – Friday inclusive)
- 08.00am – 2.00pm* (Saturday)
- There will be no work on Sunday and Bank Holidays.

Subject to the agreement of the Local Authority, out-of-hours working may be required for water main connections, foul drainage connections, tower crane erection and removal etc. Any such arrangements will be agreed at construction stage.

2.4.4 Construction Traffic Management Plan

Based on the calculated quantities of cut and the fill requirements for Phase 1 'The Meadows' identified in Tables 2.3, it is estimated in Chapter 5 that over the 2-year construction stage this would equate to approximately 1,000 HGV trips to the site for imported structural fill material. Similarly, for Phase 2 'The Farm' this would equate to approximately 1,100 HGV trips during the construction phase. Other construction stage deliveries include concrete, concrete blocks, timber, structural steel, reinforcing steel, road construction materials, finishing materials, subsurface drainage works (including attenuation and storage systems), public lighting columns, windows and doors which will be delivered to site during both phases of the proposed development.

As noted in the accompanying CEMPs, detailed Construction Traffic Management Plans will be prepared and submitted to the Planning Authority prior to the commencement of any construction. As referenced previously, the subject lands will be accessed via the existing access road off Bessboro Road.

During the construction of the pedestrian bridge, there will be a requirement to close the greenway and ramp access to allow for the construction of the bridge supports and lift the pre-fabricated bridge into place. This closure is likely to be for a limited period only and again the details of such a closure will be agreed with Cork City Council in advance of construction work commencing on the development. Appropriate diversions will be put in place to enable users to continue their journey during the bridge construction.

2.4.5 Demolition and Waste Management

Section 10 '*Waste Management*' of the 2 no. CEMPs for Phase 1 'The Meadows' and Phase 2 'The Farm' (refer Appendix 2-1 and 2-2) details measures that will be implemented to address waste arising from construction and demolition phases of the proposed development. Demolition works relate only to Phase 2 'The Farm', where the proposed development involves the demolition of 10 no. existing agricultural structures to the east of the site as outlined previously. The demolition of these structures will generate quantities of rubble/stone, structural steel and corrugated metal roof sheeting.

A key objective of the construction strategy of the site is to minimise the amounts of material which leaves the site as waste during construction. All wastes will be managed, collected, stored, and segregated in separate areas and removed off-site where necessary, by a licensed waste management contractor at regular intervals during the works.

Section 10 of the CEMPs states that a detailed Construction Waste Management Plan will be agreed with cork City Council and put in place in order to control waste management on site, ensure segregation of waste streams and minimise construction waste costs. Waste arising from the site will be considered in relation to the waste management hierarchy of prevention, reduce, reuse, recycle, energy recovery and disposal.

2.5 Operational Phase

2.5.1 Residential Development

The proposed Phase 1 'The Meadows' and Phase 2 'The Farm' mixed-use development includes residential use, 2 no. creches, a café, shared resident facilities. The Phase 2 'The Farm' development development includes a parkland, which will serve as a valuable recreation and amenity outlet for existing and future residents of the area. In addition both phases include the provision of a pedestrian bridge across the Passage West Greenway, a variety of public open spaces, amenity walks and pedestrian/vehicular connections. An overview of the key statistics of the both phases of development is provided in table 2.6 and 2.7 below.

Key Figures of Proposed Phase 1 'The Meadows' **SHD Development**	
No. of units	280 apartment units
Site Area	2.29ha / 5.66a
Residential Developable Site Area	1.53ha / 3.78a
Density (Residential Developable site area only)	122.3 units/ha site area 183 units/ha developable area
Plot Ratio	2.27
Open Space provision	3,958 m2 (25.83%)
Creche Details	A 35 no. child capacity creche
Total Residential Car Parking spaces	102 (4 of which are creche drop-off spaces)
Total Residential Bicycle spaces (including creche)	604 no. serving apartment units
Access	Provided from existing access road off Bessboro Road

Table 2.6 – Phase 1 'The Meadows' Key Statistics of Proposed Residential Development

Figure 2.6 Phase 1 'The Meadows' Proposed Mixed-use Development

Key Figures of Proposed Phase 1 'The Meadows' **SHD Development**	
No. of units	140 apartment units
Site Area	5.13ha / 12.66a
Residential Developable Site Area	4.28ha / 10.58a
Density (Residential Developable site area only)	27.3 units/site area 32.7 units/ha developable area
Plot Ratio	0.4
Open Space provision	27,136 m2 (63.3%)
Creche Details	A 25 no. child capacity creche
Total Residential Car Parking spaces	158 (4 of which are creche drop-off spaces)
Total Residential Bicycle spaces (including creche)	330 no. serving apartment units
Access	Provided from existing access road off Bessboro Road

Table 2.7– Phase 2 'The Farm' Key Statistics of Proposed Residential Development

Figure 2.7 Phase 2 'The Farm' Proposed Mixed-use Development

(Extract from Appendix 2-2 –Construction & Environmental Management Plan – Phase 2 'The Farms'– prepared by JB Barry and Partners Limited, Consultant Engineers)

2.5.2 Access, Connectivity and Public Realm

As referenced above, both Phase 1 'The Meadows' and Phase 2 'The Farm' utilise the existing access road off the Bessboro Road provide for vehicular access to the proposed developments.

Both phases of the proposed development also provide for enhanced pedestrian access to the sites, via a proposed new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon providing direct access to the greenway and wider areas and the 215/215A bus stop. The proposed pedestrian links to the site will not only provide direct and convenient access to the Mahon District Centre, but also satisfy a long standing Council objective to address severance between Mahon and the Bessborough lands.

In addition, the Phase 2 'The Farm' development includes new pedestrian/cycle path infrastructure to the north of Bessborough Estate with a new archway access point in the estate wall with upgraded pedestrian crossing tying into the local footpath network. This will facilitate easy access to the high frequency 202/202A bus route that runs along the nearby Skehard Road.

2.5.3 Proposed Layout and Landscape Strategy

The design rationale for both Phase 1 'The Meadows' and Phase 2 'The Farm' of the proposed development has been influenced by an analysis of the sites' historical and cultural sensitivities, natural constraints, setting in the wider Mahon neighbourhood and location adjacent to the Passage West Greenway and short distance from a variety of employment, recreational, retail and service outlets.

The design rationale for the proposed development has been 'landscape-led', with the site topography and setting in its local and wider contexts forming a critical component of the development strategy of the lands. The proposed landscape, recreation and amenity strategies of the development are based upon a number of key features and landscape proposals including the following in relation to Phase 1 'The Meadows':

- The creation of a landscaped plaza and enhanced pedestrian streetscape.
- The southern communal space including a pedestrian route through a landscaped park providing connection to the pedestrian bridge.
- The eastern communal space comprising grasslands/meadow beneath existing mature trees.
- A central landscaped podium area with lawns, a water feature, seating and a play area.
- Removal of 13 no. trees to accommodate proposed infrastructure which will be offset by the planting of 108 no. new trees as part of the operational development.

In relation to Phase 2 'The Farm the following landscaping is proposed:

- The creation of a landscaped courtyard in the old farmyard area.
- New landscaping along the existing access road.
- Removal of some existing paths and reinstatement of historical path along northern boundary.

Introduction of Memorial 'Farm Girl' Bench.

- Upgrading of play facilities.
- Addition of pocket parks under existing trees.
- Publicly accessible parkland amenity.
- Focused measures to provide for reinstatement of historic landscape including removal of modern interventions, reinstatement of historic paths, re-wilding of large areas, historic geometry and distinguishing features of historic parkland.
- Dedicated parkland management strategy to proactively manage trees on the site with a view to reinstating visual character.

The proposed layout, pedestrian links, amenity areas/walks and landscaping treatments will contribute towards restoring the historic landscape character of the area. It will not only provide for the amenities of future residents of the developments, but also serve as a local 'destination' in its own right, benefiting the existing residents of the Mahon neighbourhood.

2.5.4 Engineering and Servicing

The Traffic and Transport Assessment (Appendix 5-1) prepared by MHL and Associates and the Services Infrastructure Reports prepared by JB Barry and Partners (Appendix 2-7, 2-8) detail the proposed engineering and servicing detailsrelating to the proposed development. An overview of the main servicing proposals relating to the proposed development is as follows.

- The internal estate roads have been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS). The public realm upgrades will improve pedestrian, cyclist and motorist safety in the area.
- The proposed surface water drainage system is in accordance with Sustainable Urban Drainage Systems (SUDS) principles. The proposed system for Phase 1 'The Meadows' divides the site into two (2) drainage catchments, with the proposed Phase 2 'The Farm system contained in a single catchment. All catchments are proposed for attenuation utilising Stormtech attenuation chamber systems. Each attenuation system is designed with a controlled flow rate of less than the greenfield run-off rate for the catchment area. The various SuDS components being proposed as part of the development will provide some attenuation, reduce flow rates and will disperse surface water via evapotranspiration and infiltration. However, to ensure a robust design, JB Barry and Partners have designed for the worst case and have not assumed a reduction in runoff volume from the various SuDS features and permeable surfaces in the required attenuation storage calculations. This will be revisited closer to construction stage, subject to a granted planning permission, to reduce the required attenuation storage volume if possible.
- The wastewater collection within the development will be via a network of gravity sewers. The wastewater flows will be collected and conveyed in in a westerly direction, from the western boundary of the proposed development site and will connect directly to the Bessborough Wastewater Pumping Station (WWPS) to the south-west of the site. Irish Water have advised that the proposed connection should be made directly to the WWPS, via a new inlet sewer. The WWPS is almost at design loading capacity. However, Irish Water has a project underway to replace the existing pumps which will increase the pump rate and provide sufficient capacity to accommodate this development. This upgrade project is scheduled to be completed by Q4 2022 and the proposed connection could be completed as soon as possibly practicable after this date. Irish Water has confirmed that following the upgrade, the pumping station will have sufficient capacity to adequately process the additional input from the operational demand of the proposed development. A Confirmation of Design Acceptance from Irish Water accompanies the Services Infrastructure Reports (Appendix 2-7, 2-8).
- Cork City Council watermain records show there is an existing 150mmØ watermain in the existing access roadway within both sites, an existing 300mmØ watermain in the roadway to the north of Phase 2 'The Farm', a 200mmØ watermain to the south, and an existing 1200mmØ trunk watermain running through the greenfield area in the ownership of the Applicant.
- To serve Phase 1 'The Meadows' development it is proposed that a 40mmØ watermain will be connected to the existing 150mmØ ductile iron watermain in the existing access roadway. To serve Phase 2 'The Farm', a 150mmØ watermain will be connected to the existing 300mmØ ductile iron watermain in the roadway to the north of the site.

2.5.5 Flood Risk

Site-Specific Flood Risk Assessments have been prepared by JB Barry and Partners for both Phase 1 'The Meadows' and Phase 2 'The Farm' and accompanies this EIAR in Appendix 8-1 and 8-2. These conclude that:

- The Douglas Estuary flows in an easterly direction and discharges to Lough Mahon to the south of the site. Historical flood data gathered from www.floodmaps.ie has indicated that the there is no history of flooding at the site.
- The CFRAMS Map and Cork City Council Flood Map both indicate that lies outside of Flood Zones A and B and can therefore be considered to be located within Flood Zone C.
- The type of development is defined as 'Highly Vulnerable Development'. Using the sequential approach mechanism, it is assessed that a justification test is not required for the proposed.

To prevent any increased flooding that may arise from this development, it is proposed to implement SuDS measures in order to limit the discharge from the site to the greenfield discharge rates development.

2.5.6 Energy Systems

The Energy Statements for Phase 1 'The Meadows' and Phase 2 'The Farm' prepared by DKPartnership (Appendices 2-9 and 2-10 of this EIAR) details proposed building methods and materials to promote sustainability and reduce unnecessary fuel consumption. All Buildings have been designed to meet NZEB energy standards with highly sealed and insulated building envelopes , efficient and renewable energy systems strategies which includes the use of extensive PV panels arrays to green roofs on buildings.

2.6 Impact Assessment

2.6.1 Do-Nothing Scenario

In the 'do nothing' scenario, the Phase 1 'The Meadows' lands and the Phase 2 'The Farm' lands will remain undeveloped. If the proposed development of 420 no. units does not proceed the population of Mahon and the wider city will continue to be adversely impacted due to housing shortages. It will result in the continuation of the recent trend of underperformance of the Study Area in terms of population growth. With a growth rate of 2.7% in the last intercensal period, this designated 'Strategic Growth' area experienced lower growth than the city as a whole, contrary to national and regional policies of co-locating employment, public transport and population growth.

Similarly, in the 'do nothing' scenario, the lands will remain inaccessible for public recreational use. The potential public health benefits arising from the proposed enhanced connectivity via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway or the proposed enhancement of public facilities and amenities in the form of public open space, a creche or café will not ensue. Notwithstanding the above, in this scenario there will be no additional impacts on population and human health factors.

2.6.2 Construction Phase

The construction phase will be temporary in nature and will be implemented in accordance with the requirements of the accompanying construction management plans. Without the implementation of the proposed mitigation measures, the construction stage of the development could result in potential significant indirect, cumulative and residual effects on the surrounding environment such as impacts on the local road network, potential ground/water contamination, noise, vibration, dust, air quality, pollution and waste management.

2.6.3 Operational Phase

Once constructed, the proposed development of Phase 1 'The Meadows' and the Phase 2 'The Farm' lands will result in the construction of an additional 420 no. residential units, 2 no. creches, a café and shared resident facilities. Longer term, and subject to zoning, this will increase to 620 no. residential units with the planned development of Phase 2 'The North Fields'.

The 2016 Census confirms that the average household size of the Mahon neighbourhood is c. 2.82 no. persons per household which translates that the proposed development may provide for an uplift in population of approximately 1,184 no. persons consistent with adopted planning policy objectives of concentrating population growth around high frequency public transport links in existing settlements.

The proposed residential development will result in several positive effects in the local area by providing sustainable housing units which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area. The development will support the continued operations of local public transport routes and justify future improvements and investment in local bus routes and proposed Light Rail Transit identified in CMATS.

The proposed increase in population has potential for significant effects on the demand for local services such as water, wastewater, roads, childcare/educational, and on recreation and amenity provision locally without appropriate mitigation measures. When assessed cumulatively with other developments taking place in the area (as detailed in Chapter 1 of this EIAR), the proposed development will result in the increase in housing stock and population in the areas and profound positive impacts to the local pedestrian and cyclist environment as well as enhancing access to local employment and public transport opportunities.

2.7 Mitigation, Monitoring and Residual Impacts

Chapter 15 of this EIAR, 'Summary of Mitigation Measures and Monitoring' provides a list of all proposed mitigation and monitoring procedures to be implemented during the operational and construction phases of the Phase 1 'The Meadows' and the Phase 2 'The Farm' developments.

2.7.1 Construction Phase

The CEMPs prepared by JB Barry and Partners detail the proposed mitigation and monitoring procedures which will be implemented during the construction phase of the proposed development. Section 12 outlines how the environmental performance of the contractor will be monitored through site inspections and monitoring will be carried out in accordance with the requirements of the EIAR. The following is a short summary of principal mitigation and monitoring measures proposed.

2.7.1.1 Training and Awareness

All personnel involved in the proposed Phase 1 and Phase 2 developments will receive environmental awareness training. The environmental training and awareness procedure will ensure that staff are familiar with the principles of both CEMPs, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

Where relevant, and to fulfil obligations under the CEMP, the Contractor will be responsible for engaging suitably qualified specialists including (where necessary):

- Project archaeologist
- Project ecologist
- Project arborist
- Noise and vibration specialist
- Air Quality and dust specialist
- Land, soils and contamination specialist; and
- Water specialist

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor. Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities. A register of completed training is to be kept by the SEM. The Site Manager will ensure that environmental emergency plans are drawn up and the SEM will conduct the necessary training/inductions.

2.7.1.2 Landscape Management

The CEMPs include a number of landscape mitigation measures to minimise the temporary landscape and visual impacts arising from the construction phase of the Phase 1 'The Meadows' and the Phase 2 'The Farm' developments. These measures are listed in full in Chapter 15 and summarised below:

- Tree removal will be kept to a minimum, retained trees will be protected and re-instatement of vegetation and trees will be done by a qualified landscape contractor;
- Tree protection measures shall be put in place in consultation with a qualified Arboriculturist and in line with the Arboriculture Method Statement (refer to Section 2 of Appendices 3.3a and 3.3b),

- The construction works for the new pedestrian bridge will be fenced off and protected from the public and the contractor will liaise with Cork City Council.

2.7.1.3 Construction Impact Assessment

- It is proposed to keep the moving and storage of excess material to a minimum during the construction phase.
- Excavated material will be stored on-site to be re-used for later stages of the development where possible.
- Control measures to protect surface waters from contamination will be put in place prior to the commencement of any site works.

2.7.1.4 Control of Surface Water Run-off

The control measures relating to surface water run-off during the construction phase of the development works will comply with all Statutory Legislation including the Local Government (Water Pollution) Act, 1977 and 1990 (as amended) and the contractor will cooperate in-full with Irish Water and the Environmental Department of Cork City Council. There is no immediate watercourse in the vicinity of the site. The Douglas Estuary is located south of the site on the southern side of the N40.

The main areas of water related concerns covered by this section are: pre-construction (including site clearance/tree felling), construction phase drainage controls, earthworks (i.e. infrastructure and drainage) and surface water quality protection, temporary stockpiles water management and controls; fuel usage, storage and management.

The CEMPs set out a series of detailed measures to be implemented in relation to the following areas, these are listed in detail in Chapter 15:

- Excavation, Erosion and Sediment Control,
- Accidental Spills and Leaks,
- Concrete,
- Wheel Wash Areas.

2.7.1.5 Archaeology and Heritage

With an awareness of the sensitivity of the general area in which the development is proposed, a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. The ground works will be monitored by a Forensic Archaeologist in accordance with the methodology outlined in Appendix 10.4.

The CEMPs recommend that interventions to historic boundary walls be kept to a minimum, and where required be carried out by suitably-experienced conservation contractors.

2.7.1.6 Traffic Management

In addition to the CEMPs, Construction Traffic Management Plan (CTMP)s will be prepared by the contractor to reduce the risks associated with construction traffic. The CEMPs include 25 mitigation measures (as listed in Chapter 15), some of which also tie in with mitigation measures for dust and noise. A competent traffic co-ordinator and banksmen will be appointed by the contractor to oversee the control measures which will be implemented as part of the final CTMP to reduce the risks associated with construction traffic.

The measures cover the requirement for a detailed site plan with segregated pedestrian and vehicular entrances and exits, with clear signage and lighting at crossing points. Other items covered include ensuring appropriate visibility splays and signage, maintaining access routes and walkways in good condition and free of obstructions, appropriate training and staff awareness, communication of traffic management procedures, delivery time constraints, noise and dust management procedures; construction material storage procedures, security and construction and traffic safety measures.

2.7.1.7 Noise and Vibration

The control of noise and vibration during the construction phase shall comply with the general recommendations set out in the Code of Practice BS 5228-1:2009 +A1:2014: *"Code of practice for noise and vibration control on construction and open sites"* together with specific requirements outlined in the CEMP covering the following areas:

- Appointment of a site representative in relation to noise and communication to be established between contractor and local residents, businesses and Local Authority.
- Time limitation to activities likely to generate high noise levels.
- Noise monitors to be erected.
- Ear protection zones to be established.
- Erection of barriers and siting of noisy plant as far as possible from sensitive receptors
- Selection of low noise plant and ensure all plant in good working order, with appropriate mufflers and silencers. Avoidance of unnecessary revving and idling plant.

2.7.1.8 Dust Management

Mitigation Measures to be implemented to control dust caused by construction traffic and works include measures in relation to

- The preparation of a dust minimisation plan.
- Internal trafficked areas to be watered
- delivery vehicles to be covered with tarpaulin where they have dust potential.
- A stringent 'clean as you go' policy.
- Vehicle wheel washing facilities to be in place.
- Public roads to be kept clean at all times.
- Topsoil, material management and stockpiling procedures.
- Water misting or sprays to be used during dusty activities.

Further mitigation measures are outlined in the preliminary Dust Management Plan prepared by the DK Partnership, see Appendix 12.1 of this EIAR.

2.7.1.9 Waste Management

As detailed in Section 10 of the CEMPs, the highest volume of materials generated will be topsoil and subsoil/stones from site clearance to accommodate access routes, bridge construction, footpaths, services, and foundation excavation to enable construction of the apartment blocks. Some of the material will be re-used on site for the car park podium and landscaping, however, some will be removed off-site. Beneficial reuse may be possible for some and potentially all of the inert natural material (Category A1). This material could be used as fill material in other construction projects or

engineering fill for waste licensed sites. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered. The objective is to ensure the absolute minimum amount of material leaves the site as waste. All wastes generated during construction will be managed, collected, stored, and segregated in separate areas and removed off site by a licensed waste management contractor at regular intervals.

In addition, the construction phase of Phase 2 'The Farm' development includes the demolition of 10 no agricultural structures which will generate quantities of rubble/stone, structural steel and corrugated metal roof sheeting. It is unlikely that any of this material will be re-usable on site so this material will be taken off-site to approved recycling/ recovery facilities. Surveys to date have established that there is no asbestos materials in these existing buildings and this will be confirmed at pre-demolition stage.

2.7.2 Operational Phase

Once operational, the proposed Phase 1 'The Meadows' and the Phase 2 'The Farm' developments will result in several long-term positive impacts for Bessborough, the Mahon neighbourhood area and the wider Cork City area. The proposed development will result in the provision of an additional 420 no. residential units, with potential for a further no. 200 units should the Phase 3 'The North fields' development be progressed. The proposed development will contribute to an increase in population, in an area already well served by public transport and which CMATS has earmarked for a future Light Rail Transit service. The Mahon area is a strategic employment hub within Cork City, with significantly more local jobs than workers. In addition, the Mahon area is exceptionally well provided for in terms of recreation facilities, retail offering and service provision.

The proposed 2 no. creches, make provision for a combined 60 no. childcare places, which will provide for the childcare requirements generated from the development, as well as contributing to the childcare provision in the wider area. This alongside the proposed café, the range of shared resident facilities and extensive public amenity areas will create a vibrant community with a distinctive sense of place, that is a positive addition to the Mahon neighbourhood.

It is expected that the sites' location adjacent to the 215/215A no. bus route and the public realm upgrades proposed including the pedestrian bridge connection to Mahon and the Passage West Greenway, will result in a greater uptake of walking, cycling and public transport opportunities, underpinning national, regional and local planning objectives to improve sustainable modes of transport and reducing dependency on the private vehicle. It is considered that the proposed development is of an appropriate scale, form and quality that can make a significant positive contribution to the settlement and Metropolitan Cork into the future.

The proposed landscape/recreation and amenity strategy capitalises on the sites natural resources and setting by incorporating existing natural features into the wider layout. This includes the provision of an amenity parkland, the re-introduction of historic walkways and extensive replacement planting, which mitigates the necessary loss of existing tree cover.

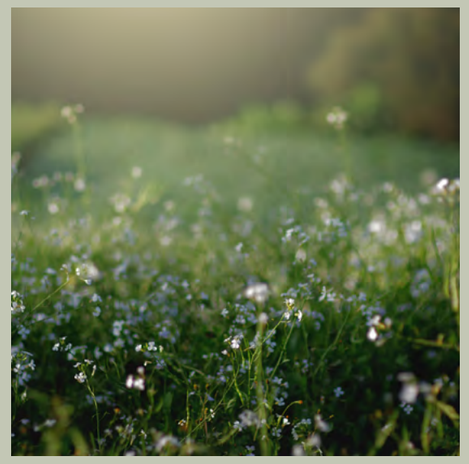
The proposed evolution of the Phase 1 'The Meadows' and the Phase 2 'The Farm' sites, from under-utilised and publicly inaccessible former institutional lands to the proposed mixed-use development will result in an increase in energy consumption and demand on local infrastructural services. The proposed layout and public realm upgrades will enhance accessibility to public transport links, promoting active and sustainable modes of travel. The proposed buildings have been designed with efficient and renewable energy systems strategies which includes the use of extensive PV panels arrays to green roofs on buildings.

2.8 References

www.cso.ie

http://planning.corkcity.ie/searchtypes

https://busconnects.ie/busconnects-cork/



BESSBOROUGH, CORK

CHAPTER 3

Alternatives Considered

BESSBOROUGH, CORK

CHAPTER 3

Alternatives Considered

CHAPTER 3

3 Alternatives Considered

3.1 Introduction

3.1.1 Chapter Context

Article 5(1) of the Directive 2011/92/EU, as amended by Directive 2014/52/EU states that:

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.

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 point 2 expands further:

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.

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."

The purpose of this chapter is to describe the reasonable alternatives considered by the developer, including alternatives considered through the design and consultation phases of the project, taking into account and comparing environmental effects and illustrating the manner in which, and reasons for, choosing the proposed development.

Regarding 'Reasonable Alternatives', the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (2018) states that:

> *The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment.*
>
> *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.**

Further the Draft 2017 Guidelines are also instructive in stating:

> *Analysis of high-level or sectoral strategic alternatives cannot reasonably 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.*

This chapter provides an outline of the main alternatives examined for Phase 1 'The Meadows' and Phase 2 'The Farm' throughout the design and consultation process to indicate the primary reasons for choosing the proposed development, considering and providing a comparison of the environmental effects.

3.2 Alternative locations

3.2.1 Phase 1 'The Meadows'

As stated above, regarding alternative locations, Section 3.4.1 of the Draft 2017 EPA Guidelines, recognise that *"in some instances some of the alternatives described below will not be applicable' – e.g. there may be no relevant 'alternative location'…".*

The subject lands are situated within the Cork City boundary and alongside the Phase 2 – The Farm' lands, are the only zoned lands in the ownership or control of Estuary View Enterprises 2020 Limited. The Cork City Development Plan 2015, has been subject to Strategic Environmental Assessment which will have taken into account of environmental considerations associated, for example, with the cumulative impact of an area zoned for development on a sensitive landscape.

We note the draft 2017 EPA Guidelines, which state:

> *Analysis of high-level or sectoral strategic alternatives cannot reasonably 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.*

3.2.2 Phase 2 'The Farm'

As stated above, regarding alternative locations, Section 3.4.1 of the Draft 2017 EPA Guidelines, recognises that "in some instances some of the alternatives described below will not be applicable' – e.g. there may be no relevant 'alternative location'…".

The subject lands are situated within the Cork City boundary and alongside the Phase 1 'The Meadows' lands are the only zoned lands in the ownership or control of Estuary View Enterprises 2020 Limited. The Cork City Development Plan 2015 has been subject to Strategic Environmental Assessment which will have taken into account environmental considerations associated, for example, with the cumulative impact of an area zoned for development on a sensitive landscape.

We note the draft 2017 EPA Guidelines, which state.

> *Analysis of high-level or sectoral strategic alternatives cannot reasonably 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.*

Refer to Appendix 3.1 for map indicating the sites in the context of the 2015 Cork City Council Zoning.

3.3 Do Nothing Alternative

3.3.1 Phase 1 'The Meadows'

In consideration of a 'do nothing' scenario on the site, the following would result:

- Serviced and zoned lands, within the rapidly growing, south-eastern suburb of the Cork City would remain undeveloped and in private ownership, in their current disused form.
- The significant security issues which currently pertain to these lands would remain. Unauthorised public access and antic-social behaviour would continue to pose risks. In a 'do-nothing' scenario these security issues would need to be addresses in the future.
- The 'do nothing' scenario would undermine the viability of proposed and planned upgrades to the adjacent greenways and public transport (and in the longer term the planned Light Rail Transit (LRT)). The critical mass required to support these infrastructure developments would be constrained by the continued under-utilisation of these accessible lands.
- The public realm and public open space provision associated with the proposed development would not be delivered, with an associated loss to the public amenity in the Mahon area.
- Enhanced connectivity to the Bessborough Estate, via the proposed pedestrian bridge would not be delivered.
- The landscape enhancement opportunities presented by the proposed development, in terms of tree management, replanting and rewilding of certain areas would not be available.

A 'do-nothing' scenario is considered to represent an inappropriate unsustainable and inefficient use of these serviced lands in this highly sustainable location.

3.3.2. Phase 2 'The Farm'

In consideration of a 'do nothing' scenario on the site, the following would result:

- Serviced and zoned lands, within the rapidly growing, south-eastern suburb of the Cork City would remain undeveloped and in private ownership, in their current disused form.
- The significant security issues which currently pertain to these lands would remain. Unauthorised public access and antic-social behaviour would continue to pose risks. In a 'do-nothing' scenario these security issues would need to be addresses in the future.
- The 'do nothing' scenario would undermine the viability of proposed and planned upgrades to the adjacent greenways and public transport (and in the longer term the planned Light Rail Transit (LRT)). The critical mass required to support these infrastructure developments would be constrained by the continued under-utilisation of these accessible lands.
- The public realm and public open space provision associated with the proposed development would not be delivered, with an associated loss to the public amenity in the Mahon area.
- Enhanced connectivity to the Bessborough Estate, via the proposed pedestrian bridge would not be delivered.
- The landscape enhancement opportunities presented by the proposed development, in terms of tree management, replanting and rewilding of certain areas would not be available.
- Heritage landscape routes, currently in disuse or lost, would not be re-activated or restored.
- The state of the currently dilapidated farm buildings, would deteriorate.

A "do-nothing" scenario is considered to represent an inappropriate unsustainable and inefficient use of these serviced lands in this highly sustainable location.

3.4 Alternative Uses

3.4.1 Phase 1 'The Meadows'

The subject lands are situated within the Cork City boundary and comprise areas zoned for 'Residential, Local Services and Institutional Uses' and 'SE4 – Landscape Preservation Zone' in the Cork City Development Plan 2015. The governing site-specific objectives in relation to the latter zoning allow for development on lands within the immediate environs to the north of Bessborough House, subject to it being consistent with the landscape and protected structure significance of the site.

In assessing the most suitable land uses at the subject site, it is considered that high-intensive employment or industrial development would not be appropriate at this sensitive location. It is also considered that an alternative consisting entirely of open space, recreation, community or education uses would not reflect the most efficient use of the lands, due to the accessibility of the site, served by an existing high frequency public transport system with proposals for further enhancement and its adjacency of several significant employments hubs in the immediate area. In this context, the proposed pre-dominantly residential development, which contributes to addressing Mahon's future residential needs, comprises the most appropriate land-use alternative of the lands, and is in accordance with the proper planning and sustainable development of the area.

3.4.2 Phase 2 'The Farm'

The subject lands are situated within the Cork City boundary and comprise areas zoned for 'Residential, Local Services and Institutional Uses' and 'SE4 – Landscape Preservation Zone' in the Cork City Development Plan 2015. The governing site-specific objectives in relation to the latter zoning allow for development on lands within the immediate environs to the north of Bessborough House, subject to it being consistent with the landscape and protected structure significance of the site.

In assessing the most suitable land uses at the subject site, it is considered that high-intensive employment or industrial development would not be appropriate at this sensitive location. It is also considered that an alternative consisting entirely of open space, recreation, community or education uses would not reflect the most efficient use of the lands, due to the accessibility of the site, served by an existing high frequency public transport system with proposals for fur-

ther enhancement and its adjacency of several significant employments hubs in the immediate area. In this context, the proposed pre-dominantly residential development, which contributes to addressing Mahon's future residential needs, comprises the most appropriate land-use alternative of the lands, and is in accordance with the proper planning and sustainable development of the area.

3.5 Alternative Layouts

This section explores the design evolution of the individual phases from early design stage to the alternatives explored in response to engagement with Cork City Council and An Bord Pleanála (refer Appendix 3.2), through to the final iteration as proposed as part of the current applications.

3.5.1 Phase 1 'The Meadows'– Alternative A

This preliminary scheme (*Fig 3.1)* was presented to Cork City Council at an initial Section 247 meeting (13th May 2021). The scheme is set out orthogonally to the main Bessborough House, reflecting its geometry, to create a large internal central amenity space surrounded by 6 no. apartment blocks. Heights range between 5 – 9 storeys over the blocks with Building E at 5 storeys, Building A and Building B comprising 6 storey, Building C and Building F comprising 8 storey and Building D extending to 9 storeys. A split-level podium is proposed with parking contained below buildings D, E & F 's amenity space. This split level offers definition to a lateral desire line through the scheme from east to west connecting the Bessboro Road to the west with the Passage West Greenway to the east via stepped access. A northern boundary access road is provided for service to be offered in charge for orderly development of the residentially zoned site to the north. The buildings architectural expression is a simple ordered brick mono-form expression to offer contrast to the large landscape central areas. Building D is stepped in plan to reduce its mass from eastern vistas. A large public plaza is intended in front of Building F with active communal uses presenting to the square. A 25 no. child creche is located at ground floor of Building A, with a drop-off set down on the western Road. Basement/under-croft parking access is proposed to south-west corner of the site. A full photomontage pack was presented at the Section 247 meeting with the Council to facilitate assessment of the visual impacts in detail.

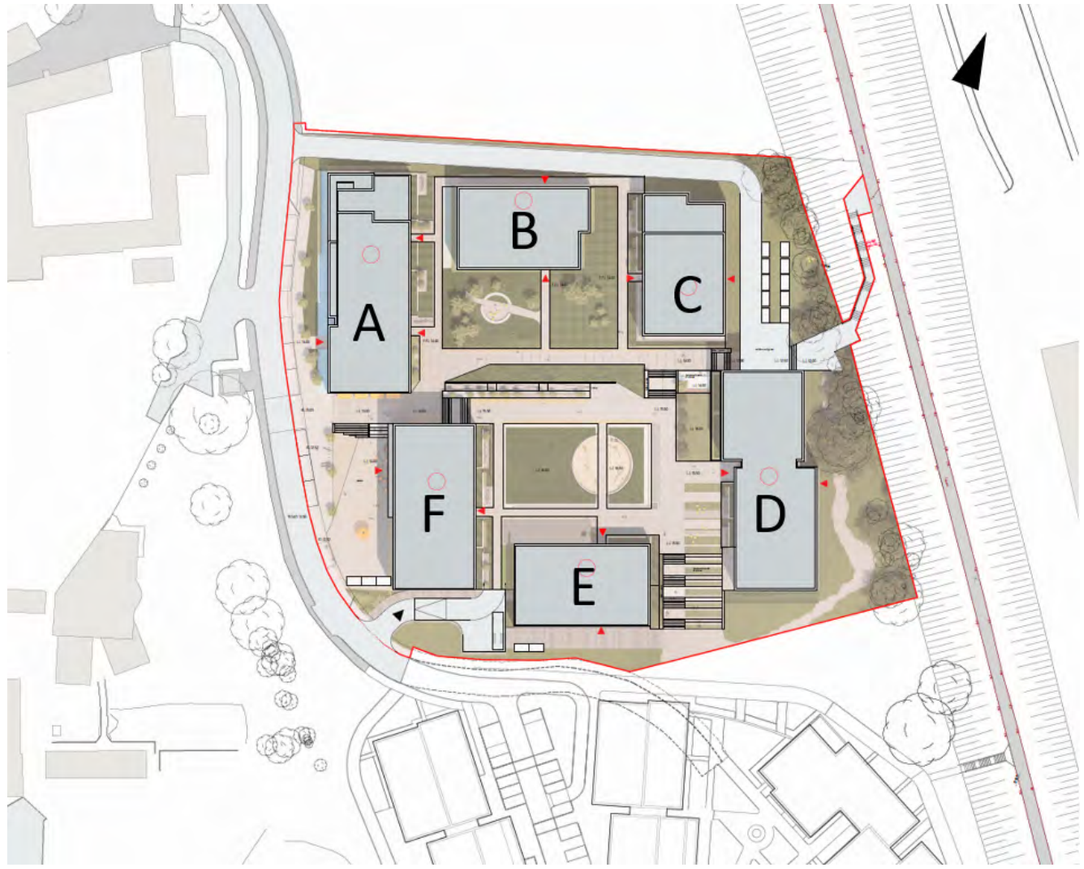


Fig 3.1 The Meadows – Alternative A – Site layout plan

Fig 3.2 The Meadows – Alternative A – preliminary model

Fig 3.3 The Meadows – Alternative A – Western Plaza

Fig 3.4 The Meadows – Alternative A – central amenity space

Key Data of Alternative A	
Total site area (red line)	15,428 sqm (1.542 hA)
Development area	15,428 sqm (1.542 hA)
Residential density	294 units total - 190/hA
Height range	5-9 storey
Housing mix	34% 1 bed ,60% 2 bed, 6% 3bed
Public open space	17% @ 2625sqm
Resident Amenity space	3696 sqm (1896 sqm min required)
Other uses	25 Child Creche
Carparking spaces	35.4% - 104 spaces
Access to development	From Bessborough Road to West and steps to East (Greenway)
Tree removals	3
Trees replanted	25+ interior landscaping

Table 3.1 The Meadows – Alternative A – development data

At the Section 247 meeting Cork City Council had significant concerns around the master-planning of the design. Principally they identified issues with placemaking, resident's amenity separation, building heights and the orientation of the buildings in relation to the Passage West Greenway to the east. The design team re-assessed certain approaches to allay these concerns. The design team subsequently liaised with the City Architect to develop upon the more macro master-planning issues and building assembly approach prior to further submission.

3.5.2 Phase 1 'The Meadows'– Alternative B

An intensive sequence of workshop meetings was held with the City Architect where a range of approaches (*Fig 3.5)* were discussed at macro master-planning level. A proposal was put forward at the second workshop to re-arrange the geometry of the now 4 no. L-shape blocks which would incorporate a number of environmental generators (the historic Bessborough House and the former railway line) to inform a unique plan formation of interest which would respond more sensitively to its setting.

A much larger scale urban gesture in the form of a new east-west streetscape was proposed with active communal-use frontages along with more articulation of the plan form and heights (*Fig 3.6)*. At this point it was agreed in principle with the Council that this approach was a better solution to the issues raised at the Section 247 meeting, with opportunities for more place-making being present in the configuration.

Fig 3.5 The Meadows – Alternative A – post S.247 City Architects – City Architect Workshop 1

Fig 3.6 The Meadows – Alternative A – post S.247 City Architects – City Architect Workshop 2

A detailed design phase was undertaken and a further Section 247 meeting was held with the City Council to present the revised approach to the Masterplan. The revised layout 'Alternative B' was submitted as part of the pre-planning consultation with An Bord Pleanala –'Tripartite Submission'' (*Fig 3.7)*.

Fig 3.7 The Meadows – Alternative B – Site layout plan

Fig 3.8 The Meadows – Alternative B – building heights

Alternative B has 4 no. L-shaped blocks arranged to reflect existing geometries apparent in heritage and landscape feature which are in close proximity to the site. The heights are stepped across each L- block to offer variation. Heights range from Building A (5-7), Building B (6-10), Building C (5-9) and Building D (5-7) (*Fig 3.8)*. All blocks have a variation in heights, with generally the corner block bookending adjoining blocks with additional height. The northern block, represents the tallest building, with a maximum of 10 storey. This is considered appropriate given its furthest location from the sensitive views and protected structure of Bessborough House to the west (*Fig 3.9)*.

A variation in material breakup to each block further de-scales the composition with higher elements in muted darker colours. The entire scheme is bisected by a large public realm piece (*Fig 3.10)* linking the west of the site to the Passage West Greenway to the east. This transept is given nodal interest points with live uses at street level. A café is introduced at the eastern side, a new pedestrian bridge is introduced to the greenway, linking with the existing ramp access off the eastern edge of the greenway. Placemaking is achieved with the spatial arrangement of the blocks and feature elements by aligning them with desire lines, in conjunction with a diverse yet considered palette of materials, and a mix of activities and amenities in strategic locations across the site. The creche drop off remains at location 'X' (Fig 3.11) with the new bridge shown at location *'Y'*.

Fig 3.9 The Meadows – Alternative B – building heights

Fig 3.10 The Meadows – Alternative B – New Street scape connecting to Greenway

While Cork City Council's report to An Bord Pleanála in response to the 'Tripartite Submission' raised some concerns around technical issues such as the creche drop off, traffic movements and buildings height to the west, these were generally adjustments to the scheme, in the form of fine tuning the overall concept. Of note is the City Architect's commentary in his report during this phase which strongly influenced the design team and steered the level of intervention to Alternative C.

> *'....In architectural terms the form of the 'L Shaped' apartments are well articulated in terms of height concentrating height at a corner location. The massing of the forms are well considered, as well as the solid to void proportions. The window fenestration treatment is very elegant. The use of brick material gives a unity to this scheme and use of various shades provide appropriate interest. In summary, this is a well-considered scheme and I have no objections. - City Architect*

Key Data of Alternative B	
Total site area (red line)	19,358 sqm (1.93 hA)
Development area	15,307 sqm (1.53 hA)
Residential density	283 units - - 184 / hA
Height range	5 – 10 storey
Housing mix	2% studio ,40% 1 beds ,53% 2 beds ,5% 3 beds
Public open space	21% 4,242 sqm
Resident Amenity space	2315 sqm (1764 sqm minimum)
Other uses	Creche, café
Carparking spaces	35% 101 spaces
Access to development	Via Western Bessborough Road
Tree removals	13 total including facilitating wayleaves & connections
Trees replanted	74 within scheme

Table 3.2 The Meadows – Alternative B – development data

3.5.3 Phase 1 'The Meadows'– Alternative C

Alternative C is a refinement of Alternative B based on the feedback from the Tripartite Meeting with An Bord Pleanála and Cork City Council. The heights broadly remain unchanged with the exception of Building A which is reduced by one floor to improve its relationship with the stables building directly to the west. Other height assessments were carried out across the scheme, with the team's analysis concluding that with the exception of Building A, the heights of the other blocks were visually acceptable. The views and visual environment are discussed in more detail in Chapter 4 of this EIAR. Vehicle circulation was reconsidered around the site resulting in the creche drop-off area moving to the north ('X' *Fig 3.11)* onto the new northern roadway. A turning facility is provided for the facility to allow collection and drop off. The creche itself is increased for a 25-child to a 35-child space facility. Parking access was also reviewed and considered with the optimum location still remaining in the southwest corner given the levels in this area. The pedestrian bridge was adjusted in design to allow for a 4.9-meter clearance with the eastern-end requiring adjusting further north to meet the correct existing ramp levels ('Y' *Fig 3.11)*. The bridge was also given a wider clearance to allow for a future Light Rail Transit (LRT) route alignment along the greenway. Landscape elements to the northern courtyard were adjusted to incorporate the larger creche play area and facilitate the turning area.

Apartment numbers were subsequently reduced to 280 units with modest revisions to internal layouts required. The redline area was increased to take in the part of the eastern road in control of the applicant in order for it to be offered in charge to Cork City Council as commented on by their department.

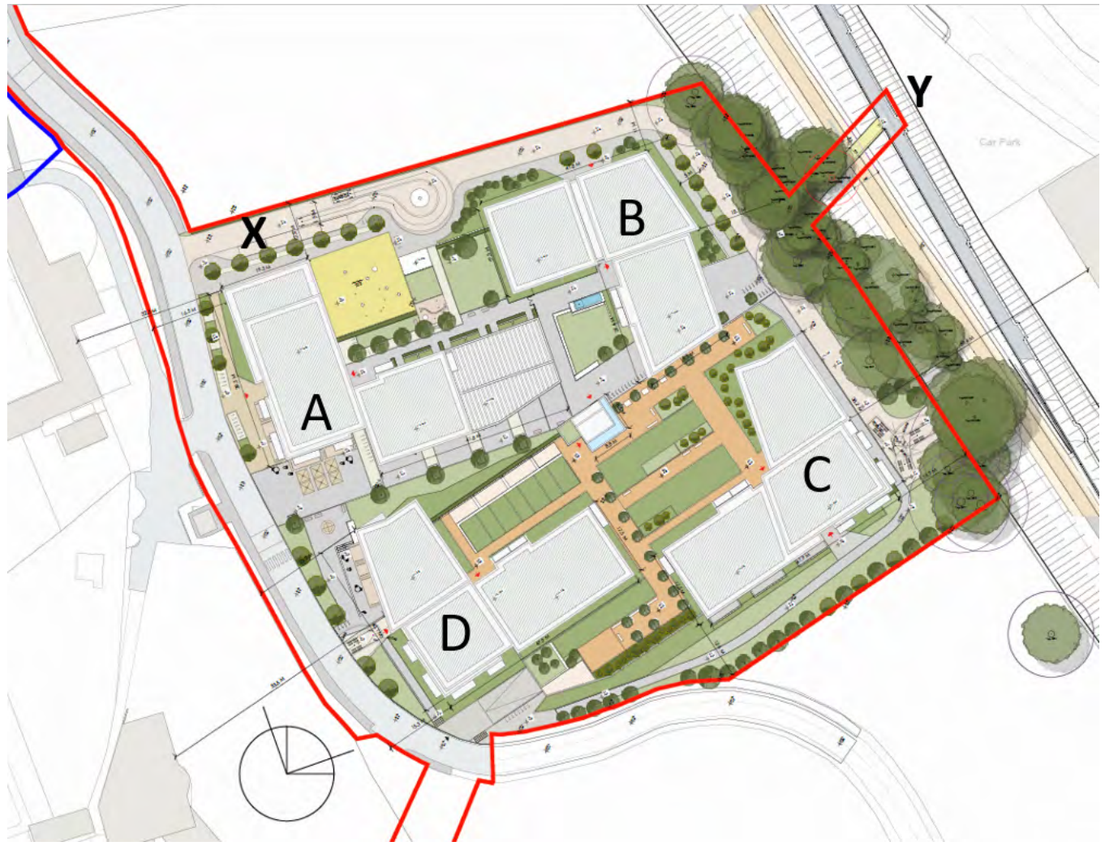


Fig 3.11 The Meadows – Alternative C – Site layout plan

Fig 3.12 The Meadows – Alternative C – scheme interior view

Key Data of Alternative C	
Total site area (red line)	22,905 sqm (2.29 hA)
Development area	15,307 sqm (1.53 hA)
Residential density	280 units - 183 / hA
Height range	1 – 10 storeys
Housing mix	2% studio ,40% 1 beds ,53% 2 beds ,5% 3 beds
Public open space	26% 3,958 sqm
Resident Amenity space	2,119 sqm (1742 sqm minimum)
Other uses	Creche, café
Carparking spaces	35% 98 spaces (Plus 4 creche dropoff)
Access to development	Via Western Bessborough Road
Tree removals	13 total including facilitating wayleaves & connections
Trees replanted	108 within scheme

Table 3.3 The Meadows – Alternative C – development data

3.5.4 Phase 2 'The Farm' – Alternative A

The Phase 2 'The Farm' application area incorporates two distinct character areas: 'The Farm' and 'The Park' *(Fig 3.13)*. 'The Farm' area has unlisted heritage elements of old agricultural buildings of varying character and condition. It forms a central enclosed space which is partially retained in all the alternatives assessed. To the west is 'the Park', a parkland area which was originally unplanted, but where a wide variety of trees have been planted since c.1980. An Arboricultural Assessment has been prepared by Arbo Care for this area (refer Appendix 3.3), in conjunction an Historic Landscape Assessment Report prepared by Forestbird Design (refer Appendix 3.4), an extract from which is included below as Figure 3.14. Both of these studies informed the design teams consideration on the level, scale and locations of potential development within the application boundary.

Arising from this analysis 'The Farm' area was identified as an appropriate location for development at an early stage and designed in consultation with John Cronin & Associates, Heritage Consultants. Buildings were weighted on the basis of their historic and fabric value for retention and conservation. The more macro-heritage landscape elements, including the sense of enclosure and the boundary created to the park area to the west were also identified. A masterplan for this specific character area was developed *(Fig 3.15)* with the farm shed to the west identified for demolition along with later single-storey out buildings to the north. The buildings to the east were earmarked to be retained and it was determined that new development immediately to the west of the farm area should reflect the original enclosure and function as a clearly defined boundary to 'The Park', area to the west. 'The Park' area was assessed in terms of sensitivity and capacity to absorb development, in line with the historic landscape assessment report. A number of early workshops were held in this respect focussing on design layout scenarios optimised to retain the significant numbers of graded trees and ensure low visual impact to the wider estate (Fig *3.16)*.

Alternative A, as depicted in Figure 3.17, represents the design development stage at the Section 247 Pre-planning Consultation Meeting with Cork City Council. 'The Farm' provides for two main residential buildings, E (2-5 storey) and F (3-4 storey) with Building E forming the main enclosure and boundary to 'The Farm' area. 'The Park' area has 4 no. pavilion blocks, Buildings A-D, organically placed to minimise tree removals, ranging in height from 4-5 storeys *(Fig 3.18)*. Buildings A-D are accessed via the historic entrance, while Buildings E and F are accessed by the main access roadway to the east. The traditional farmyard area provided the main location for communal uses in a hub location format while a 25-child crèche is provided for in Building A. Parking is at surface level with care given to focus it in locations between trees in the park area *(Fig 319)*.

Fig 3.13 The Farm application defined areas – The Farm & The Park

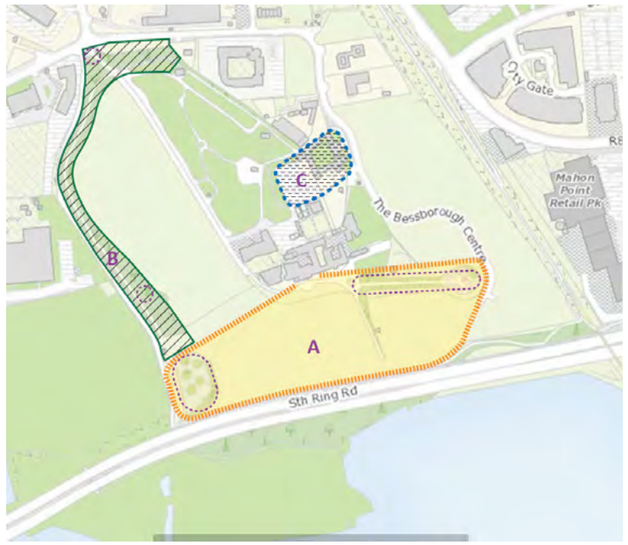


Fig 3.14 excerpt image p.11 from Forestbird Design's Historic Landscape Assessment identifying most sensitive areas for protection/ retention (Appendix 3.4.).

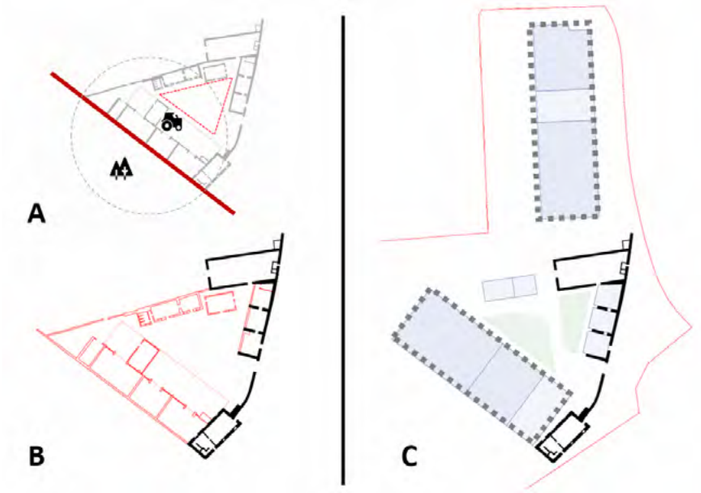


Fig 3.15 'The Farm Area' design strategy.

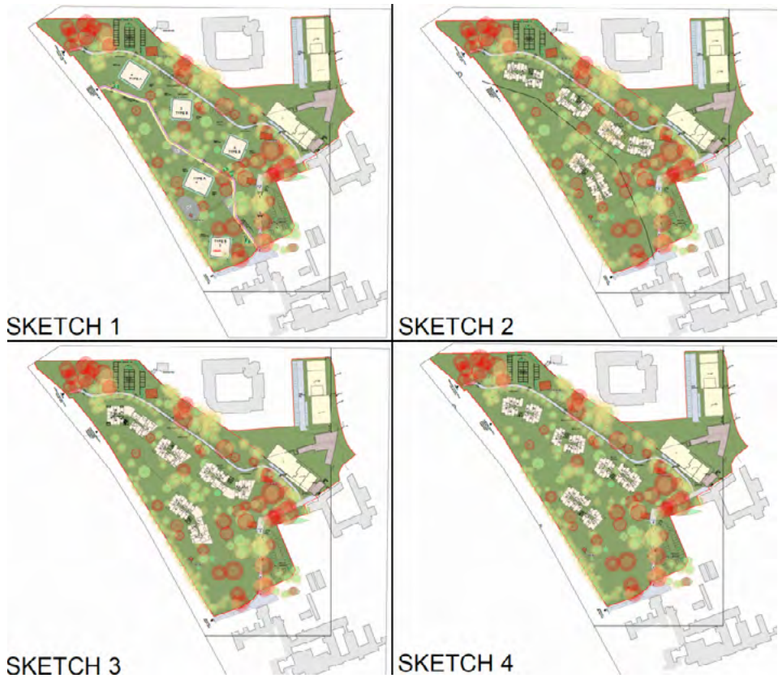


Fig 3.16 The Farm – early-stage workshop sketches of the Park area.

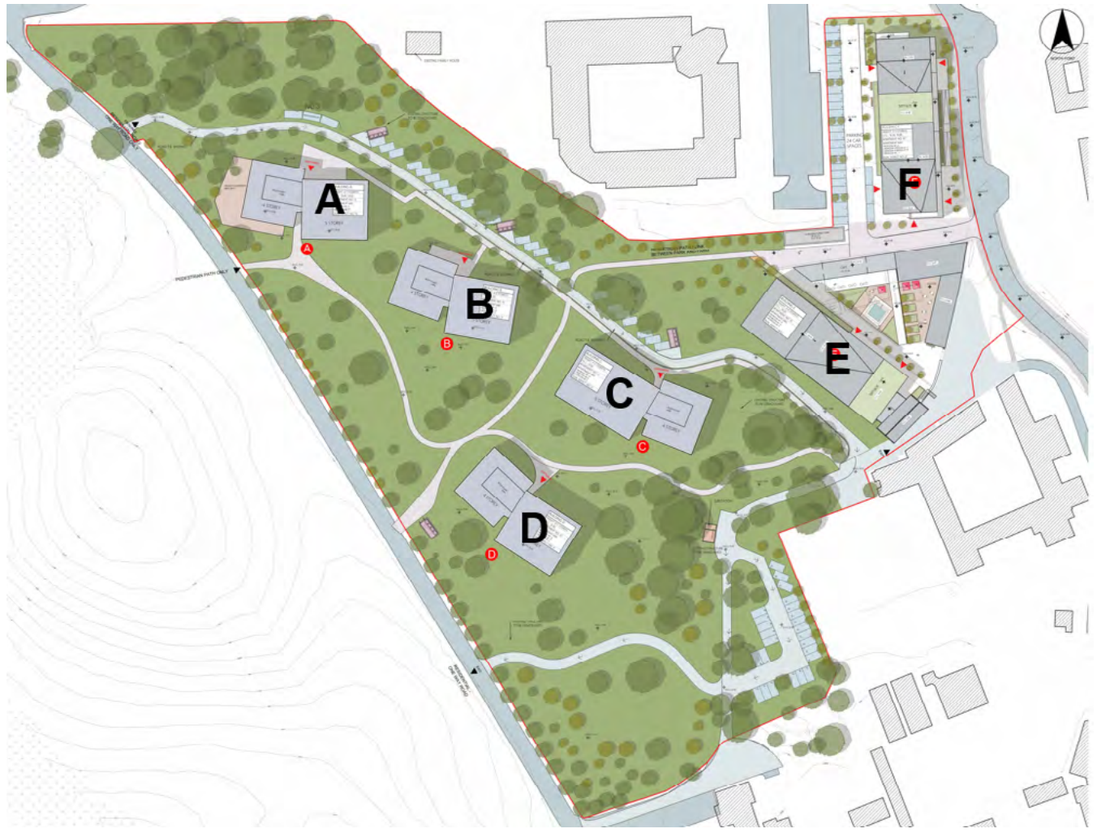


Fig 3.17 The Farm – Alternative A – Site layout plan – S247 Meeting stage

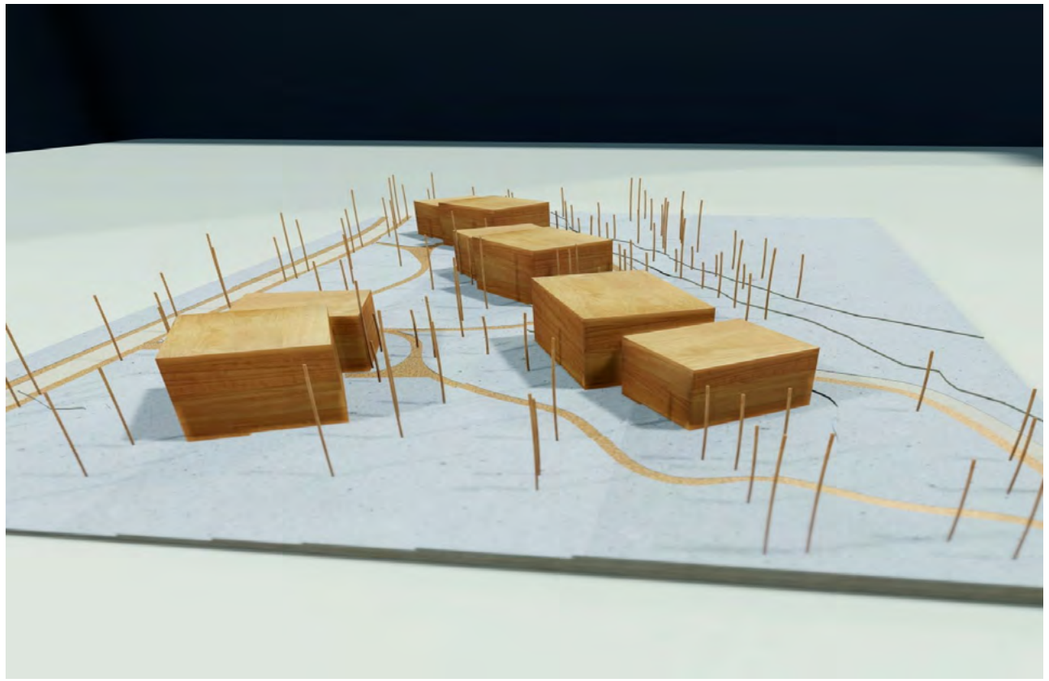


Fig 3.18 The Farm – Alternative A – park area concept model

Fig 3.19 The Farm – Alternative A – overview

Key Data of Alternative A	
Total site area (red line)	38,853 sqm (3.88 Ha)
Development area	38,853 sqm (3.88 Ha)
Residential density	233 units - 60/hA
Height range	1-5 storeys
Housing mix	44% 1 bed ,53% 2 bed ,3% 3 bed
Public open space	60%
Resident Amenity space	1269 sqm (1433 sqm min)
Other uses	creche
Carparking spaces	32% - 76 spaces
Access to development	Via Bessborough Avenue to West and main access roadway to East
Tree removals	9% 30
Trees replanted	60 +

Table 3.4 The Farm – Alternative A – development data

3.5.5 Phase 2 'The Farm' – Alternative B

At the Section 247 meeting significant concerns were raised by Cork City Council in relation to development in 'The Park' area of the proposal. 'The Farm' approach (*Fig 3.22)* was generally well received with some technical comments to be address around privacy and proportions. The design team subsequently reconsidered the development approach to 'The Park' and revised the design to reference the original historic intent of open landscape areas and incorporate the renewal of the original circulation patterns *(Fig 3.20)*.

Fig 3.20 Historic open space and historic routes in relation to alternative B

Alternative B, as depicted in Figure 3.21, is the design as submitted for the Tripartite Pre-consultation Meeting with An Bord Pleanála and Cork City Council. Building heights in 'The Farm' remain the same as Alternative A, with Building D lengthened to address issues raised by the Council in relation to proportions and give stronger definition to the separation between 'The Park' and 'The Farm'. Building D incorporates an integrated archway access through to 'The Park' area from the east. A significantly larger public park element is proposed to the west with 3 no. pavilion buildings proposed (A, B and C) just north of the main house, consistent with the specific objectives of the zoning, with redefined historic routes providing semi-private open space enclosure.

Buildings A, B and C are 3 – 4 storeys in height with a unique expression of canted roofs and angular plan format to give interest and a broken-down scale *(Fig 3.23)*. These building are given a black material finish to further mute their impact in 'The Park' landscape. Access is via the main gates and avenue for Buildings A, B and C while buildings E and D are accessed from the main access road to the east. A new pedestrian and cycle link is proved to the north-west corner of the site to allow residents access the Passage West Greenway to the east and providing linkage and a potential circular route with the existing Heritage Park Greenway along the western and southern boundary of the masterplan area which is scheduled to be upgraded in the future.

Fig 3.21 The Farm – Alternative B – Site layout plan

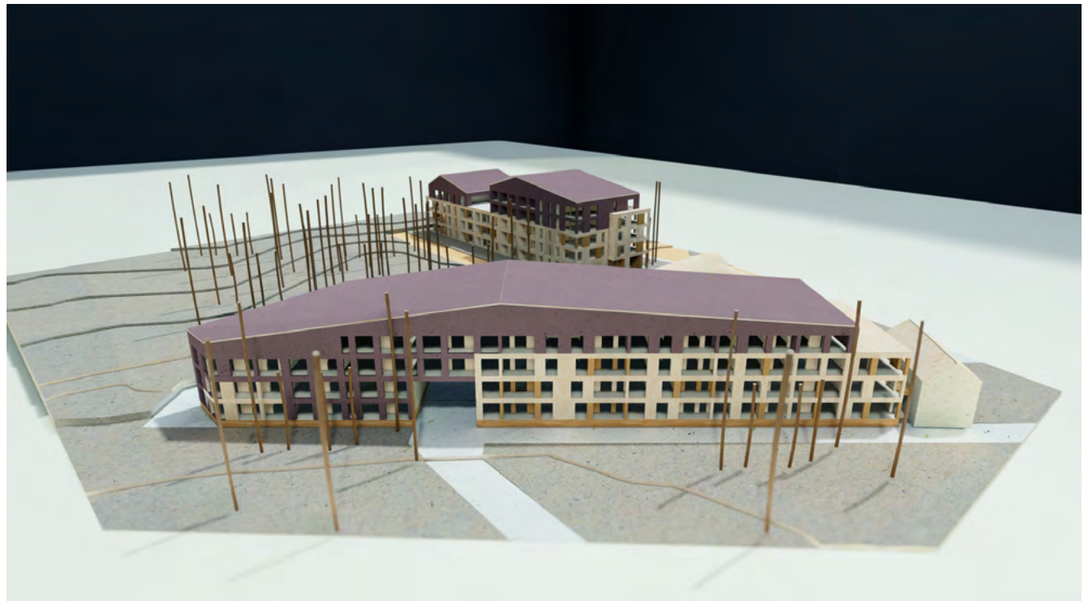


Fig 3.22 The Farm – Alternative B – Farm area concept model with building D in the foreground

Fig 3.23 The Farm – Alternative B – Park area concept image -building C in the foreground

Key Data of Alternative B	
Total site area (red line)	45,327 SQM (4.53 hA)
Development area	45,327 SQM (4.53 hA)
Residential density	184 units (40/Ha)
Height range	2-5 storey
Housing mix	2 % studio ,46% 1 bed , 50% 2bed ,2% 3bed
Public open space	46% 20,983 sqm (20.9Ha)
Resident Amenity space	5474 sqm (1096 sqm minimum)
Other uses	Creche
Carparking spaces	35% 64 spaces
Access to development	Via the main avenue and main access road to the East
Tree removals	15% - 51 specimens
Trees replanted	100+

Table 3.5 The Farm – Alternative B – development data

3.5.6 Phase 2 'The Farm' – Alternative C

Alternative C is the end result of the various alterations and the design that is being submitted with the Phase 2 'The Farm' planning application. Following the Tripartite Meeting feedback from An Bord Pleanála and Cork City Council the following responses were incorporated in terms of design alterations. The design of 'The Farm' element was generally endorsed as noted in the Cork City Architect's comments below and remains predominantly unchanged in Alternative C.

> *'...The 'crafting' of the 'new build' with the existing farm buildings to form clusters and 'places' is a very good urban design approach. The architectural form, use of materials and massing is to a very high standard'.*

The City Council retained concerns about the building locations in 'The Park' element of the Alternative B design. As outlines in Figure 3.24, they considered that Buildings B and C should be re-located to the boundary edge and that Building A should be omitted entirely, as indicated in the city Council's comment:

> *'....The original Bessborough House and Estate had farm buildings and associated plots to the north-east area of the estate and the remainder of the estate was parkland. The proposed development are apartments within a park setting, four to six storeys in height and have minimal relationship to the park. Block A should be omitted, and Blocks B and C relocated and reconfigured to form an edge to this parkland in association with the farm buildings.'*

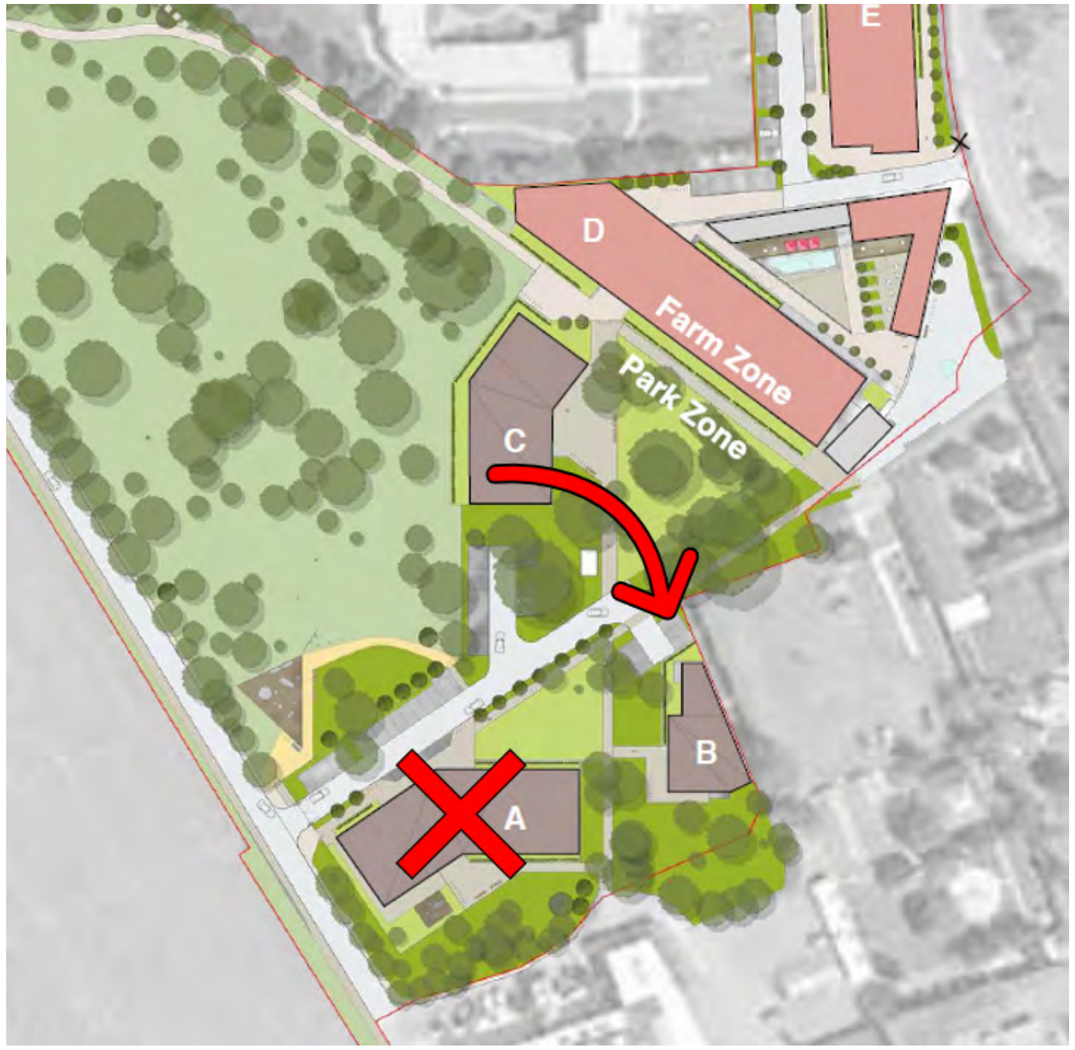


Fig 3.24 The Farm – Alternative C – to remove building A and relocate B & C to form boundary to the park

The design team responded with this request by omitting Building A and wrapping a combined Building C and B into one building (renamed Building C) at the edge of 'The Park' element *(Fig 3.25)*. The height of this new designed building, at 3 storeys, aimed to further reduce any impacts resulting from the closer proximity to protected structure to the east and south *(Fig 3.5.2.C .5 & 6)*.

Fig 3.25 -Building C wrapping boundary of Park per Alternative C

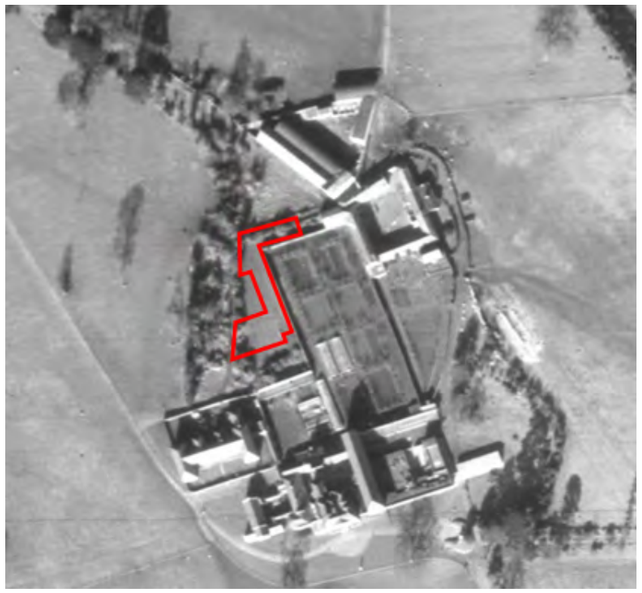


Fig 3.26 -Building C location to East of open parkland

Fig 3.27 -Building C on the boundary to 'The Park' at 3 storeys

Fig 3.28 Building C at 3 storeys with Mansard effect roof to further reduce scale

In addition, potential heritage impacts were addressed in Alternative C by reconfiguring the access arrangement, thereby omitting the requirement to access the development from Bessborough Avenue and avoid the requirement to upgrade/ modify the entrance gates (*Fig 3.29*).

The creche and associated drop-off were relocated into the north of Building B with surface parking provided within Building B through an arched access point. All vehicular access now enters from the main access road to the east. Consequently, the redline has been adjusted to incorporate the pedestrian/cycle bridge to the east in order to ensure its delivery in the event that the proposed development of Phase 1 'the Meadows' was delayed or did not proceed.

With regard to 'The Park' area, a more managed approach is proposed, consisting of the removal of c.1980 landscape interventions and the re-introduction of historical routes. In particular, the reinstatement of the eastern boundary route is proposed. In order to facilitate its linkage with the existing pedestrian crossing at the junction to the north of the site a modest opening in the existing estate wall is proposed.

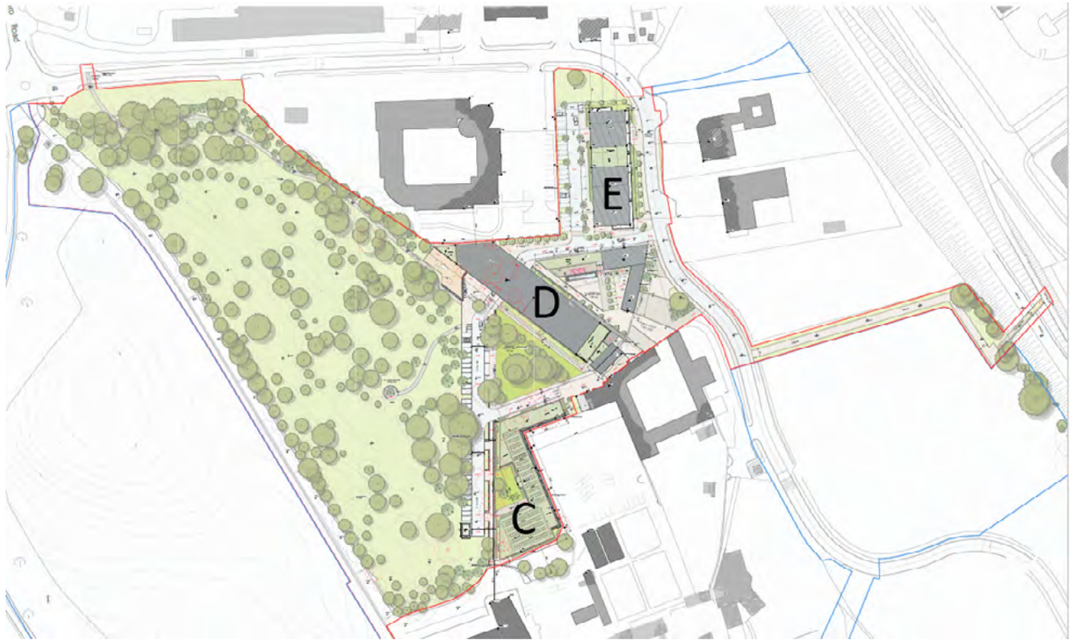


Fig 3.29 The Farm – Alternative C – Site layout plan

Key Data of Alternative C	
Total site area (red line)	51,300 sqm (5.13ha))
Development area	42,842 sqm (4.28 hA)
Residential density	140 (32.7 /hA)
Height range	1 – 5 storey
Housing mix	50% 1 bed, 49% 2 bed, 1% 3 bed
Public open space	63% - 27,136sqm
Resident Amenity space	2,563sqm (exceeds minimum of 830sqm minimum required)
Other uses	creche
Carparking spaces	38% 54 spaces (Plus 4 creche dropoff)
Access to development	Via main access road to the East
Tree removals	54 total including facilitating wayleaves & connections
Trees replanted	116

Table 3.6 The Farm – Alternative C – development data

3.6 Comparison of Environmental Impacts – Construction Phase

3.6.1 Phase 1 'The Meadows'

This section provides a summary of the comparison of environmental impacts during the construction phase between the various alternatives outlined previously.

3.6.1.1 Landscape & Visual

It is not considered that the landscape and visual considerations differ significantly between the various alternatives. All the considered alternatives would require similar levels of bulk excavation, and removal of existing vegetation to accommodate the proposed units/roads and underground utilities. Tower cranes will be visible across all alternatives from beyond the site in what is a sensitive landscape area, however, this impact will be temporary in nature.

3.6.1.2 Traffic & Transportation

Due to the higher number of residential units in Alternative A (294) compared to Alternative C (280), it is likely that there will a very modest level of decreased construction traffic from previous alternatives. The evolution of the scheme to provide for a pedestrian bridge over the Passage West Greenway in Alternative C, may potentially result in some short-term negative impacts to pedestrian and cyclist users of the greenway over Alternative A. However, the construction mitigation measures identified in the CEMP (ref Appendix 2.1) developed in detail in advance of Alternative C, will ensure that any impacts will be localised and not significant in nature, and temporary in duration.

3.6.1.3 Services, Infrastructure & Utilities

It is not considered that services, infrastructure and utilities considerations differ significantly between the various alternatives described. The decrease in the number of residential units between Alternative A and Alternative C will result in a modest reduction in demand for connections to services and utilities. However, in the context of the wider development, this is not considered to be significant. Each alternative assessed would require similar levels of excavation to accommodate the proposed buildings and underground utilities.

3.6.1.4 Land, Soils & Geology

It is not considered that land, soils and geology considerations differ significantly between the various alternatives described. Each alternative requires approximately the same level of excavation in similar if not the same footprint locations.

3.6.1.5 Water & Hydrology

It is not considered that water (hydrology & hydrogeology) considerations differ significantly between the various alternatives described. The principles of the surface/foul water strategies have remained relatively consistent across all alternatives proposed. Alternative B and Alternative C have larger paved areas in compared to Alternative A, however, these are designed to be permeable offsetting any consideration of significant change.

3.6.1.6 Biodiversity

It is not considered that biodiversity considerations differ significantly between the various alternatives described. Detailed construction mitigation measures were developed as the project evolved and are detailed in the accompanying CEMP.

3.6.1.7 Noise & Vibration

Noise and vibration levels during construction are not anticipated to be different between alternatives due to the relatively consistency of scale and heights between alternatives. As detailed in the CEMP, noise and vibration limits will be rigorously monitored throughout construction and will not exceed the standards outlined in the CEMP. It is not considered that noise and vibration considerations differ significantly between the various alternatives described.

3.6.1.8 Cultural Heritage

It is not considered that cultural heritage considerations differ significantly between the various alternatives described in terms of construction impacts.

3.6.1.9 Air Quality & Climate

The decrease in the proposed number of residential units throughout the various alternatives, may result in a modest decrease in levels of dust emissions during construction. However, with mitigation measures enforced, it is considered that any negative impacts relevant to air quality and climate are not significant across all alternatives.

3.6.1.10 Population & Human Beings

The modest decrease in the number of residential units throughout the various project alternatives, may result in some slight reduction in impacts relating to population and human health. These may include a shorter construction period, lower construction traffic numbers and nuisances such as noise, vibrations and dust. The differential in the number of residential units between Alternatives A-C is 14 units or 5%. All alternatives are located at the end of the main access road, allowing for limited disruption to surrounding neighbours, though construction traffic will need management to minimise inconvenience. It is considered that with mitigation and management measures in place, that these will be temporary/short term in nature and not significant.

Criteria	Alternative A	Alternative B	Alternative C
Landscape & Visual	=	=	=
Traffic & Transportation	=	=	X
Services, Infrastructure & Utilities	=	=	✓
Land, Soils & Geology	=	=	=
Water & Hydrology	=	=	=
Biodiversity	=	=	=
Noise & Vibration	=	=	=
Cultural Heritage	=	=	=
Air Quality & Climate	=	=	✓
Population & Human Beings	=	=	✓

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 3.7 – Comparison of Impacts - The Meadows

3.6.2 Phase 2 'The Farm'

3.6.2.1 Landscape & Visual

It is considered that landscape and visual considerations differ significantly between the various alternatives described notably in 'The Park' element of the proposed development. Reduction in density, relocation and omission of buildings occur across each alternative between Alternative A to Alternative C, resulting in a significant reduction in the scale of the proposed construction works. Given the site is in an area of high landscape value, Alternative C is considered the most sensitive to the receiving environment. It's construction will require reduced levels bulk excavation, to accommodate the proposed units/roads and underground utilities in comparison the previous alternatives. Tower cranes will be visible across all alternatives from beyond the site in what is a landscape sensitive area, however, this will be temporary in nature, limited to the construction phase.

3.6.2.2 Traffic & Transportation

Due to the higher number of residential units in Alternative A (233) over Alternative C (140), it is likely that there will a significant reduction in construction traffic from previous alternatives. The evolution of the scheme to provide for a pedestrian bridge over the Passage West Greenway, may potentially result in some temporary negative traffic impacts on pedestrian and cyclist users of the Greenway in comparison to Alternative A & B . However, the construction mitigation measures identified in the CEMP, will ensure that any impacts will not be significant in nature, and any negative impacts will be short term in duration.

3.6.2.3 Services, Infrastructure & Utilities

It is considered that services, infrastructure and utilities considerations differ significantly between the various alternatives described. The decrease in the number of residential units between Alternative A and Alternative C will result in a significantly lower demand for connections to services and utilities. In the context of the wider development, this is considered to be significant. Each alternative assessed from Alternative A to Alternative C would require reduced levels excavation on the park area to accommodate the proposed buildings and underground utilities.

3.6.2.4 Land, Soils & Geology

It is considered that land, soils and geology considerations differ significantly between the various alternatives described. Each iteration from Alternative A and Alternative C has a diminishing scale of excavation in 'The Park' area in particular.

3.6.2.5 Water & Hydrology

It is considered that water (hydrology & hydrogeology) considerations differ significantly between the various alternatives described. With diminishing impacts from Alternative A to Alternative C. The principles of the surface/foul water strategies adjust in the park area across all alternatives proposed.

3.6.2.6 Biodiversity

It is considered that biodiversity considerations differ significantly between the various alternatives with significantly larger areas of 'The Park' remaining as open space and undeveloped in Alternative C. However, this is counter-balanced by slightly higher levels of tree loss in Alternative C over Alternative A. Collectively it is considered Alternative C is the least impactful for biodiversity given the level of parkland area retained. Detailed construction mitigation measures have been developed as the project evolved and are detailed in the accompanying CEMP.

3.6.2.7 Noise & Vibration

Noise and vibration levels during construction are anticipated to be different between alternatives due to the proposed reduction in scale from Alternative A through to Alternative C. As detailed in the CEMP, noise and vibration limits will be rigorously monitored throughout construction and will not exceed the standards outlined in the CEMP.

3.6.2.8 Cultural Heritage

Through the reduction in scale and the lowering of height it is considered the construction phase of Alternative C will have a reduced impact in comparison to Alternatives A and B in respect of the heritage items in close proximity.

3.6.2.9 Air Quality & Climate

The decrease in the proposed number of residential units throughout the various alternatives will result in decreased levels of dust emissions during construction. With mitigation, the construction impacts on air quality and climate are considered to be not significant across all alternatives with alternative C being the least impactful.

3.6.2.10 Population & Human Beings

The significant decrease in the number of residential units through the evolution of the various project alternatives, will result in reduction in impacts relating to population and human health. These may include a shorter construction period, lower construction traffic numbers and nuisances such as noise, vibrations and dust. The differential in the number of residential units between Alternatives A-C is 93 units or 39%.

Criteria	Alternative A	Alternative B	Alternative C
Landscape & Visual	**X**	✓	✓
Traffic & Transportation	=	✓	✓
Services, Infrastructure & Utilities	=	✓	✓
Land, Soils & Geology	=	✓	✓
Water & Hydrology	=	✓	✓
Biodiversity	**X**	✓	✓
Noise & Vibration	=	✓	✓
Cultural Heritage	=	✓	✓
Air Quality & Climate	=	✓	✓
Population & Human Beings	=	✓	✓

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 3.8 – Comparison of Impacts - the Farm

3.7 Comparison of Environmental Impacts –Operational Phase

This section provides a summary of the comparison of environmental impacts during the operational phase between the various alternatives outlined previously.

3.7.1 Phase 1 'The Meadows'

3.7.1.1 Landscape & Visual

It is considered that the evolution of the project from Alternative A to Alternative C, results in an enhanced landscape and visual amenity context. Differing approaches to heights range across each alternative with Alternative C being lowest to the west in closest proximity to heritage items. The resulting sensitive development has been designed, cognisant of the High Landscape Value designation of the site and in accordance with the City Council's recommendations.

3.7.1.2 Traffic & Transportation

Due to the higher number of residential units in Alternative A (294) over Alternative C (280), it is likely that there will a very modest level of decreased operational traffic from previous alternatives. The internal traffic movements in Alternative C have been revised to include improved creche drop-off and turning and service vehicle movements. The evolution of the scheme to provide for a pedestrian bridge over the Passage West Greenway in Alternative C will enhance the connectivity of the wider Bessborough lands with the greenway, the Mahon District Centre and with local employment hubs for both existing and future residents of the area.

3.7.1.3 Services, Infrastructure & Utilities

It is not considered that services, infrastructure and utilities considerations differ significantly between the various alternatives described. The decrease in the number of residential units between Alternative A and Alternative C will result in a modest reduction in operational demand for connections to services and utilities.

3.7.1.4 Land, Soils & Geology

It is not considered that land and soil considerations differ significantly between the various alternatives described over the operational phase.

3.7.1.5 Water & Hydrology

It is not considered that water (hydrology & hydrogeology) considerations differ significantly between the various alternatives described. The principles of the surface/foul water strategies have remained relatively consistent across all alternatives proposed and operationally do differ significantly.

3.7.1.6 Biodiversity

It is not considered that biodiversity considerations differ significantly between the various alternatives described. All alternatives have a significant quantum of new planting proposed which will positively contribute to enhancing biodiversity.

3.7.1.7 Noise & Vibration

It is not considered that noise and vibration considerations differ significantly between the various alternatives described during operational phase. The decrease in the number of residential units between Alternative A (294) and Alternative C (280) may result in a slight reduction in noise generated from residents' small vehicle traffic during the operational phase.

3.7.1.8 Cultural Heritage

Given the reduction in scale and breakup of massing it is considered that the relationship between the proposed layout in Alternative C and the nearby cultural features is an enhancement over Alternative A and Alternative B.

3.7.1.9 Air Quality & Climate

It is not considered that air quality and climate considerations differ slightly between the various alternatives described. The decrease in the number of residential units between Alternative A and Alternative C may result in a slight reduction in carbon emissions from the reduced number of units (294 to 280) and in a slight reduction in the emissions generated from the residents' small vehicle traffic during the operational phase.

3.7.1.10 Population & Human Beings

The modest decrease in the number of residential units and reconfiguration of buildings throughout the various project alternatives, will result in some slight reduction in impacts relating to some elements of population and human health. These may include improved natural light to amenity spaces, larger public realm elements and improved architectural

expression, variety and placemaking. Conversely, the reduction in the number of homes being created between Alterative A and Alternative C will result in a slight reduction in the positive impact that the proposed development will have on the housing shortage in the Mahon Area and the wider Cork City area. It will also result in a slight reduction in the contribution that the proposed development will make towards achieving the requisite critical mass to support future public transport plans for the area in the form of the LRT.

Nonetheless, the inclusion of the pedestrian bridge makes access to the Greenway amenity and cycle commutes more accessible for existing and future residents.

Criteria	Alternative A	Alternative B	Alternative C
Landscape & Visual	=	✓	=
Traffic & Transportation	=	=	✓
Services, Infrastructure & Utilities	=	=	=
Land, Soils & Geology	=	=	=
Water & Hydrology	=	=	=
Biodiversity	X	✓	=
Noise & Vibration	=	=	✓
Cultural Heritage	=	✓	✓
Air Quality & Climate	=	=	✓
Population & Human Beings	=	✓	=

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 3.9 as shown provides an objective comparison analysis of the evolution of the proposed development in context of the categories outlined above.

3.7.2 Phase 2 'The Farm'

3.7.2.1 Landscape & Visual

It is considered that landscape and visual considerations differ significantly between the various alternatives described notably in 'The Park' element of the proposed development. The reduction in density and relocation and omission of buildings occurred throughout the evolution of the project from Alternative A through to Alternative C having a significantly positive impact from a landscape and visual impact approach at the operational phase. Given the site is in an area of High Landscape Value and partially within a Landscape Preservation Zone, the Alternative C layout is considered to be the most sensitive in scale and to be visually most sympathetic to the nearby heritage structures. The provision of a central amenity parkland and more appropriate public open spaces within the proposed scheme, results in a higher quality residential amenity and reflects the sites existing context.

3.7.2.2 Traffic & Transportation

Due to the higher number of residential units in Alternative A (233) in comparison to Alternative C (140), it is likely that there will a significant decrease in the level of operational traffic in Alternative C from the previous alternatives. The evolution of the scheme to provide for a pedestrian bridge over the Greenway, is likely to result in increased residents' use of sustainable travel modes along the greenway over Alternative A & B given the ease of access and improved connectivity to nearby employment and retail hubs.

3.7.2.3 Services, Infrastructure & Utilities

It is considered that services, infrastructure and utilities considerations differ significantly between the various alternatives described. The decrease in the number of residential units between Alternatives A-C will result in a significantly lower operational demand for connections, services and utilities. In the context of the wider development, this is considered to be significant.

3.7.2.4 Land, Soils & Geology

It is not considered that land and soil considerations differ significantly between the various alternatives described over the operational phase.

3.7.2.5 Water & Hydrology

It is considered that water (hydrology & hydrogeology) considerations differ significantly between the various alternatives described, with impacts diminishing from Alternative A to Alternative C. The principles of the surface/foul water strategies have been adjusted in 'The Park' element across all the proposed alternatives. Alternative C presents Building C with a green roof which further improves attenuation over earlier alternatives during operational phases.

3.7.2.6 Biodiversity

It is considered that biodiversity considerations differ significantly between the various alternatives described, with significantly larger areas of 'The Park' element remaining open and undeveloped in Alternative C in comparison to earlier alternatives. Construction stage tree loss, while slightly greater in Alternative C in comparison to alternative A, is compensated for and offset by proposed greater levels of replanting and rewilding to existing hard landscaped areas.

3.7.2.7 Noise & Vibration

It is not considered that noise and vibration considerations differ significantly between the various alternatives described. Nonetheless, the decrease in the number of residential units between Alternative A (233) and Alternative C (140) may result in a slight reduction in noise generated from residents' small vehicle traffic during the operational phase.

3.7.2.8 Cultural Heritage

Through the reduction in scale and lowering of height in proximity to heritage elements, it is considered the Alternative C is an improvement over Alternatives A and Alternatives B in respect of its relationship to nearby heritage structures. Furthermore, Alternative B and Alternative C propose the re-establishment of historic landscape routes in 'The Park' area which was not a feature in Alternative A, thus improving the operational cultural and heritage value to the scheme.

3.7.2.9 Air Quality & Climate

It is not considered that air quality and climate considerations differ significantly between the various alternatives described. The decrease in the number of residential units between Alternative A and Alternative C may result in a slight reduction in carbon emissions from the reduced number of units (233 to 140) and in a slight reduction in the emissions generated from the residents' small vehicle traffic during the operational phase.

3.7.2.10 Population & Human Beings

The significant decrease in the number of residential units throughout the various project alternatives, will result in reduction in impacts relating to population and human health. The differential in the number of residential units between Alternatives A-C is 93 units or 39%. This combined with improved connectivity, greater amenity and open-space offered over successive alternatives makes Alternative C superior in terms of wellbeing for the local population.

Conversely, the reduction in the number of homes being created between Alterative A and Alternative C will result in a slight reduction in the positive impact that the proposed development will have on the housing shortage in the Mahon Area and the wider Cork City area. It will also result in a slight reduction in the contribution that the proposed development will make towards achieving the requisite critical mass to support future public transport plans for the area in the form of the LRT.

Nonetheless, the inclusion of the pedestrian bridge makes access to the Greenway amenity and cycle commutes more accessible for existing and future residents.

Criteria	Alternative A	Alternative B	Alternative C
Landscape & Visual	X	✓	✓
Traffic & Transportation	=	=	✓
Services, Infrastructure & Utilities	=	=	✓
Land, Soils & Geology	=	=	=
Water & Hydrology	=	=	✓
Biodiversity	X	✓	✓
Noise & Vibration	=	=	✓
Cultural Heritage	=	✓	✓
Air Quality & Climate	=	=	✓
Population & Human Beings	=	=	=

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 3.10 as shown provides an objective comparison analysis of the evolution of the proposed development in context of the categories outlined above.

3.8 Main Reason for Option Chosen

3.8.1 Phase 1 'The Meadows'

When all construction and operational aspects are assessed, it is objectively considered that Alternative C, consisting of 280 no. residential units, creche, café, extensive public realm improvements and new pedestrian bridge is the most appropriate and efficient alternative layout assessed. The design of Alternative C has been strongly influenced by the opinions of Cork City Council, in particular the City Architect and subsequently An Bord Pleanála arising out of the Section 247 and Tripartite discussions (refer Appendix 3.2), and represents a more efficient and technically resolved development than that previously proposed in Alternatives A and B.

- Alternative C provides for a more efficient density of residential development on zoned land, reflective of the site's location adjacent to the Passage West Greenway, and within walking and cycling distance of various services and amenities provided for in Mahon District Centre and Cork City Centre.
- The landscape, visual and amenity strategy has evolved throughout the scheme design, to provide for a more broken-up massing and material breakup, which was not initially envisaged in Alternative A. Alternative C has a more sophisticated approach to height placement over Alternative A, with further reduction in height than Alternative B. The Alternative C layout also provides for an enhanced relationship between the built environment and the sensitive landscape setting, from that proposed in Alternative A and B.
- Alternative C provides improved access to the wider site via the main East / West larger feature public realm piece with Greenway connectivity via the bridge proposal which differs from alternative A. The chosen layout will succeed in facilitating internal pedestrian movements within the site and integrate into the existing settlement, satisfying desire lines to local destinations, including Mahon point, the eastern Greenway and employment zones in Mahon.
- Alternative C provides clearer delineation between public realm and residents' amenities than was the case in Alternative B and Alternative C, offering residents an improved amenity experience.
- It is considered that the proposed layout has incrementally improved across all alternative layouts iterations, to the benefit of the future residents. Alternative C, across its construction and operational phases, will result in several positive environmental and socio-economic impacts to the locality.

3.8.2 Phase 2 'The Farm'

When all construction and operational aspects are assessed, it is objectively considered that 'Alternative C', consisting of 140 no. residential units, a crèche, a new publicly accessible parkland and new pedestrian bridge is the most appropriate and efficient alternative layout assessed. Alternative C reflects the observations of Cork City Council, in particular the City Architect and the Park Superintendent, and subsequently An Bord Pleanála made during Section 247 and Tripartite discussions, and represents a more efficient and technically resolved development than that previously proposed in Alternatives A and B.

- Alternative C provides for a lower density of residential development within the zoning objectives of the site reflective of the site's location within a sensitive heritage and landscape setting. However, the proposed development balances cognisance of the sensitivities of the site, with recognition of the sustainability and accessibility of the location, which links to the Passage West Greenway and is within walking & cycling distance of various services and amenities provided for in Mahon and the Cork City Centre.
- The landscape, visual and amenity strategy has evolved throughout the scheme design, to provide for a reduced level of development in 'The Park' element which was not initially envisaged in Alternative A & B. The Alternative C layout is considered less intrusive with an improved orientation strategy in comparison to Alternative A and Alternative B. The Alternative C layout also provides for an improved relationship between the existing built environment and the sensitive landscape setting, in comparison to that proposed in Alternatives A and B.

- Alternative C provides improved access to the wider site via the bridge proposal which differs from Alternative A. The selected layout will succeed in facilitating internal pedestrian movements within the site and improve permeability between the Bessborough estate and the Mahon, satisfying desire lines to local destinations, including Mahon Point and Retail Park, the Passage West Greenway and a number of employment hubs in the Mahon area.
- Alternatives C's revised access is proposed from the east and not via the main entrance to Bessborough House which offers a reduced heritage impact in comparison to Alternatives A and B. Historic routes and connectivity are re-established and form a key element of the sustainable access strategy underpinning Alternative C, unlike the earlier alternatives.
- It is considered that the proposed layout has incrementally improved across all the alternative layouts considered and will positively contribute to the future residential and economic growth of the settlement. Once operational the proposed development will result in several positive environmental and socio-economic impacts to the locality.

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4 Landscape & Visual Impact

4.1 Introduction

4.1.1 Chapter Context

This Landscape/Townscape and Visual impact Assessment report has been prepared in respect of a Strategic Housing Development (SHD) by Estuary View Enterprises 2020 LTD. This report describes the townscape/visual context of the proposed development and assesses the likely impacts of the scheme on the receiving environment, in terms of both townscape character and visual amenity.

Landscape/townscape assessment relates to changes in the physical environment, brought about by a proposed development, which may alter its character. This requires a detailed analysis of the individual elements and characteristics of a landscape/townscape that go together to make up the overall character of that area. By understanding the aspects that contribute to this character it is possible to make judgements in relation to its quality (integrity) and to identify key sensitivities. This, in turn, provides a measure of the ability of the landscape/townscape in question to accommodate the type and scale of change associated with the proposed development, without causing unacceptable adverse changes to its character.

Visual Impact Assessment relates to changes in the composition of views as a result of changes to the landscape/townscape, how these are perceived and the effects on visual amenity. Such impacts are population-based, rather than resource-based, as in the case of landscape impacts.

For a full project description, please refer to Chapter 2.

4.1.2 Methodology

Production of this Landscape/townscape and Visual Impact Assessment involved:

- A desktop study to establish an appropriate study area and relevant landscape and visual designations in the Cork City Development Plan 2015-21;
- A desktop study to establish an appropriate study area and relevant landscape and visual designations in the Cork County Development Plan 2014-2021 and draft County Development Plan 2022-2028;
- Fieldwork undertaken to study the receiving environment;
- Assessment of the significance of the landscape impact of the proposed development as a function of landscape sensitivity weighed against the magnitude of the landscape impact;
- Assessment of the significance of the visual impact of the proposed development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact.

This document uses methodology as prescribed in the Institute of Environmental Management and Assessment (IEMA) and Landscape Institute (UK) 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA-2013).'

Although this is principally a 'townscape' assessment, it utilises the same outline methodology as would be employed for the more familiar Landscape and Visual Impact Assessment (LVIA) of developments in rural settings. The justification for this approach is provided below.

It is important to note that the Guidelines for Landscape and Visual Impact Assessment' (GLVIA-2013) follow the European Landscape Convention (ELC) definition of landscape:

'Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe, 2000). Thus, GLVIA-2013 covers all landscapes from *"high mountains and wild countryside to urban and fringe farmland (rural landscapes), marine and coastal landscapes (seascapes) and the landscapes of villages towns and cities (townscapes)"* - whether protected or degraded.

In the case of this project, the study area is overwhelmingly that of an urban setting or 'townscape' and this is defined in GLVIA-2013 in the following manner (Section 2.7):

" 'Townscape' refers to areas where the built environment is dominant. Villages, towns and cities often make important contributions as elements in wider-open landscapes but townscape means the landscape within the built-up area, including the buildings, the relationships between them, the different types of urban spaces, including green spaces, and the relationship between buildings and open spaces. There are important relationships with historic dimensions of landscape and townscape, since evidence of the way the villages, towns and cities change and develop over time contributes to their current form and character."

4.1.2.1 Landscape/townscape Impact Assessment Criteria

When assessing the potential impacts on the townscape resulting from a proposed development, the following criteria are considered:

- Landscape/townscape character, value and sensitivity;
- Magnitude of likely impacts;
- Significance of landscape effects.

The sensitivity of the townscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape/townscape Value and Sensitivity is classified using the following criteria set out in **Table 4-1**, below.

Sensitivity	Description
Very High	Areas where the townscape character exhibits a very low capacity for change in the form of development. Examples of which are high value townscapes, protected at an international or national level (e.g., World Heritage Site), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the townscape character exhibits a low capacity for change in the form of development. Examples of which are high value townscapes, protected at a national or regional level, where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the townscape character exhibits some capacity and scope for development. Examples of which are townscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the townscape character exhibits a higher capacity for change from development. Typically, this would include lower value, non-designated townscapes that may also have some elements or features of recognisable quality, where management objectives include, enhancement, repair and restoration.
Negligible	Areas of townscape character that include derelict sites and degradation where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of townscape improvements and/or restoration.

Table 4.1 Landscape/Townscape Value and Sensitivity

The magnitude of a predicted landscape/townscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed Development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape/townscape components and/or a change that extends beyond the immediate setting that may have an effect on the townscape character. **Table 4-2** refers, below.

Sensitivity	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the townscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important townscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the townscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable.
Positive	Changes that restore a degraded landscape or reinforce characteristic landscape elements.

Table 4.2 Magnitude of Landscape/Townscape Impacts

The significance of a landscape/townscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following matrix set out in **Table 4-3**, below.

	Sensitivity of Receptor				
Scale/ Magnitude	***Very High***	***High***	***Medium***	***Low***	***Negligible***
Very High	Profound	Profound-substantial	Substantial	Moderate	Minor
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Table 4.3 Impact Significance Matrix

Note: The significance matrix provides an indicative framework from which the significance of impact is derived. The significance judgement is ultimately determined by the assessor using professional judgement. Due to nuances within the constituent sensitivity and magnitude judgements, this may be up to one category higher or lower than indicated by the matrix. Judgements indicated in orange are considered to be 'significant impacts' in EIA terms.

4.1.2.2 Visual Impact Assessment Criteria

As with the landscape/townscape impact, the visual impact of the proposed development will be assessed as a function of sensitivity versus magnitude. In this instance the sensitivity of the visual receptor, weighed against the magnitude of the visual effect.

Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric (human) basis. It considers factors such as the perceived quality and values associated with the view, the landscape/townscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape. A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each VRP:

Susceptibility of Receptors

In accordance with the Institute of Environmental Management and Assessment ("IEMA") Guidelines for Landscape and Visual Assessment (3rd edition 2013) visual receptors most susceptible to changes in views and visual amenity are:

- "Residents at home;
- People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;
- Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;
- Communities where views contribute to the landscape setting enjoyed by residents in the area;
- Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened".

Visual receptors that are less susceptible to changes in views and visual amenity include:

- "People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape;
- People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life".

Recognised scenic value of the view (County Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;

Views from within highly sensitive townscape areas. These are likely to be in the form of Architectural Conservation Areas, which are incorporated within the Development Plan and therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the townscape around them;

Primary views from residential receptors. Even within a dynamic city context views from residential properties are an important consideration in respect of residential amenity;

Intensity of use, popularity. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a national or regional scale;

Viewer connection with the townscape. This considers whether or not receptors are likely to be highly attuned to views of the townscape i.e., commuters hurriedly driving on busy roads versus tourists focussed on the character and detail of the townscape;

Provision of vast, elevated panoramic views. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas;

Sense of remoteness and/or tranquillity. Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example;

Degree of perceived naturalness. Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by distinctly manmade features;

Presence of striking or noteworthy features. A view might be strongly valued because it contains a distinctive and memorable landscape / townscape feature such as a cathedral or castle;

Historical, cultural and / or spiritual significance. Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;

Rarity or uniqueness of the view. This might include the noteworthy representativeness of a certain townscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;

Integrity of the townscape character. This looks at the condition and intactness of the townscape in view and whether the townscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;

Sense of place. This considers whether there is special sense of wholeness and harmony at the viewing location;

Sense of awe. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity. No relative importance is inferred by the order of listing. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

4.1.2.3 Visual Impact Magnitude

The visual impact magnitude relates to the scale and nature of the visual change brought about by the proposal and this is reflected in the criteria contained in **Table 4.4** below.

Criteria	Description
Very High	The proposal alters a large proportion or critical part of the available vista and is without question the most distinctive element. A high degree of visual clutter or disharmony is also generated, strongly reducing the visual amenity of the scene
High	The proposal alters a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual clutter or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene
Medium	The proposal represents a moderate alteration to the available vista, is a readily noticeable element and/or it may generate a degree of visual clutter or disharmony, thereby reducing the visual amenity of the scene.
Low	The proposal alters the available vista to a minor extent and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene.
Negligible	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene.
Positive	Changes that enhance the available vista by reducing visual clutter or restoring degraded features.

Table 4.4 Magnitude of Visual Impacts

4.1.2.4 Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix and applies the same EPA definitions of significance as used earlier in respect of townscape impacts (see **Table 4-3** above).

4.1.2.5 Quality of Effects

In addition to assessing the significance of landscape/townscape effects and visual effects, EPA Guidance for EIAs requires that the quality of the effects is also determined. This could be negative/adverse, neutral, or positive/beneficial.

Whereas, the introduction of new built elements into rural areas more often than not results in negative landscape and visual effects, in urban and/or peri-urban settings, development proposals are often replacing one built feature with another. The consequence for the townscape character and visual amenity is often beneficial, or may be a combination of positive effects and negative effects for different receptors. In the context of this assessment, the judgment of the quality of the effects is made in combination with the significance judgement for both landscape/townscape impacts and visual impacts (e.g., Moderate / Positive or Moderate / Negative).

4.2 Description of Existing Baseline Environment

4.2.1 Definition of Chapter Study Area

Figure 4.1 – EIAR study area for the proposed development

It is anticipated that the proposed development is not likely to give rise to significant landscape/ townscape or visual impacts beyond 1 - 1.5km. However, out of an abundance of caution, a 2km-radius study area is used in this instance (see Figure 4.1, above).

4.2.2 Baseline Environment

The landscape/townscape baseline represents the existing context and is the scenario against which any changes to it, brought about by the proposed development, will be assessed. A description of the landscape/townscape context of the proposed site and wider study area is provided below. Although this description forms part of the landscape/townscape baseline, many of the elements identified also relate to visual receptors (i.e., places from which viewers can potentially see the proposed development). The visual resource will be described in greater detail in Section 4.4. It is worth nothing that "the site" in all instances refers to the EIAR site, rather than the areas associated with each of the three phases of the proposed development (i.e., Phase 1 'The Meadows' area; Phase 2 'The Farm' area; Phase 3 'The North Field' area).

4.2.2.1 Immediate Townscape Context

The Phase 1 'The Meadows' area is 2.31 hectares, located within c.16 hectares that are in ownership of the applicant. As evidence in Figure 4.2, below, the redline 'extensions' to the northeast, northwest and southwest of the area pertains solely to utilities and/or access to this area. Thus, it is not considered part of Phase 1 The Meadows area, for the purposes of this assessment.

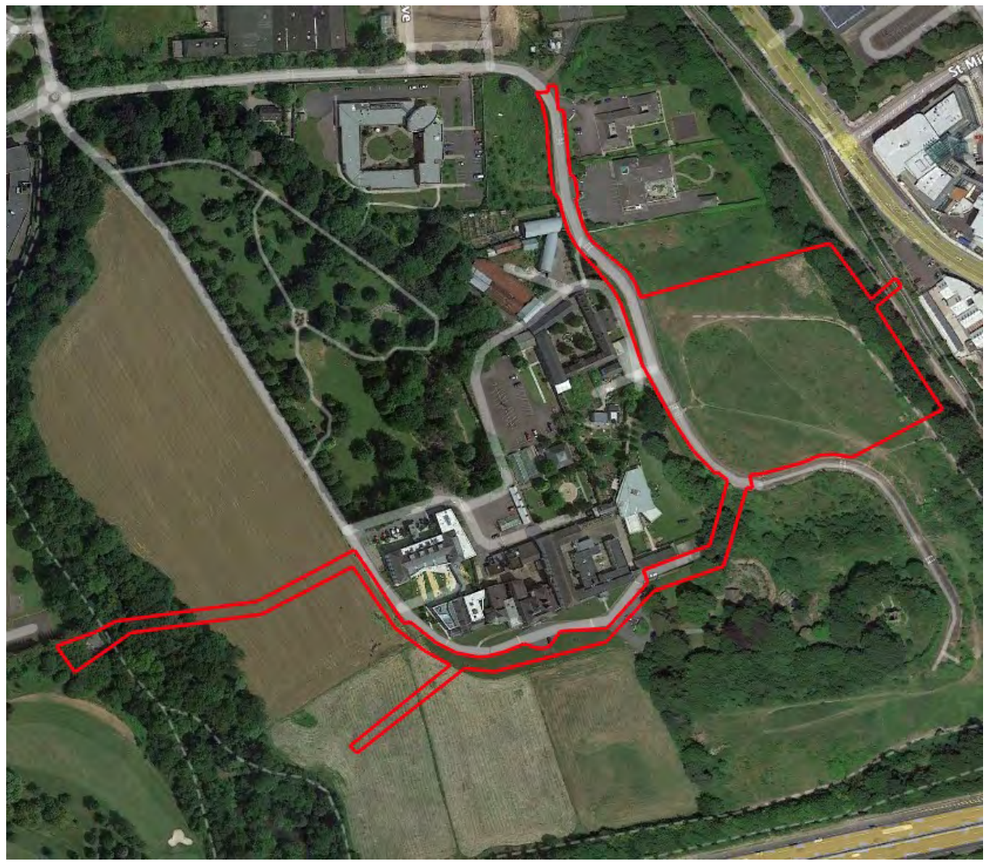


Figure 4.2 – overview of land use and cover within the immediate context of Phase 1 'The Meadows.'

Like other areas within the site, this area formed part of the Bessborough Estate, centred upon Bessborough House. Bessborough House is a large Georgian country house dating back to 1760. Quaker gentry previously owned it, before being eventually purchased by the Sacred Heart Order in 1922, and served as a Mother and Baby home from the 1920s to the 1990s. The original estate encompassed over 200 acres (80 hectares) of land before Cork City Council compulsory purchased approx. 140 acres (57 hectares) in the 1970s. Those approx. 140 acres have since been substantially developed in recent decades to accommodate multi-storey residential, commercial and institutional use, among other land uses (e.g., lands now consisting of Mahon Industrial Estate, Loughmahon Technology Park, City Gate, Mahon Point Retail Park etc.). This Phase 1 'The Meadows' area is located between Bessborough House and the former Railway Line aligning the site's eastern boundary, which is now the Passage West Greenway and which is set in a 19th Century linear cutting at a distinctively lower elevation to that of the site. This area is to the north and northeast of a mid-19th Century Folly and very small graveyard.

Figure 4.3 – The Phase 1 'The Meadows' area's northern site boundary is demarcated by a palisade fence. Note the presence of City Gate development, east of the Passage West Greenway.

The Phase 1 'The Meadows' area is a greenfield area that is characterised by unmanaged, regenerating scrub mostly consisting of rough grass and briars, along with shrubs and young trees averaging 1-2m height, with a pronounced treeline of mature and semi-mature trees aligning the area's eastern boundary. Along the area's western and south-western boundaries there is a road that is currently closed off to vehicular traffic and that was constructed within the last 20 years to facilitate the future development of this area and lands to its south. Immediately west of the road is a childcare/crèche facility and, separately, mediation services facility, used by the wider locality. This area's northern site boundary and north-western site boundary (i.e., between it and the aforementioned road) is demarcated by a palisade fence.

This manmade, modified landscape is also marked by some low-level dilapidation and dumping, while along the road aligning this area there is regular evidence of anti-social behaviour (e.g., much broken glass, evidence of past fires etc). The Phase 1 'The Meadows' area also currently serves as a *de facto* short-cut connecting pedestrians from the east (i.e., from the Passage West greenway and/or Mahon Point retail park further east) to residential development northwest of this area, albeit across private property. Between 11-15m AOD, this area is low-lying and marginally sloping to the south, as it falls towards the Douglas River and Cork Harbour estuary located approx. 250m south of it. Within this Phase 1 'The Meadows' area there are no known Protected Structures, National Monuments or ecological and/or conservation designations. Overall, this area is at a considerable aesthetic, naturalistic and functional disconnect to that of the wider Bessborough grounds, as well as land use and character to its east. Aside from the trees aligning its eastern boundary, this area offers little naturalistic or scenic amenity, and is of little conservation or recreational value; in contrast to much of the wider Bessborough Estate.

Figure 4.4 – The Phase 1 'The Meadows' area is characterised by unmanaged, regenerating scrub.

Figure 4.5 – An unused road marks the Phase 1 'The Meadows' area's western/south-western boundary

Figure 4.6 – set in a 19th linear cutting at a distinctively lower elevation to that of the site, the Passage West Greenway is located to the immediate east of the site.

It is worth noting that in historical maps of the estate (see Figures 4.19 & 4.20), the Phase 1 'The Meadows' area is not indicated as part of the demesne, although the lack of any manifest boundary between it and the demesne, as well as the presence of a shared track, indicates that the site may have been used by the demesne (e.g., for crops/grain) and/or had an integral association with the landowner. In that regard, to this day the landscape character of the site remains distinct from and aloof to that of the wider remnants of the Bessborough estate.

Immediately north of the Phase 1 'The Meadows' area is a similar, fallow, fenced off section of greenfield land approx. 40m in width, north of which is Alzheimer Society of Ireland centre. North of these is a further building and two large telecommunications mast. Within 500m north, west and east of this area is the location of considerable residential, commercial, retail warehousing and Business & Technology premises, many of which are large, multi-storey buildings, such as those found within Mahon Industrial Estate, Mahon Point Retail Park and City Gate. These were mostly constructed earlier this century and in the case of Mahon Point Retail Park and City Gate, constitute a high-end architectural bookend to the south-eastern approach to the city. South of the Bessborough estate, beyond the Southern Ring Road/N40, is the Douglas River estuary, while immediately southwest of the estate is the Mahon Golf Course

The Phase 2 'The Farm' area is 5.13ha and is located north of Bessborough House. As evidence in Figure 4.7, below, the redline 'extensions' to the east and southwest of the area pertains solely to utilities and/or access to this area. Thus, it is not considered part of Phase 2 'The Farm' area, for the purposes of this assessment.

This area is located between Bessborough House and 'Bessboro' *(sic)* Road. A relatively-recently constructed road demarcates its northern boundary, south of which is a relatively-recently constructed Sacred Heart Convent. This Phase 2 'The Farm' area's southern boundary is aligned with the built infrastructure up to four storeys in height, and associated car parking, of the Bessborough Centre (a not-for-profit organisation providing child and family services), an adoption mediation agency and community mediation service; south of which is the historic Bessborough House.

This Phase 2 'The Farm' area's western boundary is the historic entrance avenue to Bessborough House, from 'Bessboro' Road (*sic*), whereas this area's eastern boundary is that of a relatively-recently constructed road. Stretching up to approx. 275m (north-south) and approx. 240m east-west in places, this large area exhibits a variety of land uses from west to east, which in turn impacts the landscape fabric within it. However, the overwhelming majority of this Phase 2 'The Farm' area is made up of a mature parkland landscape, consisting of over 330 native and non-native trees, interlaced with lawn and pathways and dotted with occasional small, single-storey buildings (see Figure 4.8 & 4.9, below). This area is mostly greenfield with brownfield areas in the eastern section. In terms of topography, at approx. 10m AOD, the site is low-lying and marginally sloping westwards, where it eventually feeds into the Douglas River and Cork Harbour estuary, approx. 300m south of the site. The plethora of mature native and non-native trees indent a rich sylvan character to the site and urban surrounds, reinforcing a veritable 'green lung' within the heart of the estate.

Figure 4.7 – overview of land use and cover within the immediate context of Phase 2 'The Farm' area

Figure 4.8 – the mature parkland landscape of Phase 2 'The Farm' area

Figure 4.9 – the parkland landscape is interlaced with lawn and pathways and dotted with occasional small, single-storey buildings

In the centre-east of this area are numerous old and/or dilapidated buildings that are the remnants of the original Bessborough farmyard, as well as more recent shed additions. This area is a tangle of forms and structures, with numerous sections cordoned off, and fluctuates between operational and defunct buildings, with little coherency or cohesiveness.

Figure 4.10 – The Phase 2 'The Farm' area's southern boundary is aligned with the built infrastructure, and associated car parking, or numerous public health and mediation facilities

Figure 4.11 – The northeast corner of the Phase 2 'The Farm' area' is characterised by regenerating scrub. Note the boundary wall of the Sacred Heart Convent to the west (i.e., right)

North of the former farmyard are some allotments, while in the northeast corner of the Phase 2 'The Farm' area, behind a roadside palisade fence, is a fallow section that is marked with regenerating scrub (e.g., briar and self-seed bushes and trees), one mature tree and which offers a negligible degree of visual amenity (see Figure 4.11, above). Overall, in this eastern section of the Phase 2 'The Farm' area, landform is marginally sloping southwards, rather than westwards. Within its immediate context, this modified, anthropomorphic area bears the marks of at least three centuries of settlement and cultivation, and currently represents a neutral transition between numerous alternative land uses to north, west, south and east of this area. However, this area also presents as an enclosed, fenced-off domain within a wider, more accessible and permeable estate.

However, historical Ordnance Survey maps of the 19th Century (see Figure 4.19 and 4.20, below), show that north of Bessborough House was a structured parterre garden and orchard (i.e., the eastern section of this area). The demesne was, at the time, divided up into four field parcels (the northern-most being the parkland landscape of this area), each with parkland-type tree planting, indicating that the fields were intentionally planted and used as animal pastures, rather than grains or crops. Boundary planting to all sides was a verdant thicket of mixed species (primarily deciduous), with large stone boundary walls within the tree planting. Across the road that aligns the eastern boundary of Phase 2 'The Farm' area, there are two large telecommunications towers, two institutional buildings and a derelict site proposed to be developed (i.e., area of Phase 1 'The Meadows'). North of the north-east corner of this area is large housing development that has recently been completed.

Figure 4.12 – overview of land use and cover within the immediate context of Phase 3 North Fields

The third and final area of the site is the Phase 3 ‘The North Field’ area. This is 10.56ha and is located west/northwest, south and southeast of Bessborough House and was previously central to the layout of the Bessborough Estate. As can be deduced from Figure 4.12, below, land within the Phase 3 ‘The North Field’ area can be summarised as comprising of three separate landscape characters, deriving primarily from land use and associated heritage/history.

Figure 4.13 – In the northwest of the Phase 3 ‘The North Field’ area, a relatively large pastoral field aligns the western side of the Bessborough House entrance avenue.

Figure 4.14 – a mature thicket of woodland aligns the western and southern periphery of the Phase 3 ‘The North Field’ area, as landform in this section of the area slopes marginally from west to east.

The majority of land in this Phase 3 ‘The North Field’ area comprises of one medium-sized, slightly sloping (i.e., east to west) field in the northwest of the area (see Figure 4.13 & 4.14, above), aligning the main entrance avenue to Bessborough House, and three smaller, slightly sloping (i.e., north to south) fields in the central south of the Phase 3 ‘The North Field’ area (see Figure 4.15, below). These fields follow broadly similar sizes and apparent land use to that indicated on historical maps of the estate; that of pasture. These fields supported the dietary/food needs of the Bessborough estate in former times (e.g., milk, beef, lamb) and are representative of demesne landscape design of the 19th Century.

Over the 20th century, specimen trees dotted aesthetically about these fields have been removed in line with modern agricultural intensification practises. These fields are currently demarcated by post and wire (agricultural) fencing and are broadly inaccessible to all but the landowner. They no longer have livestock present but are used primarily for silage. A mature thicket of woodland aligns the western and southern periphery of this Phase 3 ‘The North Field’ area.

Figure 4.15 – the pastoral fields in the south-central section of this area slope slight from north to south (i.e., towards the estuary), with Bessborough House to its north and a mature thicket of woodland to its south.

This aforementioned mature thicket of woodland aligning the western and southern periphery of this area is that which originally abounded the boundaries of the Bessborough estate and makes up the second landscape character of this area. Like multiple demesne landscapes about the country, such thickets usually stood inside large stone walls of an estate, and to the land owners it was a source of visual amenity, privacy and biodiversity/wildlife. Plant species found along this western and southern thicket, which stretches over 1km in length, entails oak, beech, ash, Horse Chestnut, sycamore, as well as, in places, London Plane with an understorey of hazel.

In the contemporary property, a rough, walking trail winds its way within the thicket from along the western boundary (where it enters these private lands through an unlocked narrow gate) and along the southern thicket, before emerging in the south-eastern corner of the site, close to the aforementioned greenway. In that regard, throughout each day multiple walkers and/or dog walkers tend to 'skirt' the estate along the southern and western boundaries, albeit within private property. This woodland path is mostly too rough and uneven for runners or cyclists, and there is considerable evidence of litter and anti-social behaviour along multiple stretches of this woodland. In the south-western corner of the estate, and set within this woodland is an ornate a manmade pond associated with the 19th demesne landscape, and where Scots Pine are apparent. The pond hosts five small islands within it, with a flutter of trees on each (see Figure 4.16, below), though there is also evidence of litter and antisocial behaviour.

Figure 4.16 – the pond in the southwest corner of the site.

The final landscape character of this Phase 3 'The North Field' area is in the south-eastern corner of the site, and is largely made-up of fallow, unmanaged lands in a gradual state of evolution, in some sections, and disrepair in others. This section of the Phase 3 'The North Field' area lies south of the folly (castle tower) and north of the aforementioned thicket aligning the southern boundary of the site. It is frequently accessed by people crossing the site for access; some for daily walks while others for dumping and/or anti-social behaviour (see Figure 4.17, below). This area formerly formed part of agricultural fields that have been discontinued. While this area mostly consists of self-seeding vegetation, there is a notably high quantity of young Turkish oaks that appear to have been planted in this section of the area within the last decade, as evidenced in Figure 4.18, below.

The wider context of the Bessborough Estate is that of multiple large but clustered buildings of institutional use (i.e., a not-for-profit organisation that provides child and family services, as well as the residence of religious order) set within a more picturesque parkland setting. The estate was originally located along the northern shores of the Douglas River estuary, but is now separated from it by the busy N40 national road/ South Ring Road. Bessborough House is a Protected Structure (PS490), a National Monument (NM ref. no. C0074-077) and is listed on the National Inventory of Architectural Heritage (NIAH ref. no. 20872005). Within the former estate remain an icehouse (NM C0074-051) to the west, a 'Farm Complex and Walled Garden' (NIAH 20872006) to the north and the tower folly (NIAH 20872007) to the east of the House.

Figure 4.17 – evidence of dumping and anti-social behaviour near the Folly, in the south-eastern section of this area. Please note: the folly is north of this area.

Figure 4.18 – a notably high quantity of young Turkish oaks that appear to have been planted in this section of the Phase 3 'The North Field' area within the last decade.

In terms of the landscape design context of the estate, by the time of the construction of Bessborough House in 1760, 'designed landscapes' were becoming more regular for Ireland's landed gentry, especially across stately, south-facing, accessible demesnes as this. While the more common styles would either opt towards the more ornamental French style or the planned natural English style, this appears to be less palpable for this estate. Consistent with its Quaker owners for the estate's first 150 years, this demesne appeared to have forged a closer link with the natural world. Indeed, the estates of Quaker landed gentry in Ireland and Britain more tended to be populated with wildlife, individual tree planting and typically shunned high degrees of ornament or amenity.

Figure 4.19 – extract of 6-inch Ordnance Survey map 1st Edition (1841), showing the location of the site

According to historical Ordnance Survey maps of the 19th Century (see Figure 4.19 & 4.20, above/below), north of the House was a structured parterre garden and orchard. The demesne was divided up into four field parcels, each with parkland-type tree planting, indicating that the fields were intentionally planted and used as animal pastures, rather than grains or crops. Boundary planting to all sides of the estate was a verdant thicket of mixed species (primarily deciduous), with large stone boundary walls within the tree planting.

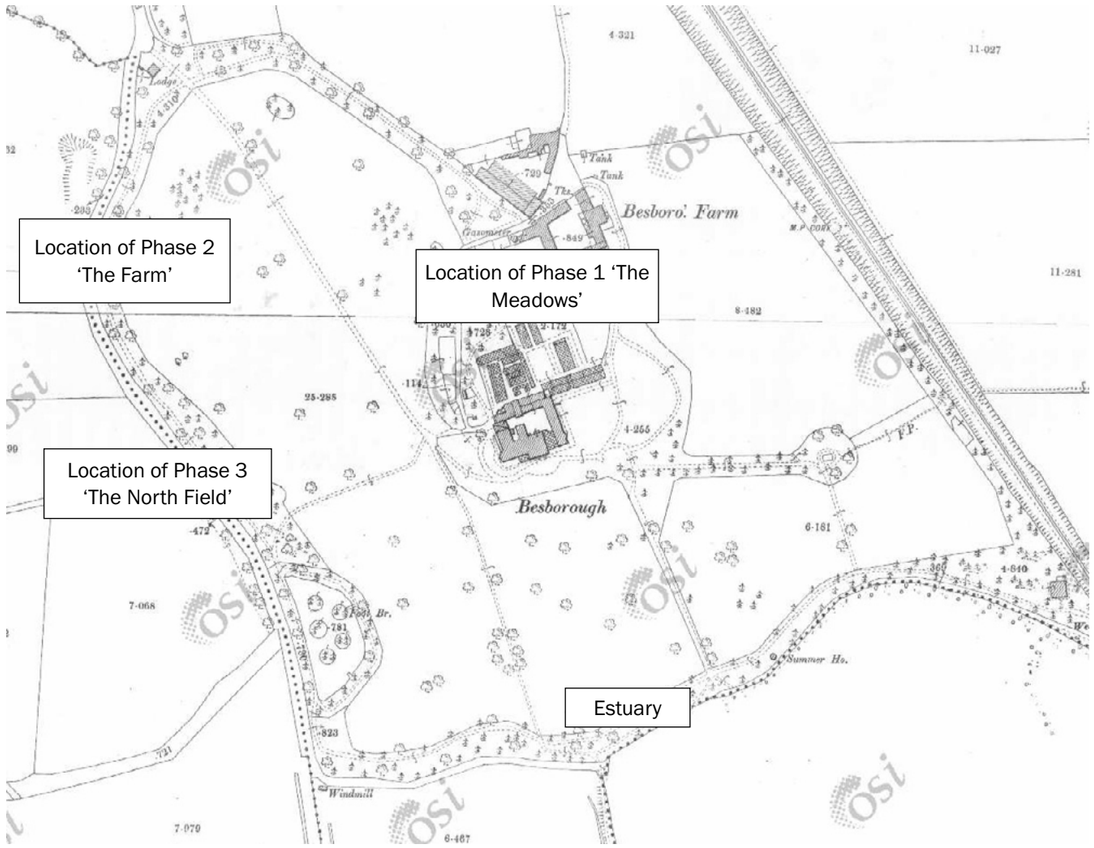


Figure 4.20 – extract of 25-inch Ordnance Survey map (1899), showing the location of the site

Figure 4.21 – Bessborough House dates to 1760 but has been owned by the Sacred Heart Order since 1922.

Lastly, it is worth noting that in August 2020 a Historic Landscape Assessment Report of the Bessborough Estate was completed by Forestbird Design (Landscape Architecture/ Landscape Planning/Environmental Design), of Cloyne, Co. Cork (please refer to Appendix 3.4- Historic Landscape Assessment Report by Forestbird Design).

Much of the relevant information in that report has been covered above/in this section. The report also concluded that the key landscape components identified in the report are contained within three different zones of the Bessborough Estate (see Figure 4.22 below). That report states that these three zones (i.e., Zones A, B & C) "*should be protected and enhanced to enable retention of historic landscape character. Areas not highlighted have a degree of flexibility to receive landscape change or built development.*". Of such areas, the report also states, *"The lack of zone identification does not give the right for unencumbered development. Works in these areas are to be cognisant of the individual inventory and to create new uses embedded within a parkland setting."*

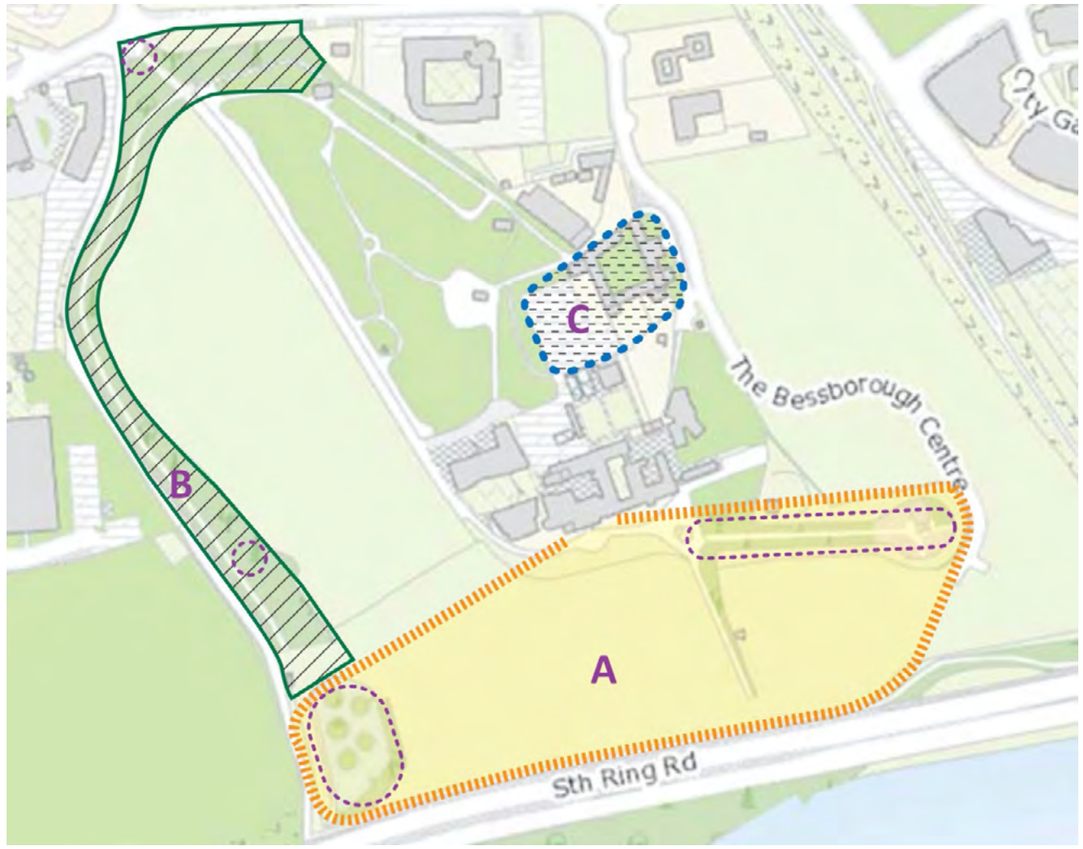


Figure 4.22 – extract of map on Page 11 of Forestbird Design's 'Historic Landscape Assessment' Report on the Bessborough Estate.

4.2.2.2 Broader Townscape Context

The wider reaches of the study area also constitute a considerable diversity of land use and landform, fluctuating from the edge of the city centre to farmland. Lough Mahon in the east and the River Lee are notable water bodies in the wider study area. In the far north is Tivoli Docks and Industrial estate, while in the southwest is Douglas Golf Course and Douglas Court Shopping Centre. In the south-eastern fringe of the study area there is a wooded glen and pastoral agriculture. However, the overriding land use within the study area is that of low-rise, extensive residential development reflective of the suburbs of most Irish cities and towns. In terms of landform, most of the study area rarely rises above 20m AOD. However, south of the Douglas river estuary land swiftly lifts from sea level to over 80m AOD.

4.3 Planning Policy Context

4.3.1 Within the Bessborough Estate

As the three separate areas within the site (i.e. Phase 1 'The Meadows'; Phase 2 'The Farm'; Phase 3 'The North Field') share such common and overlapping attributes, Section 4.3 will address the site at large, while specifying where and how such planning policy context may differ from area to area.

It is worth noting that the aforementioned 140 acres (57 hectare) acquired from the landowners in the 1970s by Cork City Council under compulsory purchases has since been extensively developed. However, since 2000 there has been significant planning activity within the Bessborough Estate, with 20 planning applications lodged for development. Of these 20 applications, 18 were granted, one was withdrawn and one refused. Of the 18 permitted developments, 15 have been constructed to date.

4.3.2 Cork City Development Plan 2015-2021

As a point of clarification, the site and most of the study area are within the Cork City Council administrative boundary. Indeed, in relation to land within the study area, it is only south of the Douglas River estuary that is outside the administrative boundary of Cork City Council. Chapter 10 of the current Cork City Development Plan relates to 'Landscape & Natural Heritage.'

Section 10.5:

> *"Landscape shapes our image of a place, give us a sense of place, an identity and can be a source of pride and inspiration and so influence our well-being and quality of life. All aspects of our natural, built and cultural heritage come together in the landscapes we experience. Landscape is a finite resource but is constantly changing through natural processes and through human activity. It is in our interest to ensure that the city's landscape assets are protected."*

Section 10.6:

> *"Cork City as a focus for economic development and population growth is under constant pressure of development. The challenge for Cork City Council is to manage the city's landscape in a manner that facilitates economic growth and development while protecting and enhancing the city's key landscape assets and resources."*

Relevant landscape objectives include:

Objective 10.1:

> *"To preserve and enhance Cork's landscape character and key landscape assets. To preserve and enhance Cork's views and prospects of special amenity value."*

Objective 10.3:

> *"To preserve and enhance Cork's landscape and where appropriate, to increase access to and utilise the landscape for recreational purposes through the implementation of the Landscape Structure Plan."*

In terms of zoning, according to the plan: Phase 1 'The Meadows' area is within the Z04 'Residential, Local Services & Institutions' zoning objective. Phase 2 'The Farm' and Phase 3 'The North Field' are both within the Z12 'Landscape Preservation' zoning objective.

Cork City Landscape Character Assessment

Section 10.7 of the Plan states that:

> *"The Cork City Landscape Study 2008 was commissioned by Cork City Council to establish principles and provide the framework for protecting and enhancing the natural environment and positively managing its change, as well as providing the context within which the design of developments can take place in an appropriate manner. The Landscape Character Assessment defined 8 no. Landscape Character Areas within the city."*

According to the Landscape Character Assessment (Page 24 of the document): Phase 1 'The Meadows' area is within an area described as being "Urban Industrial/Commercial/ Institutional"; Phase 2 'The Farm' area is primarily of 'Urban Sylvan Character' with some pockets of 'Suburban residential,' while Phase 3 'The North Field' area is exclusively of 'Urban Sylvan Character' (refer to Figure 4.23, below).

Figure 4.23 – extract of Landscape Character Assessment of Cork City (viewed at/zoomed in to 500%)

Areas of High Landscape Value (AHLV)

According to the Development Plan's 'Zoning and Development Plan Objectives,' Phase 1 'The Meadows' area is within an area designated as being a 'High Value Landscape.' However, it should be noted that there are several buildings recently constructed within proximity of this area, which are also within this same 'High Value Landscape' (refer to Figure 4.24, below).

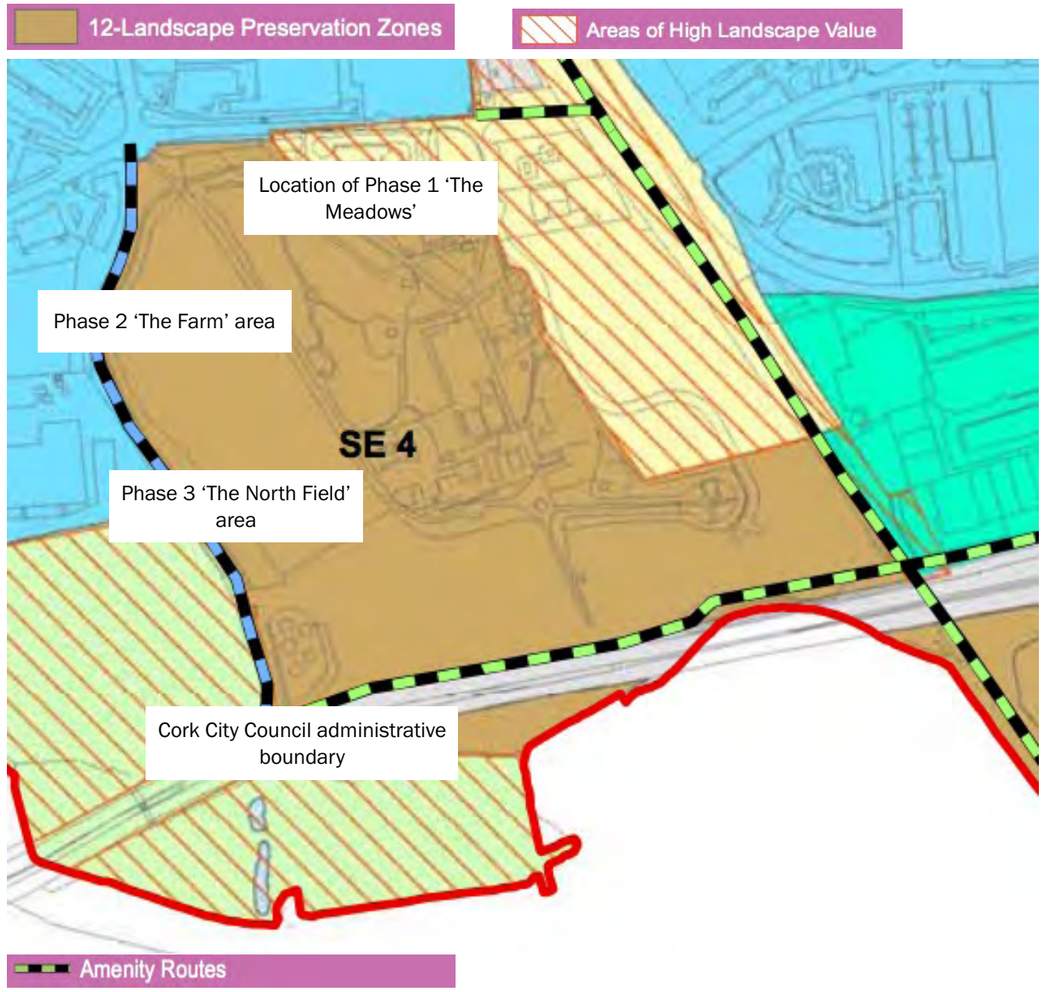


Figure 4.24 – extract of 'Map 6 South East Suburbs Objectives'

Section 10.19:

> *"The AHLV is an additional objective overlaying the land-use zoning objective. Development proposals must comply with the underlying land-use zoning objective. The key areas include the Montenotte/Tivoli Ridge; Shanakiel Ridge/Sunday's Well Ridge; Blackpool Valley; Lough Mahon/ Douglas Estuary; River Lee/ Curragheen River."*

Objective 10.4 Areas of High Landscape Value:

"To conserve and enhance the character and visual amenity of Areas of High Landscape Value (AHLV) through the appropriate management of development, in order to retain the existing characteristics of the landscape, and its primary landscape assets. Development will be considered only where it safeguards to the value and sensitivity of the particular landscape. There will be a presumption against development where it causes significant harm or injury to the intrinsic character of the Area of High Landscape Value and its primary landscape assets, the visual amenity of the landscape; protected views; breaks the existing ridge silhouette; the character and setting of buildings, structures and landmarks; and the ecological and habitat value of the landscape."

Landscape Preservation Zone

As can be determined from Figure 4.24 above, while Phase 1 'The Meadows' area is not within a designated Landscape Preservation Zone, both Phase 2 'The Farm' and Phase 3 'The North Field' are within a designated Landscape Preservation Zone. Relevant policies/objectives of Landscape Preservation Zones entail:

Section 10.20:

"Landscape Preservation Zones (LPZs) are areas in need of special protection as their character and amenity value is considered to be to highly sensitive to development and as such have limited or no development potential. Typically the landscape character of LPZs combines distinctive landscape assets such as topography / slope, tree cover, setting to historic structures / other types of open spaces and other landscape assets."

Section 10.21:

"The objective of LPZs is to preserve and enhance the landscape character and assets of the sites. There will be a presumption against development within LPZs. Development in LPZs is limited in scope and character to the respective site specific objectives, outlined in Table 2. In exceptional circumstances, there may be limited scope for development to enable existing occupiers to adapt existing buildings to their evolving requirements, providing that the form or nature of development is compatible with the landscape character of the area. This might include a change of use and/or minor extensions."

Objective 10.5 Landscape Preservation Zones:

"To preserve and enhance the character and visual amenity of Landscape Preservation Zones through the control of development. Development will be considered only where it safeguards to the value and sensitivity of the particular landscape and achieves the respective site specific objectives, as set out in Table 10.2."

The City Development Plan includes specific commentary on each Landscape Preservation Zone. As stated in Table 10.2 'Schedule of Objectives applying to Landscape Preservation Zones,' the following is set out in relation to SE4, which adjoins the subject site:

SE4 Bessboro House

Characteristics:

- Historic Landscapes (including monuments / historic routes)
- Landmarks / Natural Features / Cultural Landscape – land forming the setting to existing landmark buildings and/or protected structures / buildings of significance
- Tree Canopy - Areas with existing woodlands or significant tree groups, or areas with potential for new woodlands.
- Water / River Corridors - rivers, estuary, harbour, The Lough, Atlantic Pond, Docklands, Port of Cork
- Institutional Open Space

Objectives:

- To reinstate Historic Landscape;
- To seek use of grounds as a Neighbourhood Park in context of local area plan (H);
- To allow development within the immediate environs to the north of Bessboro House consistent with the landscape and protected structure significance of the site.

Views & Prospects

Section 10.22:

"Cork City benefits from the prominent ridges, which provide a series of striking viewing points of the city. This important resource helps to define the character and identity of the city. Given the development pressures associated with the planned growth of the City, the Cork City Council is faced with the challenge of managing development and protecting the city's valued landscape and views of same."

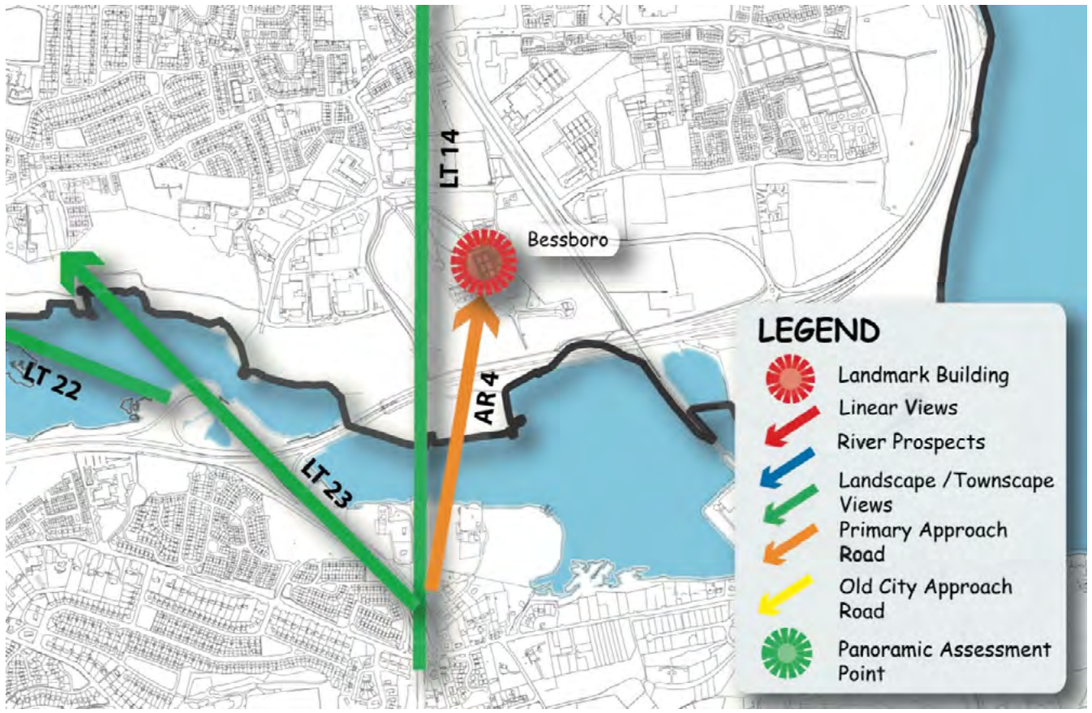


Figure 4.25 – extract of Map 16 – Views and Prospects: South-East in Volume 2 of the Plan

There is just one of Cork City designated view/prospect that may be of relevance to the site. This can be found in Map 16 – Views and Prospects: South-East in Volume 2 of the Plan, an extract of which is set out below in Figure 4.25, above. It shows that the AR4 view is towards 'Bessboro' *(sic)* and is a 'primary approach road' (view). In Volume 3 of the plan, AR4 is described as being from 'Carrigaline Road/ Carr's Hill' with views to 'Bessboro House.' This approach road is the N28, connecting Cork City with Carrigaline and Ringaskiddy. However, the designated landscape & townscape view, LT14, originates in the same location as that of AR4, as can be seen in Figure 4.25, above. Indeed, LT14 also originates from Carr's Hill, with views to 'Montenotte/Tivoli Ridge.' Be that as it may, LT14's view towards 'Montenotte/Tivoli Ridge' happens to be in the same general direction as the Bessborough Estate. Exclusively in the context of views towards the site of the proposed development, therefore, AR4 is, by default, representative of LT14.

Lastly, it is worth nothing that there are no Cork City Tree Preservation Orders in or near the site.

4.3.3 Cork County Development Plan 2014

As previously set out, the site and most of the study area are within the Cork City Council administrative boundary, while it is only south of the Douglas River estuary that is outside the administrative boundary of Cork City Council. In that regard, the only potential relevance the Cork CDP may have to the site and the proposed development is that of relevant scenic designations. There is one Cork County designated scenic route and one designated scenic area within the study area, both of which are located more than 1.4km from the site, in the south-eastern corner of the study area. The scenic route S55 is described as a "Road along wooded stretch to Rochestown," is approx. 700m in length and is set within a thickly wooded glen that allows for highly localised views only. Those segments of the designated 'scenic area' within the study area are, with the exception of a handful of private residences, almost exclusively across elevated farmland.

4.3.4 Cork County Development Plan (draft) 2022-2028

As stated in Section 4.3.3, the only potential relevance the Cork CDP may have to the site and the proposed development is that of relevant scenic designations. However, in the (draft) CDP 2022-2028 there are no designated scenic routes and scenic area within the study area.

4.3.5 Cork County Development Plan (draft) 2022-2028

In terms of designations within the study area, the nearest NPWS (National Parks & Wildlife Service) and/or Natura 2000 sites within the study area are the following:

- Cork Harbour SPA (Special Protection Area), located less than 100m south of the site.
- Proposed Natural Heritage Area: Douglas River Estuary, located less than 100m south of the site.

4.4 Visual Resource

4.4.1 Identification of Viewshed Reference Points as a Basis for Assessment

Viewpoints (VPs) are the locations used to study the likely visual impacts associated with the proposed development. It is not warranted to include each and every location that provides a view as this would result in an unwieldy report and make it extremely difficult to draw out the key impacts arising from the proposed development. Instead, the selected viewpoints are intended to reflect a range of different receptor types, distances and angles. The visual impact of a proposed development is assessed using up to 6 categories of receptor type as listed below:

- Key Views - from features of national or international importance;
- Designated Scenic Routes and Views;
- Local Community views;
- Centres of Population;
- Major Routes;
- Amenity and heritage features.

The Viewpoints selected in this instance are set out in Table 4.5 & 4.6 and shown on Figure 4.26 & 4.27, below.

Please note that an additional four viewpoints (i.e. Viewpoints No. 15, 16, 17 & 18) were selected and prepared from within the Bessborough Estate, following recent ABP Pre-Consultation Opinion (i.e. item 3 of Case Reference ABP-311438-21 & ABP-311382-21). This has resulted in 18 viewpoints, in total, for Phase 1 'The Meadows' and 19 viewpoints, in total, Phase 2 'The Farm.'

4.4.1.1 Phase 1 'The Meadows'

Figure 4.26 – Viewpoint Selection Map for Phase 1 "The Meadows" (Source: Pederson Focus)

VRP No.	Location	Direction of view
VP1	R852 by Mahon Retail Park	W
VP2	Greenway pedestrian/cycle bridge over N40	NW
VP3	Estuary path at Jacob's Island	NW
VP4	County Cork scenic route S55 near junction with R610	NW
VP5	Public green at Charlemont Heights, Rochestown	N
VP6	Public green at Rowan Hill, Mount Oval	N
VP7	Cork City AR4 & LT14 protected view along N28	NE
VP8	Mahon Golf Course	NE
VP9	Field to the fore of Bessborough House	NE
VP10	Access road connecting site to Bessborough Road	SE
VP11	Entrance to Greenway from R852	SW
VP12	St. Michael's Drive by City Gate Business Park	SW
VP13	R852 bridge over Greenway	S
VP14	Ballinure Avenue by Saint Michael's Cemetery	SW
VP15	Bessborough Estate entrance avenue	E
VP16	View from the west of Bessborough Estate	E
VP17	View from the south of Bessborough House	N

Table 4.5 Outline Description of Selected Viewshed Reference Points (VRPs) for Phase 1 'The Meadows'

4.4.1.2 Phase 2 'The Farm'

Figure 4.27 – Viewpoint Selection Map for Phase 2 'The Farm' (Source: Pederson Focus)

VRP No.	Location	Direction of view
VP1	R852 by Mahon Retail Park	W
VP2	Greenway pedestrian/cycle bridge over N40	NW
VP3	Estuary path at Jacob's Island	NW
VP4	County Cork scenic route S55 near junction with R610	NW
VP5	Green open space at Charlemont Heights, Rochestown	N
VP6	Public green at Rowan Hill, Mount Oval	N
VP7	Cork City AR4 & LT14 protected view along N28	NE
VP8	Mahon Golf Course	NE
VP9	Field to the fore of Bessborough House	NE
VP10	Entrance to Bessborough Estate	SE
VP11	Residential development on Frederick Avenue	S
VP12	St. Michael's Drive by City Gate Business Park	S
VP13	R852 bridge over Greenway	SW
VP14	Ballinure Avenue by Saint Michael's Cemetery	SW
VP15	Bessborough Estate entrance avenue	E
VP16	View from the west of Bessborough Estate	E
VP17	View from the south of Bessborough House	N
VP18	View to the rear of protected 'Farm Complex and Walled Garden'	SW
VP19	Entrance to Greenway from R852	SW

Table 4.6 Outline Description of Selected Viewshed Reference Points (VRPs) for Phase 2 'The Farm'

4.4.1.3 Phase 3 'The North Field'

As the exact nature, scale and appearance of the proposed development within the Phase 3 'The North Field' area is yet to be determined, neither can there yet be a selection of a suitable viewpoint selection to accompany any such development.

4.5 Landscape/townscape Impact Assessment

4.5.1 Do nothing Scenario

4.5.1.1 Phase 1 'The Meadows'

In the 'do nothing' scenario, the subject lands will remain undeveloped and there will be no additional impacts on landscape and visual factors.

4.5.1.2 Phase 2 'The Farm'

In the 'do nothing' scenario, the subject lands will remain undeveloped and there will be no additional impacts on landscape and visual factors.

4.5.1.3 Combined Phase 1 and Phase 2

In the 'do nothing' scenario, the subject lands will remain undeveloped and there will be no additional impacts on landscape and visual factors.

4.5.2 Landscape/townscape Impacts

4.5.2.1 Landscape/townscape value and sensitivity

4.5.2.1.1 Phase 1 'The Meadows'

In accordance with Section 5.5 of the GLVIA-2013, a townscape character assessment requires a particular understanding of, among other criteria, "the context or setting of the urban area and its relationship to the wider landscape."

As was previously established in Section 4.2.2.1, this greenfield area is a manmade, modified landscape, characterised by unmanaged, regenerating scrub. It's most salient and appreciable landscape quality is a pronounced treeline of mature and semi-mature trees aligning the area's eastern boundary, while elsewhere the this area's value is depreciated by palisades fencing and low-level dilapidation and dumping. Aside from the aforementioned treeline, there is a negligible degree of naturalistic, ecological or scenic value associated with this area, while the only arguable amenity value is that it serves as a *de facto* short-cut for some people in the locality. As previously set out, there are no conservation or heritage designations associated with this area, nor no known Protected Structures or National Monuments.

In terms of landscape character, this area remains at the same 'remove' from the wider Bessborough Estate, being at a considerable aesthetic, naturalistic and functional disconnect to it. Indeed, historical maps from the 19th Century reveal how these lands are not indicated as part of the demesne. Furthermore, at present, it has neither the aesthetic nor recreational merit of the greenway aligning its eastern boundary, nor the functional, contemporary value of development east of the greenway. Rather, it has a tone of dereliction and dilapidation that is broadly inconsistent and unsupportive of the wider sense of place of the study area.

In terms of landscape character within 500m of this area, aside from the Bessborough Estate, which consists of several large clustered buildings at its nucleus, there is also a considerable density of residential, commercial, retail warehousing and Business & Technology premises, many of which are large, multi-storey buildings. As was previously established in Section 4.2.2, residential development is by far the most common form of land use in the wider study area, although the wider study area is notably, distinctively diverse in land use and land form.

Although this area is designated as being within an 'Area of High Landscape Value' (AHLV), according to the Cork City Development Plan 2015-2021, the only tangible or apparent landscape element within this area that may be deemed to be high value is the treeline aligning its eastern boundary, as the remainder of this area contains a negligible degree of ecological, naturalistic, aesthetic or recreational value. Indeed, there are no Cork City Tree Preservation Orders in or near the site. This would appear to be supported by the fact that, unlike most of the remaining areas of the Bessborough Estate, this area is not within a 'Landscape Preservation Zone.'

Furthermore, it is worth noting that numerous other buildings and structures (i.e. large telecommunications masts) have relatively-recently been constructed in proximity to this area and within this same 'Area of High Landscape Value.' In each case, it is unsure how such developments could be deemed to "result in a neutral/positive impact on the landscape," as Section 10.16 of the Plan stipulates. In addition, according to the aforementioned Landscape Character Assessment of the city, this area is within an area described as being "Urban Industrial/Commercial/Institutional"; not land uses typically associated with an 'Area of High Landscape Value.'

Be that as it may, as previously set out, Section 10.19 of the Plan states, *"The AHLV is an additional objective overlaying the land-use zoning objective. Development proposals must comply with the underlying land-use zoning objective."* That underlying objective, in relation to this area, pertain to the ZO4 'Residential, Local Services & Institutions' zoning objective, as defined in the Cork City Development Plan 2015-2021.

On balance of all the factors outlined above, the sensitivity of the receiving townscape setting is considered to be **Medium-low**.

4.5.2.1.2 Phase 2 'The Farm'

As was previously established in Section 4.2.2, although this largely greenfield area is of a rich, verdant, sylvan character, it is also a manmade, modified landscape, like that of its vicinity/hinterland, and over the last two centuries, the fundamentals of its layout and land use remain largely present (i.e. that of a parkland setting associated with historic demesnes). This area is not publicly accessible, nor does it provide any public open space, but is, instead, secured/cordoned off from the public. A mix of over 330 mature native and non-native species are found within the site.

Owing to this pleasant parkland mix of trees, grass and paths, there is a palpable degree of scenic value associated with this area. Although an anthropocentric, well-maintained, designed landscape, it also has evident naturalistic and/or ecological values, although this is tempered somewhat by the presence of swathes of non-native trees and cut lawn (as opposed, for example, to a pollinator-friendly meadow), and is confirmed by the lack of any ecological or conservation status or even heritage status upon this parkland. This is seconded by the lack of any Cork City Tree Preservation Orders in or near this area.

While there some National Inventory of Architectural Heritage sites and monuments within the Bessborough estate, none are within this area. The mostly dilapidated condition of the original Bessborough farmyard in the centre east of this area offers a similar low level of aesthetic or heritage value, while the allotments and fallow, regenerating scrub north of the former farmyard (i.e. in the northeast corner of this area) offers a degree of ecological value, but little else. As previously noted, is this area is within a designated 'Landscape Preservation Zone.' However, there have been multiple developments within that same Zone of the Bessborough Estate that have been granted planning permission since 2000, as previously noted. In addition, according to the Landscape Character Assessment, this area is partly made-up of pockets of 'Suburban residential' land use.

In terms of landscape character within 500m of this area, aside from the Bessborough Estate, which consists of several large clustered buildings at its nucleus, there is also a considerable density of commercial, retail warehousing and Business & Technology premises, many of which are large, multi-storey buildings (i.e. up to 18m in height).

On balance of all the factors outlined above, the sensitivity of the receiving townscape setting is considered to be **Medium**.

4.5.2.2 Construction Phase Landscape Impacts

4.5.2.2.1 Phase 1 'The Meadows'

There will be permanent physical effects to the land cover of this area, which are not readily reversible. During the construction stage of the proposed development there will be intense construction-related activity within and around this area, including approach roads. This will include, but is not limited to:

- HGVs transporting materials to and from this area;
- Movement of heavy earth-moving machinery and the erection of several tall tower cranes on-site;
- Temporary storage of excavated materials and construction materials on-site;
- Gradual emergence of the four proposed blocks, and associated works;
- Gradual emergence of new pedestrian/cycle bridge over the adjoining Passage West Greenway;
- Security fencing and site lighting.

Construction stage impacts on landscape/townscape character are likely to last for approx. 24 months. Thus, they will be 'short-term' (i.e. lasting 1-7 years), in accordance with the EPA definitions of impact duration. Furthermore, the context of this construction activity is within an urban fabric where the construction of multi-storey buildings has been long established.

No demolition works are associated with the construction works, aside from the palisade fence along the northern and north-western boundaries of this area. The construction phase will also require the felling of a maximum of 13 No. trees to facilitate the proposed development, including the construction of the pedestrian bridge over the adjacent greenway. A suitable set back from the existing trees in the treeline along the site's eastern boundary will be put in place, to prevent any potential root or crown damage to any of the retained trees. In addition, it is proposed to plant 108 new trees within the site, as part of the proposed landscape works.

Lastly, the existing 150mm foul sewer will be upgraded to a 225mm sewer, from this area to the Irish Water Pump Station on the western boundary of the overall Bessborough Estate. While this upgraded sewer will be several hundred metres in length**,** the physical effects associated with it will be temporary and highly localised.

On the basis of the reasons outlined above, the magnitude of construction stage landscape/townscape impacts is deemed to be **Medium**. When combined with the Medium-low sensitivity of the receiving landscape, **the overall significance of construction stage landscape/townscape impacts** is considered to be **Moderate** and **Negative,** in accordance with the criteria contained in Section 4.1.2.

4.5.2.2.2 Phase 2 'The Farm'

There will be permanent physical effects to the land cover of this area, which are not readily reversible. During the construction stage of the proposed development there will be intense construction-related activity within and around this area, including approach roads. This will include, but is not limited to:

- HGVs transporting materials to and from this area;
- Movement of heavy earth-moving machinery and the erection of several tall tower cranes on-site;
- Temporary storage of excavated materials and construction materials on-site;
- Gradual emergence of the five proposed blocks, and associated works;
- Gradual emergence of new pedestrian/cycle bridge over the adjoining Passage West Greenway;
- Security fencing and site lighting.

Construction stage impacts on landscape/townscape character are likely to last for approx. 24 months. Thus, they will be 'short-term' (i.e. lasting 1-7 years), in accordance with the EPA definitions of impact duration. Furthermore, the context of this construction activity is within an urban fabric where the construction of multi-storey buildings has been long established.

Multiple demolition works are proposed for this area, which will result in four small, single-storey buildings of no known architectural or heritage value, being demolished. In the centre-east section of this area, this also pertains to six very small shed-like structures and one wall, as well as two larger 20th Century barn-like structures in a dilapidated state. It is worth repeating that none of these structures are deemed to be of any known architectural or heritage value, and none are listed as being National Inventory of Architectural Heritage sites and monuments.

The construction phase will also entail the felling of 51 no. trees of the 335 no. trees surveyed within this area. In addition, as part of the proposed development, a total number of 116 No. new trees will be planted in this area, of which 76 No. will be native and 40 No. will be non-native, but largely naturalised. Lastly, a sufficient set back from the existing trees will be put in place, to prevent any potential root or crown damage to any of the retained trees.

On the basis of the reasons outlined above, the magnitude of construction stage landscape/townscape impacts is deemed to be **Medium**. When combined with the Medium sensitivity of the receiving landscape, **the overall significance of construction stage landscape/townscape impacts** is considered to be **Moderate** and **Negative,** in accordance with the criteria contained in Section 4.1.2.

4.5.2.2.3 Combined Phase 1 and Phase 2

The multiple points raised in Sections 4.5.2.2.1 & 4.5.2.2.2, above, will here be considered for construction stage effects for the combined Phase 1 and Phase 2. Added to these multiple factors will be the fact that construction activity for each area will not occur concurrently, or are even likely to overlap. Thus, overall, the magnitude of construction stage landscape/townscape impacts is deemed to be **Medium** for the combined Phase 1 and Phase 2 areas.

When combined with the Medium-low and Medium sensitivity of the receiving landscape of the Phase 1 'The Meadows' and Phase 2 'The Farm' areas, respectively, **the overall significance of construction stage landscape/townscape impacts** is considered to be **Moderate** and **Negative,** in accordance with the criteria contained in Section 4.1.2.

4.5.2.3 Operational Phase Landscape Impacts

4.5.2.3.1 Operational Phase

Following the completion of the proposed works, landscape/townscape impacts will relate entirely to the development's impact on the character of the receiving landscape/townscape.

4.5.2.3.2 Phase 1 'The Meadows'

The most notable landscape/townscape impacts of this area will result from the permanent 4 no. blocks that range in height from 6 to 10 storeys, followed by a new pedestrian/cycle bridge over the adjoining Passage West Greenway. While this represents a notable and highly apparent vertical imprint into what had been a greenfield area, it also represents a compatibility with the townscape fabric and character within the broader vicinity of this area (i.e., less than 500m), and wider study area.

To be more detailed: although there are several 3-storey buildings and one four-storey building clustered within the heart of the Bessborough estate approx. 100m to the southwest of this area, there are several multi-storey residential, commercial and institutional buildings within 200m of the site (e.g. Mahon Industrial Estate, Loughmahon Technology Park, City Gate, Mahon Point Retail Park etc.), which reach up to 19m in height, in some instances: all of which are on lands that originally formed part of the Bessborough Estate. Lastly, the high-end architectural quality, detail and finish of the four proposed blocks is likely to prove a distinct, long-term asset to the landscape/townscape character of the study area.

Overall, these various factors - in tandem with the presence of multiple tall trees and treelines within the Bessborough Estate (to the west and south of this area) and aligning the Passage West greenway (to the east of this area) - will have the effect of 'softening' the vertical scale of the development, helping to 'anchor' it into the surrounding townscape fabric and character, while also enriching it.

Yet the development's impact on the character of the receiving landscape/townscape is not confined to the four proposed multi-storey blocks. This development will also include a 35-child crèche facility, communal open space areas, landscaping, under-podium and car parking spaces (102 spaces), bicycle parking spaces, public lighting and a new pedestrian and cycle way bridge connecting this area to the Passage West greenway. New trees and shrubs will be densely planted throughout this area to enrich further its existing verdant character. Owing to the net gain of not just proposed trees but other proposed planting, upon establishment the character of this area is likely to be strengthened, rather than weakened, by the proposed development. It is also worth noting that the aforementioned upgraded 225mm sewer, from this area to the Irish Water Pump Station on the western boundary of the overall Bessborough Estate, will be exclusively subsurface, with excavated material all reinstated and replanted and/or re-surfaced, and will therefore have no residual impact nor bearing upon landscape character.

Whilst the proposal will result in a distinct increase in the scale and intensity of development within this area, and its immediate surrounds, such a development is to be expected in a dynamic, and ever-evolving locality as this, and will knit into the prevailing urban fabric rather than contrasting against it.

For the reasons outlined above, the **magnitude of operational stage landscape/townscape impacts** is considered to be **Medium-Low.** On balance of the intensity and scale of new development against the quality of the architectural and landscape design, the operational landscape/townscape quality of effect is deemed to be marginally negative i.e., Neutral-negative.

In accordance with the Landscape/Visual significance matrix contained in Section 4.1.2., the combination of a **'Medium-low**' townscape sensitivity judgement and a '**Medium-low**' townscape impact magnitude judgment results in a **Moderate-slight** overall operational stage significance of townscape impact, with a **Neutral-negative** quality of effect.

4.5.2.3.3 Phase 2 'The Farm'

The most notable landscape/townscape impacts of this area will result from the permanent presence of 5 no. residential blocks that range from 4-5 storeys, followed by a new pedestrian/cycle bridge over the adjoining Passage West Greenway. While this represents a distinct vertical imprint upon the previously undeveloped areas of the site, it also represents a compatibility with the cluster of buildings to this area's immediate south, as well as the townscape fabric and character within the broader vicinity of the site (i.e. less than 500m), and wider study area. Furthermore, several of the proposed buildings will be at a similar height to the aforementioned mature tree canopy in its immediate vicinity.

To be more detailed: there are several 3-storey buildings clustered within the heart of the Bessborough estate, approx. 100m to the south of the proposed buildings, and proposed blocks A & B will be within 40m of those large existing buildings. Thus, the proposal will serve as a northern extension of that existing landscape fabric and character; broadening the cluster of development at the heart of the estate. Furthermore, there are several multi-storey buildings within 500m of this area (e.g. Mahon Industrial Estate, Loughmahon Technology Park, City Gate, Mahon Point Retail Park etc.); buildings that extend up to 18m in height, in some instances: again, all of which are on lands that originally formed part of the Bessborough Estate. Lastly, the high-end architectural quality, detail and finish of the five proposed blocks is likely to prove a distinct, long-term asset to the landscape/townscape character of the study area.

Residually, this area will experience a net gain in trees and vegetation, as a result of the proposal. In terms of any long-term/residual impacts upon the designated 'Landscape Preservation Zone' in which this area is located, it is worth noting that the discerning nature, scale and building placement of the proposal respects the scope and character of the site specific objectives of the Bessborough Estate (as set out in Section 1.5.2, above), and will create a development that is compatible with the landscape character of the area. Of the five listed characteristics of 'SE4 Bessboro House' Landscape Preservation Zone, none are likely to experience long-term/residual impacts. In addition, the proposal is compatible with the one relevant objective of 'SE4 Bessboro House' Landscape Preservation Zone (i.e. "*To allow development within the immediate environs to the north of Bessboro House consistent with the landscape and protected structure significance of the site.*")

In terms of any long-term/residual impacts upon the findings of the aforementioned Historic Landscape Assessment Report of the Bessborough Estate, it should be noted that the proposal is highly cognisant and respectful of the relevant, listed inventory within the site. Furthermore, the scheme has been designed and buildings positioned specifically in order to reduce the impact on existing mature trees in the parkland. The immediate presence of a tall tree canopy will have the effect of 'softening' the vertical scale of the development, helping to knit it into the surrounding townscape fabric and character, while also enriching it.

Yet the development's impact on the character of the receiving landscape/townscape is not confined to the five proposed multi-storey blocks. This development will also include a 35-child crèche facility, communal open space areas, landscaping, surface car parking spaces, bicycle parking spaces, bin stores and public lighting. New trees and shrubs will be planted throughout the site to enrich further its existing verdant character. Owing to the net gain of not just proposed trees but other proposed planting, upon establishment the character of the site is likely to be strengthened, rather than weakened, by the proposed development.

Whilst the proposal will result in a distinct increase in the scale and intensity of development within this area, and its immediate surrounds, such a development is to be expected in a multi-layered, ever-evolving estate as this, and will knit into the prevailing urban fabric rather than contrasting against it.

For the reasons outlined above, the **magnitude of operational stage landscape/townscape impacts** is considered to be **Medium-Low.** On balance of the extent of new development against the quality of the architectural and landscape design, the operational landscape/townscape quality of effect is deemed to be marginally negative i.e., **Neutral.**

In accordance with the Landscape/Visual significance matrix contained in Section 4.1.2., the combination of a 'Medium' townscape sensitivity judgement and a 'Medium-low' townscape impact magnitude judgment results in a **Moderate-slight** overall operational stage significance of townscape impact, with a **Neutral** quality of effect.

4.5.2.3.4 Combined Phase 1 and Phase 2

The multiple points raised in Sections 4.5.2.3.2 and 4.5.2.3.3, above, will here be considered for operational stage effects for the combined Phase 1 and Phase 2.

Overall, although the combined Phase 1 & 2 will result in a marked increase in the scale and intensity of development within these areas, and the wider Bessborough Estate, such a development is to be expected in an ever-evolving locale as this, and will broadly knit into the prevailing urban fabric rather than contrasting against it.

For the reasons outlined above, as well as in Sections 4.5.2.3.2 and 4.5.2.3.3, the **magnitude of operational stage landscape/townscape impacts** is considered to be **Medium-Low** and **Neutral-Negative.**

In accordance with the Landscape/Visual significance matrix contained in Section 4.1.2., the combination of a 'Medium/Medium-low' townscape sensitivity judgements and a 'Medium-low' townscape impact magnitude judgment results in a **Moderate-slight** overall operational stage significance of townscape impact for the combined Phase 1 and Phase 2, with a **Neutral/Neutral-negative** quality of effect.

4.6 Mitigation Measures, Monitoring and Residual Effects

4.6.1 Mitigation & Monitoring

In terms of potential Landscape & Visual Impacts, all mitigation measures have been embedded into the design and detail of the proposed development. Thus, they are being assessed in this chapter, in Section 4.5 (i.e. landscape impacts), above., and Section 4.7 (i.e. visual impacts), below. In addition, no monitoring is required, in relation to potential Landscape & Visual Impacts.

4.6.2 Residual Impacts

4.6.2.1 Phase 1 'The Meadows'

Residual impacts for Phase 1 'The Meadows' are being assessed in this chapter, in Section 4.5 (i.e. landscape impacts), above, and Section 4.7 (i.e. visual impacts), below.

4.6.2.2 Phase 2 'The Farm'

Residual impacts for Phase 2 'The Farm' are being assessed in this chapter, in Section 4.5 (i.e. landscape impacts), above., and Section 4.7 (i.e. visual impacts), below.

4.6.2.3 Combined Phase 1 and Phase 2

Residual impacts for Combined Phase 1 and Phase 2 are being assessed in this chapter, in Section 4.5 (i.e. landscape impacts), above., and Section 4.7 (i.e. visual impacts), below.

4.7 Visual Impact Assessment

4.7.1 Phase 1 'The Meadows'

4.7.1.1 Visual Receptor Sensitivity

In consideration of the visual receptor criteria set out in Section 4.1.2, the main variation in the nature of views and those availing of those views, in this instance, relates to an overt sense of place. Accordingly, the resulting visual receptor sensitivity of all 17 viewpoints will be informed by these factors. Thus, in terms of visual sensitivity, the receptors will be categorised as those being:

- Chiefly residential in land use and character;
- Chiefly commercial and/or institutional in land use and character;
- Chiefly recreational in land use and character;
- Chiefly that of road users;
- That of a scenic designation.

Those receptors that are chiefly residential in land use and character entail **VPs: 5, 6, 11 & 14**. Overall, views within this receptor base are deemed to be of 'Medium-low' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

Those receptors that are chiefly commercial in land use and character entail **VPs: 1 & 13.** Overall, views within this receptor base are deemed to be of 'Medium-low' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

Those receptors that are partly institutional and recreational in land use and character, within Bessborough Estate, entails **VPs: 9, 15, 16 & 17.** These were deemed to have a 'Medium' visual sensitivity.

Those receptors that are chiefly recreational in land use and character entail **VPs: 2, 3 & 8.** Overall, views within this receptor base are also deemed to be of 'Medium' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

Those receptors that are chiefly that of road users entail **VPs: 10 & 12.** Overall, views within this receptor base are deemed to be of 'Medium-low' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

Those receptors that are that of a scenic designation entail **VPs: 4 & 7**, which are deemed to be 'Medium' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

4.7.1.2 Magnitude of Visual Effect

The assessment of visual impacts at each of the selected viewpoints is aided by photomontages of the proposed development, and should be read in conjunction with the photomontage booklet contained at the end of this chapter. Photomontages are a 'photo-real' depiction of the scheme within the view, utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. For each viewpoint, the following images have been produced:

1. Existing View
2. Montage View upon completion of all proposed works

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP1	R852 by Mahon Retail Park	438m	W
Representative of:	• Local community views; • Centres of population • Major route		
Receptor Sensitivity	**Medium-low**		
Existing View	By way of context, this muscular regional road cuts between Mahon Retail Park and City Gate Business Park; a relatively recent road connecting the N40 /south ring road with Blackrock. It is a commercial/retail/business hub that once was part of the original Bessborough estate, and which has only been developed this century from greenfield sites. In this notably urban scene, a wide, busy junction occupies the complex foreground. South (i.e. left) of the road is the retail park with attendant vast car park. North of the road is numerous large multi-storey blocks up to 19m height. In the distance, a tall treeline marks the alignment of the Passage West Greenway, which curtails all views beyond.		
Visual Impact of proposed development	In the distance, rising above the greenway treeline, multi-storey blocks will be evident to varying degrees, in direct line of sight of road users. These 6-10 storey buildings will be apparent as a suitably scaled, aesthetically finished piece of contemporary multi-storey architecture. The proposal will accelerate the intensity and scale of built development within this urban scene, spurring a distinct visual change and a notably increased sense of visual enclosure, but will be neither visually dominant from this location, nor appear overbearing. The treeline to the blocks' east will help provide a degree of softening and screening of the development. Aesthetically, the proposal will read as a 'natural' extension of similar scaled buildings visible north (i.e. right) of the foreground road (i.e. City Gate Business Park), which will have a crossover in their cuboid and/or rectangular form. With their mix of light grey buff, red natural brick, dark brown panels and white render finish, the discerning break-up of height, tones and materials will avoid the potential for 'massing' of the proposed blocks, when viewed from this location. In that regard, the proposal - in tandem with Mahon Point Retail Park and City Gate - will constitute a high-end architectural bookend to the south-eastern approach to the city. As a result, the proposal will not have a marked effect on the visual amenity of the scene. As a result of these factors, the magnitude of visual impact is deemed to be **Medium-low** and of a **negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Medium-low	**Moderate-Slight/negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP2	Greenway pedestrian/cycle bridge over N40	297m	NW
Representative of:	• Local community views; • Amenity and heritage features		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, this pedestrian/cycle bridge connects the former rail line – now Passage West greenway - across this wide and busy south ring road/N40. While this location is one governed by views of a non-aesthetic, heavily frequented arterial route, those receptors upon this bridge otherwise experience a more aesthetic, naturalistic and peaceful option to either side of this road, as they journey along the greenway. In this view, beyond the bridge and the northern side of the N40, a dense thicket of mature trees marks the southern boundary of the wider Bessborough estate. These trees - less than 30m from this location - largely curtail views in the direction of the site. Be that as it may, above a low dip in this treeline, a couple of buildings and a crane can be discerned		
Visual Impact of proposed development Summary	Above treetops in the aforementioned dip in the foreground thicket, the eight-storey Block C and 10-storey Block B will be partially visible. The height and scale of these buildings will be difficult to determine, owing to the foreground trees screening their bases, as well as the viewer being on this arched, elevated bridge. However, they will certainly not be visually dominant or overbearing, while there are several other multi-storey buildings in existence in the locality. The low visual presence of the proposed development will derive partly from the busy foreground setting working in tandem with distance over scale, as well as the more noticeable, mature trees between the site and this location. Indeed, it is only because of an inconsistency in this tree alignment that will permit a partial view of the two blocks. Of what can discerned of the proposed blocks will read as a contemporary multi-storey apartment complex that can be regularly seen about this city, and the proposed building's scale, form, text or tone is unlikely to draw attention to itself. The proposal will mark a modest increase in the scale and intensity of built development, but will also serve to contrast and offset the 'leafy' profile of Bessborough that is visible in this scene. Overall, the proposal may not be noticed by a casual observer and even if noticed, would not have a deleterious effect on the visual amenity of the scene.		
Summary	Based on the assessment criteria and matrices outlined at Section 4.1.2 the significance of residual visual impact is summarised below		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low	**Slight/Negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP3	Estuary path at Jacob's Island	811m	NW
Representative of:	• Local community views; • Amenity and heritage features		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, the Estuary Path along Jacob's Island stretches for over 3km, running between the N40/ southern ring road and Lough Mahon and River Douglas & Lee estuaries. Thus, it is very popular with walkers, runners and cyclists. It's overwhelming source of visual amenity is water-based; in this instance to the south, southeast and southwest (i.e. left of this vista, and the direction in which the path-side benches are facing). An old stonewall borders the northern side of the path. Wire fixings and a modest industrial-like structure are visible above the wall, but otherwise multiple treelines are common; some of which belong to the Bessborough Estate. While an ostensibly tranquil scene, the setting is nonetheless within 500m from major arterial and infrastructural development that is evident elsewhere along this pathway.		
Visual Impact of proposed development	In the wider line of sight of path-users, approx. 800m away, two multi-storey blocks will be partially visible above intervening tall trees. Where visible, the proposed development will be evident as an appropriately scaled, tastefully finished piece of contemporary multi-storey architecture. However, owing to the robustness of tress within the site, of the four proposed blocks, only the uppermost floors of two of the proposed blocks will be visible from this location. The proposal will add to the intensity and scale of built development within the scene, while suggesting a contemporary/21st Century architectural presence within the Bessborough Estate that was not previously palpable. The partially visible two blocks will read as a contemporary multi-storey apartment complex that can be regularly seen about this city, and the proposed building's scale, form and tone is unlikely to draw attention to itself. While increasing the scale of built development and vertical profile of buildings within this scene, the overwhelming source of visual amenity at this location will remain water-based/ seaward, and therefore largely unaffected. Thus, the proposed development will have no noticeable impact upon the visual amenity of this vista. For the reasons outlined above, the magnitude of visual impact is deemed to be **Low** and of a **Negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low	**Slight/Negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP4	County Cork scenic route S55 near junction with R610	1.4km	NW

Representative of:	• Designated Scenic Routes and Views; • Major route.		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, there is one Cork County designated scenic route within the study area, located more than 1.4km from the site, in the south-eastern corner of the study area. This scenic route S55 is described as a "Road along wooded stretch to Rochestown," is approx. 700m in length and is set within a thickly wooded glen that allows for highly localised views only. However, at the northern end of the scenic route, it emerges from the glen by the junction with the R610. In this scene, however, mature trees on the northern side of the R610 preclude views in the direction of the site.		
Visual Impact of proposed development	Owing to the mature trees on the northern side of the R610, no views of the proposed development will be attainable. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP5	Public green at Charlemont Heights, Rochestown	1.3km	N

Representative of:	• Local community views; • Amenity and heritage features.		
Receptor Sensitivity	**Medium-low**		
Existing View	South of the River Douglas estuary, the numerous, extensive housing developments of Rochestown are set across a steep hillside with sweeping views north, across the estuary, towards Mahon Golf Course, Blackrock, the city centre and beyond. A small public green by the roadside at Charlemont Heights (residential road) allow for relatively open views in the direction of the site. Above a foreground residence, across the estuary, the tree-lined boundaries of Bessborough are visible, as is the substantial multi-storey development of City Gate Business Park, marginally east (i.e. left) of the site. To the northwest, the stadium roof of Páirc Uí Chaoimh is discernible, as is the large cranes of Tivoli Docks, while the low hills north of the Lee draw the eye to a near-horizontal skyline/ridgeline; along with the estuary, the most apparent sources of visual amenity in this scene.		
Visual Impact of proposed development	Nestled within the mid-ground of this elevated, long-distant and multi-faceted view, the proposed 6-10 storey buildings will be partially visible as an appropriately scaled, appealingly finished piece of high-end multi-storey architecture. The proposal will marginally increase the intensity and scale of built development within this broad, sweeping vista, but at over 1.2km, will be neither visually dominant nor appear overbearing. The thicket of trees along the southern boundary of the Bessborough Estate will help provide a degree of softening and screening of the development. Aesthetically, the proposed development will read as a *de facto* extension of the contemporary, sharp design of the City Gate Business Park, as well as being one of several multi-storey and/or large developments visible from this elevated viewpoint. With their mix of light grey buff, red natural brick, dark brown panels and white render finish, the discerning break-up of height, tones and materials will circumvent the potential for 'massing' of the proposed blocks. Indeed, as views of the city and its continual evolution are pertinent to this hillside, the proposal will constitute a high-end architectural statement reflective of a 21st Century, ever-evolving European city. In addition, the proposal will remain fastened well below the skyline, while the manifest sources of visual amenity in this scene will not be affected. Overall, the proposal alters the vista to a minor extent and would not have a marked effect on the visual amenity of the scene. Consequently, the magnitude of visual impact is deemed to be **Low** and of a **Negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Low	**Slight/negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP6	Public green at Rowan Hill, Mount Oval	1.4km	N

Representative of:	• Local community views; • Amenity and heritage features.		
Receptor Sensitivity	**Medium-low**		
Existing View	Mount Oval is home to extensive housing developments set across a steep hillside with sweeping views north, across the estuary, towards Mahon Golf Course, Blackrock, the city centre and beyond. A relatively large public green by the roadside at Rowan Hill (residential road) allow for relatively open views in the direction of the site. Above some downhill residences, across the estuary, the tree-lined boundaries of Bessborough are visible, as is the substantial multi-storey development of City Gate Business Park and Mahon Park retail park, marginally east (i.e. left) of the site. However, the sizeable cluster of mid-rise buildings in the heart of the Bessborough estate is also apparent. To the northwest, the large cranes of Tivoli Docks are visible, while the low hills north of the Lee draw the eye to a near-horizontal skyline/ridgeline; along with the estuary, the most apparent sources of visual amenity in this scene.		

Visual Impact of proposed development	Nestled within the mid-ground of this elevated, broad vista, the proposed 6-10 storey buildings will be partially visible as a suitably scaled, well finished piece of high-end multi-storey architecture. The proposal will marginally increase the intensity and scale of built development within this view, but at 1.4km, will be neither visually dominant nor appear overbearing. The thicket of trees along the southern boundary of the Bessborough Estate, and between the site and Bessborough House, provides a degree of softening and screening of the development. Aesthetically, the proposed development will read as a *de facto* extension of the multi-storey, high-end design of the City Gate Business Park, as well as being one of large developments visible from this elevated viewpoint. Indeed, from this location, the proposal will serve to bridge a veritable 'gap' between two clusters of mid-rise buildings (i.e. Bessborough House cluster and City Gate). With their mix of light grey buff, red natural brick, dark brown panels and white render finish, the discriminating break-up of height, tones and materials will thwart the potential for 'massing' of the proposed blocks. Indeed, as views of the city and its continual evolution are evident from this hillside, the proposal will constitute a high-end architectural statement reflective of a 21st Century, ever-evolving European city. In addition, the proposal will remain well below the skyline, while the manifest sources of visual amenity in this scene will not be affected. Overall, the proposal will alter the scene to an unimportant extent and would not have a patent effect on the visual amenity of the scene. Consequently, the magnitude of visual impact is deemed to be **Low** and of a **Negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Low	**Slight/Negative**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP7	Cork City AR4 & LT14 protected view along N28	1.2km	NE
Representative of:	• Designated Scenic Routes and Views; • Major Route.		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, this location reflects the two Cork City designated views/prospects in the study area that may be of relevance to the site. This is the aforementioned AR4' view from 'Carrigaline Road/ Carr's Hill' with views to 'Bessboro House', as well as the less relevant LT14, which originates at the same location as AR4 (i.e. Carr's Hill). This view is from the N28, connecting Cork City with Carrigaline and Ringaskiddy. In this scene, mature roadside trees curtail views in the direction of the site; as they do along this road, in the broader vicinity of this location.		

Visual Impact of proposed development	Owing to the aforementioned roadside trees, no views of the proposal will be attained from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible	**Imperceptible/Neutral**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP8	Mahon Golf Course	661m	NE
Representative of:	• Amenity and heritage feature		
Receptor Sensitivity	**Medium**		
Existing View	Mahon Golf Course is an 18-hole, purpose made Municipal Golf Course that opened in 1980. It lies to the immediate southwest of the Bessborough Estate. This scene is typical of many/most scenes from this or other golf courses: numerous mature and semi-mature trees are dotted between fairways and greens of the golf course. As the terrain is not greatly sloping, no views beyond that of the course can be attained, owing to the depth and density of planting.		
Visual Impact of proposed development	Owing to the density of the aforementioned trees within the golf course, No views of the proposed development will be attained from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible	**Imperceptible/Neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP9	Field to the fore of Bessborough House	286m	NE
Representative of:	• Amenity and heritage features		
Receptor Sensitivity	**Medium-low**		
Existing View	This location is within the private grounds of the Bessborough Estate, and is the 'front' field over which the historic Bessborough House reigns. This field is one of the original four large fields shown on aforementioned historic maps from the 19th. However, it is not accessible to the public, but used for agricultural purposes. Be that as it may, owing to the potential for on-going development/evolution of the estate, this large field to the south of these buildings may or may not be, at some point in the future, developed as a public park and/or amenity area; thus, the rationale for the selection of this viewpoint in this visual impact assessment. In this view, beyond a sloping field of freshly cut grass, the cluster of mid-rise buildings around Bessborough is apparent, spanning three different centres. A mature treeline east and southeast of the house (i.e. to the right of the scene) is also visible. The scene is one of architectural discordance and a low-level visual disharmony. This mid-rise cluster constitutes a variety of forms, tones, materials, ages, functions and scale of buildings, none of which appear to be aesthetically 'in synch' with the other, and do little to respect the grace and elegance of the 18th Century Bessborough House.		
Visual Impact of proposed development	To the northeast of the Bessborough House cluster, behind the aforementioned treeline east of the cluster, the proposed multi-storey blocks will be partially visible. These 6-10 storey buildings will be apparent as a suitably scaled, aesthetically finished piece of contemporary multi-storey architecture. The proposal will further accelerate the intensity and scale of built development within this urban scene, but will be neither visually dominant nor overbearing. The treeline to the blocks' west will help provide a degree of softening and screening of the development. Aesthetically, the proposal will read as a less immediate, more set back development than the Bessborough cluster. It will be characterised by a step-up in scale from the foreground buildings, and a distinctively high-end 21st Century signature style that is unlikely to be confused or associated with the Bessborough cluster. With their mix of light grey buff, red natural brick, dark brown panels and white render finish, the discerning break-up of height, tones and materials will avoid the potential for 'massing' of the proposed blocks, when viewed from this location. Overall, while the proposal will represent a moderate alteration to the available vista, it will not have a marked effect on the visual amenity of the scene. As a result of these factors, the magnitude of visual impact is deemed to be **Medium-low** and of a **negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Medium-low	**Moderate-Slight/ negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP10	Access road connecting site to Bessborough Road	158m	SE
Representative of:	• Local community views		
Receptor Sensitivity	**'Medium-low'**		
Existing View	This road has been relatively-recently constructed (i.e. within the last quarter century) to facilitate for the on-going development of lands in the former Bessborough estate, and is the only road serving the site; a *cul de sac* linking the site with Bessborough road. In this scene, two healthcare/institutional-zoned buildings occupy the foreground to the east (i.e. left) of the road. To the west of the road, behind palisade fencing is former land belonging to the Bessborough estate. While not within this scene, it is worth noting that two large and highly visible telecommunications towers are located within 30m north of this location. Owing to the foreground, in combination with some mid-distant trees, little can be discerned in this scene, aside from its apparent absence of any overt or distinguished visual amenity.		
Visual Impact of proposed development	Four multi-storey blocks will rise up above the foreground buildings, in an ostensible manner and in the direct line of sight of road users. The juxtaposition of 6-10 storey buildings behind low-rise foreground buildings will typically present a stark contrast, as it will do in this instance, even though the proposal will be an aesthetically finished piece of contemporary multi-storey architecture. Nonetheless, it will notably increase the intensity and scale of built development within this scene, imprinting a distinct visual change and a notable increased sense of visual enclosure. However, it will be neither visually dominant from this location, nor appear overbearing. In addition, in the broader urban context of this setting, views of multi-storey development will not be untoward. Visually, the escalation of building scale in this scene will create a readily noticeable element in this vista. There will be limited aesthetic, form or style compatibility between the foreground buildings and street scene, and that of the proposed development. Be that as it may, with their mix of light grey buff, red natural brick, dark brown panels and white render finish, the alternation of height, tones and materials will avoid the potential for 'massing' of the proposed blocks. Even though there are numerous high-end multi-storey blocks within 300m of this location, they are not visible from this exact location. Overall, the proposal will introduce a moderate alteration to the available vista and will be a readily noticeable element, modestly escalating a low degree of visual disharmony into a setting without any pre-existing strong or overt visual amenity. Thus, the magnitude of visual impact is deemed to be **Medium** and of a **negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Medium	**Moderate-slight/ negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP11	Entrance to Greenway from R852	87m	SW
Representative of:	• Local community views • Major route • Heritage & Amenity feature (i.e. the greenway)		
Receptor Sensitivity	**Medium-low**		
Existing View	By way of context, this location is at the footpath along the eastern side of the R852/Mahon Link Road; the point where a pedestrian/cycle entrance onto the Passage West Greenway drops down into that deep and heavily vegetated cutting. While this particular scene to the southwest is one which is most verdant and vegetated, it is worth recalling that a heavily frequented greenway is set beneath this roadside location; a busy regional link road aligns the other side of this footpath, while there are multiple, conspicuous high end, multi-storey buildings in the immediate vicinity, with some being less than 40m away (i.e. across this road, to the east and southeast).		
Visual Impact of proposed development	The strong vertical impact of the 10-storey Block B will be apparent, but not conspicuous, less than 100m from this location, as will be the proposed pedestrian bridge over the greenway. The Block's overt, adroit scale will be palpable, albeit in the context of numerous pre-existing high end, multi-storey buildings in the immediate vicinity. The Block's height, strong linear form and light grey buff finish brick will a readily noticeable element in this vista. Further south of Block B, the upper floor of the 8-storey Block C will be discernible above the treetops. In addition, the proposed pedestrian/cyclist bridge, connecting the site with the Mahon Link Road and the Greenway, will be visible. Owing to the inconsistency of mature trees along the western side of the greenway, this exact location will allow for an out-and-out 'worst case scenario' of views of the development between those trees, whereas this will vary considerably as one moves along this footpath, along the R852 and up/down the ramp into the greenway. The proposal will accelerate the intensity and scale of built development, generating an increased sense of visual enclosure, but will be neither visually dominant from this location, nor overbearing. Furthermore, it is worth noting that no views of the proposal will be likely to be attainable from the greenway itself, owing to the density, immediacy and scale of mature trees enclosing the deep linear cutting. Aesthetically, Block B's form and scale will be more apparent than finish, texture or tone. However, its light grey buff finish brick will suitably off-set the rich vegetation to the foreground, while its broader consistency with Block C will aid in legibility of the scheme. Crucially, from this location, Blocks B & C will be one of several, visible high-end, multi-storey blocks constructed in recent years on the former Bessborough estate. The proposal - in tandem with Mahon Point Retail Park and City Gate - will constitute a high-end architectural bookend to the south-eastern approach to the city; one that is now better integrated and connected through the construction of the pedestrian/cyclist bridge in the foreground. Thus, the magnitude of visual impact is deemed to be **Medium** and of a **negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Medium	**Moderate-slight/ negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP12	St. Michael's Drive by City Gate Business Park	163m	SW
Representative of:	• Local community views		
Receptor Sensitivity	**Medium-low**		
Existing View	St. Michael's Drive is a relatively recently constructed road aligning the northern side of the City Gate Business Park. Once forming the eastern lands of the Bessborough Estate, like most business parks this area is notably low on any residents/ residential development, owing to its zoning. Thus, as this not a 'link road' of any note, those using this road and attendant footpaths tend to be those working at or accessing the services (e.g. Mater Private, or VHI Swiftcare clinic) of this multi-storey development. Indeed, the highest parapet level of the buildings south of this road (i.e. left), at the junction with the R852/ Mahon Link Road in the mid-distance, is approx. 19m high, whereas the building to the north (i.e. right) of the road is approx. 11m high. Approx. 100m away to the southwest, at the junction with the R852/Mahon Link Road, the mature trees aligning the Passage West greenway can be seen, which curtail all views beyond.		
Visual Impact of proposed development	Rising above the greenway treeline, two multi-storey blocks (i.e. Block A and, closer to this location, Block B) will be partially visible, and in direct line of sight of road users. These 6-10 storey buildings will be apparent as a suitably scaled, aesthetically finished piece of contemporary multi-storey architecture. The proposal will accelerate the intensity and scale of built development within this urban scene, but will be neither visually dominant from this location, nor appear overbearing. The treeline to the blocks' east will help provide a degree of softening and screening of the development. Aesthetically, the proposal will read as a 'natural' extension of similar scaled buildings visible south (i.e. left) of the foreground road (i.e. City Gate Business Park), which will have a crossover in their cuboid and/or rectangular form. In that regard, the proposal will constitute a high-end architectural bookend to the south-eastern approach to the city. As a result, the proposal will not have a marked effect on the visual amenity of the scene. As a result of these factors, the magnitude of visual impact is deemed to be **Medium-low** and of a **negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Medium-low	**Moderate-Slight/ negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP13	R852 bridge over Greenway	597m	S
Representative of:	• Local community views • Major route		
Receptor Sensitivity	**Medium-low**		

Existing View	This location is from a bridge on a busy regional road where it crosses over the Passage West Greenway, and is the first bridge across the greenway as one travels north from the site. It reveals the deep linear cut of the greenway, as well as the density and immediacy of the mature trees surrounding it.		
Visual Impact of proposed development	Owing to the aforementioned trees aligning the greenway, there is no potential for views of the proposed development from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP14	Ballinure Avenue by Saint Michael's Cemetery	627m	SW
Representative of:	• Local community views • Heritage & Amenity feature		
Receptor Sensitivity	**Medium-low**		
Existing View	By way of context, this area contains extensive low-rise housing developments across marginally higher land than the site, which lies to the southwest. While densely residential, it is also a location that encapsulates the large and heavily frequented cemetery that is Saint Michael's Cemetery. In a street space between two-storey foreground residences, views of more distant multi-storey buildings are evident. These are a 'National Software Centre' and further to the southwest, a building within City Gate Business Park. The high-end commercial/technological multi-storeys sharply contrast with the low-rise, mid-20th Century Council terraces to the foreground.		
Visual Impact of proposed development	Above the distant City Gate building, the uppermost storey of the 10-storey Block B will be partially visible, but not noticeable, from this location. At over 700m distance, the Block will be difficult to determine, and stays 'snug' below the skyline of the closer software centre. Indeed, the partially visible block provides a subtle and gradual 'stepping' down/up of multi-storey blocks, when viewed from this location. Nonetheless, it increases the scale of built development within the scene. Overall, the proposal would be barely discernible within the available vista and will not detract from the visual amenity of the scene. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP15	Bessborough Estate entrance avenue	219m	E
Representative of:	• Local community views • Heritage & Amenity feature		
Receptor Sensitivity	**Medium**		
Existing View	This long-established entrance avenue to Bessborough House connects Bessborough Road with Bessborough House, approx. 450m to the southeast of the main entrance. This stately avenue tends to enjoy marginally elevated views out to the west and southwest (refer to Figures 4.13 & 4.14), which overlook a sloping field of pasture and woodland thicket along the west of the estate. To the east of the avenue, however, views are regularly curtailed by the density of mature planting in the vicinity. This area (i.e. to immediate east of the avenue) is made up of a mature parkland landscape, consisting of over 330 native and non-native trees, interlaced with lawn and pathways and dotted with occasional small, single-storey buildings. However, an occasional clearance or absence of avenue-side vegetation allows for more distant views into this mature, tree-dotted parkland. In this winter/bear-leaf scene, the plethora of mature native and non-native trees indent a rich sylvan character to the site, even though there is a sizable proportion of non-native trees within the parkland that were not original to the estate. Little can be discerned beyond these trees, aside from a two-storey stone building in the distance, partially visible above a stone wall.		
Visual Impact of proposed development	One of the proposed multi-storey blocks within Phase 1 'The Meadows' area will be discernible from this location, more than 200m away, although it will be very unlikely to be noticed. This block will be mostly obscured by intervening trees, while it will not noticeably increase the vertical imprint of the scene, as the foreground trees will be notably taller, in this perspective and setting. No other of the proposed buildings or structures within Phase 1 'The Meadows' area will be discernible from this location. From the little that will be discerned of the proposed development, it is likely to be read as a high-end, contemporary development at a distinct remove from the foreground parkland and the entrance avenue. In addition, this view is at an obscure angle to that of avenue-users, and so is more likely to offer a relatively fleeting, momentary glance at an obscure angle. Indeed, this is a view that is more reflective of those within the foreground parkland, which is not accessible to the public. Consequently, the magnitude of visual impact is deemed to be **Low-negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low-negligible/negative	**Slight/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP16	View from the west of Bessborough Estate	315m	E

Representative of:	• Local community views • Heritage & Amenity feature
Receptor Sensitivity	**Medium**
Existing View	This location is from the western periphery of a marginally sloping field in the west of Bessborough Estate. While the public do not and cannot access these pastoral fields in the south and west of the estate, this location is adjacent to the aforementioned mature thicket of woodland aligning the western boundary, within which a rough, walking trail winds its way. Although private property, this trail is frequently used by the public. However, it is deep within the thicket, and so this view is not representative of those using the trail within the thicket. In this highly modified, anthropocentric scene, the most apparent element is that of the large cluster of institutional buildings within the estate, mostly to the north of Bessborough House, whose chimneys are visible in the south of the cluster. The cluster of building forms, style, heights and finish do little to engender a cohesive sense of place within the estate, and their visual presence is accentuated in this view by being marginally uphill. To the north of the building cluster, the robust parkland setting is evident, owing to the scale and density of mature trees. Between it and this location, the aforementioned entrance avenue to the Estate is visible (i.e. cars upon it).
Visual Impact of proposed development	In this winter/bare leaf scene, the upper two storeys of one of the proposed multi-storey blocks in Phase 1 'The Meadows' area will be partially visible, but very unlikely to be noticed. At over 300m away, this proposed block will not noticeably increase the vertical imprint of the scene, as the Bessborough cluster of buildings will be notably higher, when viewed from this location. No other of the proposed buildings or structures within Phase 1 'The Meadows' area will be discernible from this location. From the little that will be discerned of the proposed development, it is likely to be read as a high-end, contemporary development at a distinct remove from the western side of the estate. Even if viewed from this location, the proposed development is unlikely to be detract from the visual amenity of the scene and will be assumed to be a 'natural' and modest extension of the cluster of buildings already present in the mid-distance. Consequently, the magnitude of visual impact is deemed to be **Low-negligible** and of a **Neutral** quality.
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.

	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low-negligible/ negative	**Slight-imperceptible/negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP17	View from the south of Bessborough House	195m	N

Representative of:	• Local community views • Heritage & Amenity feature
Receptor Sensitivity	**Medium**
Existing View	This location is within a sloping pastoral field to the south of Bessborough House, This field is one of the original four large fields shown on aforementioned historic maps from the 19th. However, it is not accessible to the public, but used for agricultural purposes. Be that as it may, owing to the potential for on-going development/evolution of the estate, this large field to the south of these buildings may or may not be, at some point in the future, developed as a public park and/or amenity area; thus, the rationale for the selection of this viewpoint in this visual impact assessment. In addition, large woodland thicket runs directly south of this location, which is frequently access by walkers/runners traversing the estate. In this winter/bare leaf view, at the end of slightly-sloping field of freshly cut grass, the cluster of mid-rise buildings around Bessborough is apparent, spanning three different centres. A mature treeline east and southeast of the house (i.e. to the right of the scene) is also visible. The scene is one of architectural discordance and a low-level visual disharmony. This mid-rise cluster constitutes a variety of forms, tones, materials, ages, functions and scale of buildings, none of which appear to be aesthetically 'in synch' with the other, and do little to respect the grace and elegance of the 18th Century Bessborough House.
Visual Impact of proposed development	To the northeast of the Bessborough House cluster, behind the aforementioned treeline east of the cluster, the proposed multi-storey blocks will be partially visible. These 6-10 storey buildings with the Phase 1 'The Meadows' area will be apparent as a suitably scaled, aesthetically finished piece of contemporary multi-storey architecture. The proposal will serve to accelerate the intensity and scale of built development within this urban scene, but will be neither visually dominant nor overbearing. The treeline to the proposed blocks' west will help provide a degree of softening and screening of the development. Aesthetically, the proposal will read as a less immediate, more set back development than the Bessborough cluster. It will be characterised by an alteration in colour/tone as well as a distinctively high-end 21st Century signature style that is unlikely to be confused or associated with the Bessborough cluster. With their mix of tones and materials, the discerning break-up of height, tones and materials will avoid the potential for 'massing' of the proposed blocks. Overall, while the proposal will represent a modest alteration to the available vista, it will not have a striking effect on the visual amenity of the scene. As a result of these factors, the magnitude of visual impact is deemed to be **Low** and of a **negative** quality.
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.

	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low	**Slight/negative**

4.7.1.2.1 Combined Phase 1 & Phase 2 - Significance of Visual Effect

The high level of mature tree cover surrounding the Bessborough Estate, as well as within it, results in a more limited degree of combined visibility for Phases 1 & 2 than might otherwise be the case. To begin with, it is worth noting that there was no combined visibility for Phases 1 & 2, when viewed from numerous viewpoints, including VPs 1, 2, 3, 4, 8, 9, 11, 12, 13, 14 & 16. However, there remain two locales within the study area where views of the combined Phase 1 & 2 are likely to occur.

From within the Bessborough Estate, the viewpoints where that will experience a combined visibility of both Phase 1 & 2 will be VP10 & VP16. In the case of VP10, it will be a close-range, open view of Phase 2 'The Farm', in tandem with more mid-distance views of Phase 1 'The Meadows.' In the case of VP16, both of the proposed phases will only be partially glimpsed, behind intervening trees and/or buildings, while the existing large cluster of buildings at the centre of the estate will remain considerably more apparent. However, these two viewpoints are in the context of a highly developed, urban context in which both recent and multi-storey development contributes to the strong sense of place.

The other locale is that of three viewpoints from the elevated landform/hills in the south of the study area (i.e., south of the Douglas estuary), more than 1km from the proposed development and on elevated terrain which allows for extensive views across all of Cork city. In the case of VP5 & VP6, the upper level(s) of both phases are likely to be visible, even in full leaf/summer months. However, knitted into a backdrop of considerably more developed (and higher) buildings about the city, their combined visual impact will be highly unlikely to draw attention to themselves. Meanwhile, visibility of the combined phases from VP7 (i.e. the protected views from Carr's Hill) is likely to be only discernible in a bare leaf/winter scenario and only to the point where the presence of the proposed buildings will be faintly discerned, rather than overtly visible. However, in a full leaf/summer scenario, combined visibility is unlikely to occur.

In summary, such potential for combined likely visibility of both phases pertains to five viewpoints; in other words, less than one-third of selected visual receptors across the study area.

4.7.1.2.2 Phase 1 'The Meadows': Significance of Visual impact during bare leaf/ winter conditions

Of the 17 viewpoints assessed above for Phase 1 'The Meadows' application, three of these (i.e., VPs 15, 16 & 17) are exclusive bare leaf/ winter views, and have been assessed solely on that basis. However, the following 6 no. viewpoints were captured in bare leaf/winder conditions, in addition to full leaf/summer conditions.

VP1 – R852 by Mahon Retail Park

This receptor will change from a 'Medium-low' visual impact magnitude to 'Medium' owing to: the bare leaf vegetation; to the proposed development being in the direct line of sight of road users and to the lack of more immediate, existing multi-storey buildings who will remain unaffected by the winter conditions (i.e., the baseline likely visibility of existing buildings remains constant, in this instance, regardless of the season). Thus, the bare leaf/winter conditions visual impact significance will change from 'Moderate-slight/negative' to '**Moderate/negative'** visual impact significance.

VP2 - Greenway pedestrian/cycle bridge over N40

This receptor will change from a 'Low' visual impact magnitude to 'Medium,' owing to the scale of foreground bare leaf vegetation, in combination with the proposed development being in the direct line of sight of cycle bridge users. These factors will have the effect of increasing the visual presence of the proposal. Thus, the bare leaf/winter conditions visual impact significance will change from 'Slight/negative' to '**Moderate/negative'** visual impact significance.

VP5 - Public green at Charlemont Heights, Rochestown

The significance of visual impact will remain unaffected, in this instance, chiefly because of the range and scale of existing buildings that will also be more apparent and/or visible and/or partially visible during bare leaf/winter conditions. Consequently, as the magnitude of visual impact will remain unaffected/unchanged, so too will the significance.

VP7 - Cork City AR4 & LT14 protected view along N28

This receptor will change from a 'Negligible' visual impact magnitude to 'Low-negligible,' owing to the bare leaf vegetation in combination with the proposed development being in the direct line of sight of road users. Thus, the bare leaf/winter conditions visual impact significance will change from 'Imperceptible/neutral' to '**slight-imperceptible/negative'**.

VP11 - Entrance to Greenway from R852

This receptor will change from a 'Medium' to a 'High-medium' visual impact magnitude, owing to the scale of foreground bare leaf trees in the foreground. Rather than screening a similar proportion of the proposed development, as when in full-leaf, these trees allow a higher degree of visual impact magnitude, in relation to the proposal. Thus, the bare leaf/winter conditions visual impact significance will change from 'Moderate-slight/negative' to '**Moderate/negative'**.

VP12 - St. Michael's Drive by City Gate Business Park

This receptor will change from a 'Medium-low' visual impact magnitude, to 'Medium,' owing to the scale bare leaf vegetation between the proposal and this location, in combination with the proposed development being in the direct line of sight of road users. These factors will have the effect of increasing the visual presence of the proposal. Thus, the bare leaf/winter conditions visual impact significance will change from 'Moderate-Slight/negative' to '**Moderate/negative'** visual impact significance.

4.7.2 Phase 2 'The Farm'

4.7.2.1 Visual Receptor Sensitivity

In consideration of the visual receptor criteria set out in Section 4.1.2, the main variation in the nature of views and those availing of those views, in this instance, relates to an overt sense of place. Accordingly, the resulting visual receptor sensitivity of all 19 viewpoints will be informed by these factors. Thus, in terms of visual sensitivity, the receptors will be categorised as those being:

- Chiefly residential in land use and character;
- Chiefly commercial and/or institutional in land use and character;
- Chiefly recreational in land use and character;
- Chiefly that of road users;
- That of a scenic designation.

Those receptors that are chiefly residential in land use and character entail **VPs: 5, 6, 11 & 14**. Overall, views within this receptor base are deemed to be of 'Medium-low' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

Those receptors that are chiefly commercial and/or institutional in land use and character entail **VPs: 1, 9, 13, 18 & 19.** Overall, views within this receptor base are deemed to be of 'Medium-low' visual sensitivity, on balance of a multitude of factors set out in Section 1.3.2. However, the exception to this is VP9, which is set within the verdant grounds of the Bessborough Estate.

Those receptors that are partly institutional and recreational in land use and character, within Bessborough Estate, entails **VPs: 9, 15, & 16.** These were deemed to have a 'Medium' visual sensitivity.

Those receptors that are chiefly recreational in land use and character entail **VPs: 2, 3 & 8.** Overall, views within this receptor base are also deemed to be of 'Medium' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

Those receptors that are chiefly that of road users entail **VPs: 10 & 12.** Overall, views within this receptor base are deemed to be of 'Medium-low' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

Those receptors that are that of a scenic designation entail **VPs: 4 & 7**, which are deemed to be 'Medium' visual sensitivity, on balance of a multitude of factors set out in Section 4.1.2.

4.7.2.2 Magnitude of Visual Effect

The assessment of visual impacts at each of the selected viewpoints is aided by photomontages of the proposed development, and should be read in conjunction with the photomontage booklet contained at the end of this chapter. Photomontages are a 'photo-real' depiction of the scheme within the view, utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. For each viewpoint, the following images have been produced:

1. Existing View
2. Montage View upon completion of all proposed works

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP1	R852 by Mahon Retail Park	630m	W
Representative of:	• Local community views; • Centres of population • Major route		
Receptor Sensitivity	**Medium-low**		
Existing View	By way of context, this muscular regional road cuts between Mahon Retail Park and City Gate Business Park; a relatively recent road connecting the N40 /south ring road with Blackrock. It is a commercial/retail/business hub that once was part of the original Bessborough estate, and which has only been developed this century from greenfield sites. In this notably urban scene, a wide, busy junction occupies the complex foreground. South (i.e. left) of the road is the retail park with attendant vast car park. North of the road is numerous large multi-storey blocks up to 19m height. In the distance, a tall treeline marks the alignment of the Passage West Greenway, which curtails all views beyond.		
Visual Impact of proposed development	Owing to the aforementioned treeline aligning the greenway, no views of the proposed development will be attainable from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP2	Greenway pedestrian/cycle bridge over N40	485m	NW
Representative of:	• Local community views • Amenity and heritage features		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, this pedestrian/cycle bridge connects the former rail line - now Passage West greenway - across this wide and busy south ring road/N40. While this location is one governed by views of a non-aesthetic, heavily frequented arterial route, those receptors upon this bridge otherwise experience a more aesthetic, naturalistic and peaceful option to either side of this road, as they journey along the greenway. In this view, beyond the bridge and the northern side of the N40, a dense thicket of mature trees marks the southern boundary of the wider Bessborough estate. These trees - less than 30m from this location - largely curtail views in the direction of the site. Be that as it may, above a low dip in this treeline, a couple of buildings and a crane can be discerned.		
Visual Impact of proposed development	Above treetops in the aforementioned dip in the foreground thicket, the five-storey Block E will be partially visible, albeit almost half a kilometre away. The height and scale of these buildings will be difficult to determine, owing to the foreground trees screening their bases, as well as the viewer being on this arched, elevated bridge. However, they will certainly not be visually dominant or overbearing, while there are several other multi-storey buildings in existence in the locality. The low visual presence of the proposed development will derive partly from the busy foreground setting working in tandem with distance over scale, as well as the more noticeable, mature trees between the site and this location. Indeed, it is only because of an inconsistency in this tree alignment that will permit a partial view of this block. Of what can discerned of the proposed building, it will read as high-end contemporary and tastefully designed and placed apartment block. The proposed building's scale, form, text or tone is unlikely to draw attention to itself. The proposal will mark a modest increase in the scale and intensity of built development. Its burgundy corrugated metal sheet roofing above the white render finish will serve to contrast and offset the 'leafy' profile of Bessborough that is visible in this scene. Overall, the proposal may not be noticed by a casual observer and even if noticed, would not have a deleterious effect on the visual amenity of the scene. For the reasons outlined above, the magnitude of visual impact is deemed to be **Low** and of a **Negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low	**Slight/Negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP3	Estuary path at Jacob's Island	1.0km	NW
Representative of:	• Local community views; • Amenity and heritage features		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, the Estuary Path along Jacob's Island stretches for over 3km, running between the N40/ southern ring road and Lough Mahon and River Douglas & Lee estuaries. Thus, it is very popular with walkers, runners and cyclists. It's overwhelming source of visual amenity is water-based; in this instance to the south, southeast and southwest (i.e. left of this vista, and the direction in which the path-side benches are facing). An old stonewall borders the northern side of the path. Wire fixings and a modest industrial-like structure are visible above the wall, but otherwise multiple treelines are common; some of which belong to the Bessborough Estate. While an ostensibly tranquil scene, the setting is nonetheless within 500m from major arterial and infrastructural development that is evident elsewhere along this pathway.		
Visual Impact of proposed development	Owing to the aforementioned intervening treelines, no views of the proposed development will be attainable from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP4	County Cork scenic route S55 near junction with R610	1.6km	NW
Representative of:	• Designated Scenic Routes and Views; • Major route.		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, there is one Cork County designated scenic route within the study area, located more than 1.4km from the site, in the south-eastern corner of the study area. This scenic route S55 is described as a "Road along wooded stretch to Rochestown," is approx. 700m in length and is set within a thickly wooded glen that allows for highly localised views only. However, at the northern end of the scenic route, it emerges from the glen by the junction with the R610. In this scene, however, mature trees on the northern side of the R610 preclude views in the direction of the site.		
Visual Impact of proposed development	Owing to the mature trees on the northern side of the R610, no views of the proposed development will be attainable. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP5	Public green at Charlemont Heights, Rochestown	1.3km	N
Representative of:	• Local community views; • Amenity and heritage features.		
Receptor Sensitivity	**Medium-low**		
Existing View	South of the River Douglas estuary, the numerous, extensive housing developments of Rochestown are set across a steep hillside with sweeping views north, across the estuary, towards Mahon Golf Course, Blackrock, the city centre and beyond. A small public green by the roadside at Charlemont Heights (residential road) allow for relatively open views in the direction of the site. Above a foreground residence, across the estuary, the tree-lined boundaries of Bessborough are visible, as is the substantial multi-storey development of City Gate Business Park, marginally east (i.e. left) of the site. To the northwest, the stadium roof of Páirc Uí Chaoimh is discernible, as is the large cranes of Tivoli Docks, while the low hills north of the Lee draw the eye to a near-horizontal skyline/ridgeline; along with the estuary, the most apparent sources of visual amenity in this scene.		
Visual Impact of proposed development	Nestled within the mid-ground of this elevated, long-distant and multi-faceted view, three of the proposed 4-5 storey buildings will be partially visible as an appropriately scaled, appealingly finished piece of high-end architecture. The proposal will fractionally increase the intensity and scale of built development within this broad, sweeping vista, albeit at over 1.2km. With its burgundy corrugated metal sheet roofing and upper floor, the tone of the proposed buildings may draw a small degree of attention to itself, from the stationary observer. However, the thicket of trees in the centre of the Bessborough Estate will help provide a sizeable degree of softening and screening of the development. Aesthetically, the proposed development will read as being one of several multi-storey developments visible from this elevated viewpoint. As views of the city and its continual evolution are routine from this hillside, the proposal will constitute a high-end architectural statement reflective of a 21st Century, ever-evolving European city. In addition, the proposal will remain fastened well below the skyline and is of a similar height to surrounding mature trees, while the manifest sources of visual amenity in this scene will remain unaffected. Overall, the proposal alters the vista to a minor extent and would not have a marked effect on the visual amenity of the scene. Consequently, the magnitude of visual impact is deemed to be **Low** and of a **Negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Low	**Slight/negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP6	Public green at Rowan Hill, Mount Oval	1.4km	N

Representative of:	• Local community views • Amenity and heritage features.
Receptor Sensitivity	**Medium-low**
Existing View	Mount Oval is home to extensive housing developments set across a steep hillside with sweeping views north, across the estuary, towards Mahon Golf Course, Blackrock, the city centre and beyond. A relatively large public green by the roadside at Rowan Hill (residential road) allow for relatively open views in the direction of the site. Above some downhill residences, across the estuary, the tree-lined boundaries of Bessborough are visible, as is the substantial multi-storey development of City Gate Business Park and Mahon Park retail park, marginally east (i.e. left) of the site. However, the sizeable cluster of mid-rise buildings in the heart of the Bessborough estate is also apparent. To the northwest, the large cranes of Tivoli Docks are visible, while the low hills north of the Lee draw the eye to a near-horizontal skyline/ridgeline; along with the estuary, the most apparent sources of visual amenity in this scene.
Visual Impact of proposed development	Nestled within the mid-ground of this elevated, broad vista, one four-storey and one five-storey proposed building will be partially visible as a suitably scaled, tastefully finished piece of high-end multi-storey architecture. The proposal will fractionally increase the intensity and scale of built development within this view, albeit at 1.4km, though is comparable in scale to buildings to its immediate south (i.e. the cluster of buildings in the centre of the Bessborough estate). With its burgundy corrugated metal sheet roofing and upper floor, the tone of the proposed buildings may draw a small degree of attention to itself, from the stationary observer. The thicket of trees adjacent to the proposal provides a degree of softening and screening of the development, as they are of similar height to the proposed buildings, and screen the majority of the proposed blocks, from this location. Aesthetically, the proposed development will read as being comfortably nestled within the mature wooded parkland of the Bessborough estate, and being 'of' the place rather than merely in it. Indeed, as views of the city and its continual evolution are evident from this hillside, the proposal will constitute a high-end architectural statement reflective of a 21st Century, ever-evolving European city. In addition, the proposal will remain well below the skyline, while the manifest sources of visual amenity in this scene will not be affected. Overall, the proposal will alter the scene to an unimportant extent and would not have a patent effect on the visual amenity of the scene. Consequently, the magnitude of visual impact is deemed to be **Low** and of a **Negative** quality.
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.

	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Low	**Slight/Negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP7	Cork City AR4 & LT14 protected view along N28	1.2km	NE

Representative of:	• Designated Scenic Routes and Views; • Major Route.
Receptor Sensitivity	**Medium**
Existing View	By way of context, this location reflects the two Cork City designated views/prospects in the study area that may be of relevance to the site. This is the aforementioned AR4' view from 'Carrigaline Road/ Carr's Hill' with views to 'Bessboro House', as well as the less relevant LT14, which originates at the same location as AR4 (i.e. Carr's Hill). This view is from the N28, connecting Cork City with Carrigaline and Ringaskiddy. In this scene, mature roadside trees curtail views in the direction of the site; as they do along this road, in the broader vicinity of this location.
Visual Impact of proposed development	Owing to the aforementioned roadside trees, the proposed development will be almost exclusively screened from this location. However, a minute sliver of a proposed rooftop will be vaguely discernible to the stationary observer; something which is highly unlikely on a national road. Even if this sliver of distant rooftop will be spotted, it will have no bearing upon the visual amenity of the scene or setting. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.

	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible	**Imperceptible/Neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP8	Mahon Golf Course	450m	NE

Representative of:	• Amenity and heritage feature
Receptor Sensitivity	**Medium**
Existing View	Mahon Golf Course is an 18-hole, purpose made Municipal Golf Course that opened in 1980. It lies to the immediate southwest of the Bessborough Estate. This scene is typical of many/most scenes from this or other golf courses: numerous mature and semi-mature trees are dotted between fairways and greens of the golf course. As the terrain is not greatly sloping, no views beyond that of the course can be attained, owing to the depth and density of planting.
Visual Impact of proposed development	Owing to the density of the aforementioned trees within the golf course, No views of the proposed development will be attained from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.

	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible	**Imperceptible/Neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP9	Field to the fore of Bessborough House	224m	NE
Representative of:	• Amenity and heritage features		
Receptor Sensitivity	**Medium-low**		
Existing View	This location is within the private grounds of the Bessborough Estate, and is the 'front' field over which the historic Bessborough House reigns. This field is one of the original four large fields shown on aforementioned historic maps from the 19th. However, it is not accessible to the public, but used for agricultural purposes. Be that as it may, owing to the potential for on-going development/evolution of the estate, this large field to the south of these buildings may or may not be, at some point in the future, developed as a public park and/ or amenity area; thus, the rationale for the selection of this viewpoint in this visual impact assessment. In this view, beyond a sloping field of freshly cut grass, the cluster of mid-rise buildings around Bessborough is apparent, spanning three different centres. A mature treeline east and southeast of the house (i.e. to the left of the scene) is also visible. The scene is one of architectural discordance and a low-level visual disharmony. This mid-rise cluster constitutes a variety of forms, tones, materials, ages, functions and scale of buildings, none of which appear to be aesthetically 'in synch' with the other, and do little to respect the grace and elegance of the 18th Century Bessborough House.		
Visual Impact of proposed development	As a result of the aforementioned cluster of buildings, in tandem with mature trees behind them, no aspect of the proposed development will be visible from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP10	Entrance to Bessborough Estate	249m	SE
Representative of:	• Local community views		
Receptor Sensitivity	**Medium-low**		
Existing View	This scene shows the 19th Century, formal entrance to the Bessborough Estate, off the 'Bessboro' Road. Aside from the elegant and stately entrance, most apparent here is the scale and depth of mature trees within the site. In addition, it is a reflection of the size of the site that this location is adjacent to the site boundary, yet still being almost 250m from the nearest proposed building.		
Visual Impact of proposed development	Owing to the aforementioned tall trees within the parkland setting of the site, over the course of more than 200m, no views of the proposed development will be attainable from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP11	Residential development on Frederick Avenue	85m	S
Representative of:	• Local community views		
Receptor Sensitivity	**Medium-low**		
Existing View	By way of context, this location is from a newly built housing development just north of the north-eastern corner of the site. The foreground and mid-distance is occupied by this two-storey development, which are more typical of three storey buildings, in their height (owing to their very high pitched roofs). These houses serve to funnel more distant views towards the north-eastern corner of the site, and the low hills (south of the Douglas River Estuary), more than 1km beyond. The site is bound by a green palisade fence, behind which some mature trees and the visual clutter of low, discordant buildings within the site can be discerned.		
Visual Impact of proposed development	Approx. 85m away, the multi-storey profile of the five-storey Block E and, further south, the four-storey Block D will be partially visible from this location. While not notably high, the two partially visible blocks will be more noticeable owing to: their alternative form to the extensive housing in the foreground; their high end design; their burgundy corrugated metal sheet roofing and upper floor above a white render finish, and the lack of intervening and/ or roadside trees. However, they will certainly not be visually dominant or overbearing, while there are several other multi-storey buildings in existence within 300m of this location. The low visual presence of the proposed development will also derive partly from the full foreground setting. Aesthetically, the proposed development will offset and complement the more traditional, extensive housing to the foreground, thereby providing a fresh counterbalance. While upwards of five-storeys in height, the scale of the proposed buildings will be relatable and respective of their receiving environment; as witnessed by the existing treetops, within the Bessborough parkland landscape, that will appears over the rooftop of the four-storey Block D. While the proposed development will curtail more distant views of the low hills south of the city, the visual clutter of low, discordant buildings within the site will be no more. Consequently, the magnitude of visual impact is deemed to be **Medium-low** and of a **Negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Medium-low	**Moderate-slight/ negative**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP12	St. Michael's Drive by City Gate Business Park	258m	SW

Representative of:	• Local community views		
Receptor Sensitivity	**Medium-low**		
Existing View	St. Michael's Drive is a relatively recently constructed road aligning the northern side of the City Gate Business Park. Once forming the eastern lands of the Bessborough Estate, like most business parks this area is notably low on any residents/ residential development, owing to its zoning. Thus, as this not a 'link road' of any note, those using this road and attendant footpaths tend to be those working at or accessing the services (e.g. Mater Private, or VHI Swiftcare clinic) of this multi-storey development. Indeed, the highest parapet level of the buildings south of this road (i.e. left), at the junction with the R852/ Mahon Link Road in the mid-distance, is approx. 19m high, whereas the building to the north (i.e. right) of the road is approx. 11m high. Approx. 100m away to the southwest, at the junction with the R852/Mahon Link Road, the mature trees aligning the Passage West greenway can be seen, which curtail all views beyond.		
Visual Impact of proposed development	Owing to the aforementioned trees aligning the greenway, as well as the development to the north of St. Michael's Drive, no views of the proposed development will be attainable from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP13	R852 bridge over Greenway	446m	SW

Representative of:	• Local community views • Major route		
Receptor Sensitivity	**Medium-low**		
Existing View	The R852 is a busy regional road running east-west, approx. 500m north of the Bessborough Estate and crosses over the Passage West. Greenway at this location.. The mature trees aligning the Passage West greenway are most apparent here, which curtail all views beyond.		
Visual Impact of proposed development	Owing to the aforementioned trees aligning the greenway, no views of the proposed development will be attainable from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP14	Ballinure Avenue by Saint Michael's Cemetery	709m	SW

Representative of:	• Local community views • Heritage & Amenity feature		
Receptor Sensitivity	**Medium-low**		
Existing View	By way of context, this area contains extensive low-rise housing developments across marginally higher land than the site, which lies to the southwest. While densely residential, it is also a location that encapsulates the large and heavily frequented cemetery that is Saint Michael's Cemetery. In a street space between two-storey foreground residences, views of more distant multi-storey buildings are evident. These are a 'National Software Centre' and further to the southwest, a building within City Gate Business Park. The high-end commercial/technological multi-storeys sharply contrast with the low-rise, mid-20th Century Council terraces to the foreground.		
Visual Impact of proposed development	Owing to the aforementioned foreground buildings, no views of the proposed development will be attainable from this location. Consequently, the magnitude of visual impact is deemed to be **Negligible** and of a **Neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Negligible	**Imperceptible/ neutral**

Viewshed Reference Point		Distance to nearest proposed building	Direction of View
VP15	Bessborough Estate entrance avenue	66m	E

Representative of:	• Local community views • Heritage & Amenity feature	
Receptor Sensitivity	**Medium**	
Existing View	This long-established entrance avenue to Bessborough House connects Bessborough Road with Bessborough House, approx. 450m to the southeast of the main entrance. This stately avenue tends to enjoy marginally elevated views out to the west and southwest (refer to Figures 4.13 & 4.14), which overlook a sloping field of pasture and woodland thicket along the west of the estate. To the east of the avenue, however, views are regularly curtailed by the density of mature planting in the vicinity. This area (i.e. to immediate east of the avenue) is made up of a mature parkland landscape, consisting of over 330 native and non-native trees, interlaced with lawn and pathways and dotted with occasional small, single-storey buildings. However, an occasional clearance or absence of avenue-side vegetation allows for more distant views into this mature, tree-dotted parkland. In this winter/bear-leaf scene, the plethora of mature native and non-native trees indent a rich sylvan character to the site, even though there is a sizable proportion of non-native trees within the parkland that were not original to the estate. Little can be discerned beyond these trees, aside from a two-storey stone building in the distance, partially visible above a stone wall.	

Visual Impact of proposed development	The proposal will be located over 60m away, tastefully 'embedded' within the tree-dotted parkland of this vista. While the closer of the two proposed blocks will be easier to discern, both will be interpreted as a tastefully-designed, suitably scaled (i.e. 3-4 storeys) sample of contemporary residential architecture. In light of the multi-storey developments marginally outside the estate, as well as the 3-4 storey existing cluster of development, the proposed development is unlikely to attract attention to itself. While it will marginally detract from the visual amenity of the vista, it is a scene that will not be out of place within the urban context of the setting. In addition, this view will tend to be a fleeting one at an obscure angle to that of avenue-users, whereas the most pulsing and apparent source of visual amenity will remain out the west, not east, of this location. Consequently, the magnitude of visual impact is deemed to be **Low** and of a **negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low/negative	**Slight/negative**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP16	View from the west of Bessborough Estate	160m	E
Representative of:	• Local community views • Heritage & Amenity feature		
Receptor Sensitivity	**Medium**		
Existing View	This location is from the western periphery of a marginally sloping field in the west of Bessborough Estate. While the public do not and cannot access these pastoral fields in the south and west of the estate, this location is adjacent to the aforementioned mature thicket of woodland aligning the western boundary, within which a rough, walking trail winds its way. Although private property, this trail is frequently used by the public. However, it is deep within the thicket, and so this view is not representative of those using the trail within the thicket. In this highly modified, anthropocentric scene, the most apparent element is that of the large cluster of institutional buildings within the estate, mostly to the north of Bessborough House, whose chimneys are visible in the south of the cluster. The cluster of building forms, style, heights and finish do little to engender a cohesive sense of place within the estate, and their visual presence is accentuated in this view by being marginally uphill. To the north of the building cluster, the robust parkland setting is evident, owing to the scale and density of mature trees. Between it and this location, the aforementioned entrance avenue to the Estate is visible (i.e. cars upon it).		

Visual Impact of proposed development	In this winter/bare leaf scene, the proposed development will be partially discernible, but highly unlikely to be noticed through the layers of bare leaf trees. From the little that will be discerned, the proposal will read as a tastefully-designed, suitably scaled (i.e. 3-4 storeys) sample of contemporary residential architecture. In light of the multi-storey developments marginally outside the estate, as well as the 3-4 storey existing cluster of development, the proposed development is unlikely to highly unlikely attract attention to itself. Rather, the most apparent element is that of the large cluster of institutional buildings within the estate, mostly to the north of Bessborough House. Consequently, the magnitude of visual impact is deemed to be **Low-negligible** and of a **negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low-negligible/negative	**Slight/negative**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP17	View from the south of Bessborough House	181m	N
Representative of:	• Local community views • Heritage & Amenity feature		
Receptor Sensitivity	**Medium**		
Existing View	This location is within a sloping pastoral field to the south of Bessborough House, This field is one of the original four large fields shown on aforementioned historic maps from the 19th. However, it is not accessible to the public, but used for agricultural purposes. Be that as it may, owing to the potential for on-going development/evolution of the estate, this large field to the south of these buildings may or may not be, at some point in the future, developed as a public park and/or amenity area; thus, the rationale for the selection of this viewpoint in this visual impact assessment. In addition, large woodland thicket runs directly south of this location, which is frequently access by walkers/runners traversing the estate. In this winter/bare leaf view, at the end of slightly-sloping field of freshly cut grass, the cluster of mid-rise buildings around Bessborough is apparent, spanning three different centres. A mature treeline east and southeast of the house (i.e. to the right of the scene) is also visible. The scene is one of architectural discordance and a low-level visual disharmony. This mid-rise cluster constitutes a variety of forms, tones, materials, ages, functions and scale of buildings, none of which appear to be aesthetically 'in synch' with the other, and do little to respect the grace and elegance of the 18th Century Bessborough House.		
Visual Impact of proposed development	Owing to Bessborough House and the aforementioned cluster of buildings near it, no aspect or element of the proposed development will be attained from this location. Consequently, the magnitude of visual impact is deemed to be **negligible** and of a **neutral** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		

	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Negligible/neutral	**Imperceptible/neutral**

Viewshed Reference Point		**Distance to nearest proposed building**	**Direction of View**
VP18	View to the rear of protected 'Farm Complex and Walled Garden'	25m	SW
Representative of:	• Local community views • Heritage & Amenity feature		
Receptor Sensitivity	**Medium-low**		
Existing View	By way of context, this *cul de sac* road within the eastern realm of the Bessborough Estate is currently closed off to vehicular traffic. It was constructed within the last 20 years to facilitate the future development of this area and lands to its south. Immediately west of the road is a childcare/crèche facility and, separately, mediation services facility, used by the wider locality. The land uses in this vicinity are that of institutional use, while land to the east of the road (i.e., not within this view) is a greenfield area that is characterised by unmanaged, regenerating scrub mostly consisting of rough grass and briars, along with shrubs and young trees averaging 1-2m height. In this scene, a scrub, briar-strewn hedgerow aligns a roadside footpath, a mature tree. Some buildings within the Phase 2 'The Farm' area is discernible, but little other than the sloping roofs of one or two storey buildings can be discerned. A couple of non-native cedar/evergreen non-natives are visible above/beyond the roadside hedgerow, while some taller trees are partially visible further westwards. Overall, there a limited degree of visual amenity in this scene. It is also worth noting that there are several 3-storey buildings clustered within the heart of the Bessborough estate, approx. 125m to the southwest of this location. Furthermore, there are several multi-storey buildings within 200m west of this area (e.g. Mahon Industrial Estate, Loughmahon Technology Park, City Gate, Mahon Point Retail Park etc.); buildings that extend up to 18m in height.		
Visual Impact of proposed development	A considerable degree of visual change will be introduced by the proposed development, as the pre-existing roadside hedgerow will be removed and the site of Phase 2 'The Farm' opened up to the public. A high-spec paved public space will lead to the refurbished, protected 'farm complex' stone buildings that are original to the Bessborough Estate. Above/behind these one contemporary four storey apartment block will be partially visible. This block will not curtail or cut off any appreciable source of inherent visual amenity. while the proposal will result in a distinct increase in the scale and intensity of development within this area, will create a development that is compatible with the landscape character of the area. Indeed, the high-end architectural quality, detail and finish of the proposed block will be compatible with similar contemporary developments within 200m of this location. Consequently, the magnitude of visual impact is deemed to be **Medium-low** and of a **Positive** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium-low	Medium-low/positive	**Slight/positive**

Viewshed Reference Point		**Distance to nearest proposed bridge**	**Direction of View**
VP19	Entrance to Greenway from R852	92m	SW
Representative of:	• Local community views • Heritage & Amenity feature		
Receptor Sensitivity	**Medium**		
Existing View	By way of context, this location is at the footpath along the eastern side of the R852/Mahon Link Road; the point where a pedestrian/cycle entrance onto the Passage West Greenway drops down into that deep and heavily vegetated cutting. While this particular scene to the southwest is one which is most verdant and vegetated, it is worth recalling that a heavily frequented greenway is set beneath this roadside location; a busy regional link road aligns the other side of this footpath, while there are multiple, conspicuous high end, multi-storey buildings in the immediate vicinity, with some being less than 40m away (i.e. across this road, to the east and southeast).		
Visual Impact of proposed development	Almost 100m to the southwest, an aesthetically finished, thin and elegant pedestrian/cycle path will bridge over the existing greenway. This bridge will be highly unlikely to attract attention to itself, as it is one of several such bridge found about the city, as well as that approx. 400m south of this location. In addition, it is a sight one will expect to see in a modern, ever-evolving urban sphere and will not markedly detract from the visual amenity of the setting. Consequently, the magnitude of visual impact is deemed to be **Low-negligible** and of a **Negative** quality.		
Summary	Based on the assessment criteria and matrices outlined at **Section 4.1.2** the significance of residual visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Impact Significance	Medium	Low-negligible/negative	**Slight-imperceptible/negative**

4.7.2.2.1 Magnitude of Visual Effect during bare leaf/winter conditions

Of the 19 viewpoints assessed above for Phase 2 'The Farm' application, four of these (i.e., VPs 15, 16, 17 & 18) are exclusive bare leaf/winter views, and have been assessed solely on that basis. However, the following 4 no. viewpoints were captured in bare leaf/winder conditions, in addition to full leaf/summer conditions.

VP1 – R852 by Mahon Retail Park

The significance of visual impact will remain unaffected, in this instance, because of the range and scale of intervening mature trees, as well as the distance to this viewpoint.

In the case of:

- VP2 - Greenway pedestrian/cycle bridge over N40;
- VP5 - Public green at Charlemont Heights, Rochestown;
- VP7 - Cork City AR4 & LT14 protected view along N28

The significance of visual impact will remain unaffected, in all three instances, because there is minimal difference between the scale/extent of visibility of the proposal in a bare-leaf/winter scenario, in comparison to a full-leaf/summer scenario.

4.8 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 8, Landscape as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

To protect and where appropriate, enhance the character, diversity and special qualities of the City's landscapes.

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 8 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in the most positive interaction for most of the landscape assets with EPO 8.

4.8.1 The Proposed Development in combination with permitted developments

Assessing the cumulative impacts of the proposed development is contingent on a number of other permitted developments in the locality. These include:

- Cork City Council Ref: 17/37565. Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas. Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction.
- Cork City Council Ref: 18/37820.The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three-storey apartment block (comprising 20 no. apartments) and a four-storey apartment block (comprising 27 no. apartments) and 1 no. creche Granted by way of Material Contravention of City Development Plan on 28/02/2019.
- Cork City Council Ref: 21/40481. Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works. Conditionally granted on the 13/12/2021.
- Cork City Council Ref: 2140503. Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure. Conditionally granted on the 22/12/2021.
- Cork City Council Ref: 2140453. Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works. Conditionally granted on the 22/12/2021. Decision pending.
- Cork City Council Ref: 2039705/ABP-309560-1. Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork. Refused on the 15/07/2021 as would result in Haphazard form of Development.

4.8.1.1 Summary

On balance of the nature of these permitted development, and their relative distance from the proposed development, the potential for cumulative impacts arising as a result of the proposed development in combination with permitted developments in the locality will not be significant.

4.8.2 The Proposed Development in combination with existing urban development in the study area

In terms of the potential for cumulative impacts arising as a result of the proposed development in combination with the existing urban development within the study area, to begin with, it is worth nothing that both Phase 1 'The Meadows' and Phase 2 'The Farm' come in close proximity to the long-established multi-storey development located at the centre of the former Bessborough estate.

As established in Section 4.6, from such elevated viewpoints as VP5 & VP6, the existing and proposed development at Bessborough will be viewed in tandem. In addition, within 500m north, west and east of the site of the proposed development are considerable residential, commercial, retail warehousing and Business & Technology premises, many of which are large, multi-storey (i.e. up to 18m in height) buildings, such as those found within Mahon Industrial Estate, Mahon Point Retail Park and City Gate. As the proposed development entails 4 no. blocks that range in height from 6 to 10 storeys, some of these proposed blocks will be distinctively higher than those existing buildings.

However, the proposed development is likely to serve as a *de facto* extension of the relatively recent, high-end, multi-storey development of Mahon Point Retail Park and City Gate; one that will intensify and strengthen the contemporary, multi-storey, architectural nexus at the south-eastern end of this ever-evolving city's approach. While the proposed development will serve to palpably increase the intensity of visible built development within 500m of the site, in the instances where these (proposed and existing) buildings will be viewed in combination, they are not likely to be either visually or spatially overbearing.

4.8.2.1 Summary

On balance, the potential for cumulative impacts arising as a result of the proposed development in combination with existing urban development in the study area will not be significant.

4.8.3 The Proposed Development in combination with Phase 3 'The North Field'

In the absence of design details for Phase 3 North Fields, it's potential impact in combination with the proposed development cannot be assessed. However, there is a considerable degree of mature trees aligning the western and southern periphery of this Phase 3 North Fields area, resulting in considerable separation between it and the existing urban fabric of the study area. Similarly, there is a considerable distance and array and/or thickets of tall trees between Phase 3 'The North Field' and that of the Phase 1 & 2 areas. These factors are highly likely to considerably reduce the capacity of the significant cumulative impacts arising from the proposed development in combination with Phase 3 'The North Field.'

4.9 Overall significance of impact

Overall, it is considered that the proposed development is an appropriate contribution to the built fabric of the study area that will not result in any significant landscape/townscape or visual impacts.

4.10 Difficulties in Compiling Information

No difficulties were encountered in the preparation of this Chapter.

4.11 References

Cork City Development Plan 2015-21;

Cork County Development Plan 2014-2021;

Draft County Development Plan 2022-2028;

‘Guidelines for Landscape and Visual Impact Assessment’ (GLVIA-2013)’ by the Landscape Institute;

‘Guidelines on the information to be contained in EIARs’ by the Environmental Protection Agency (Draft) 2017.

Title: Verified Photomontages of proposed Development at The Meadows, Bessborough, Mahon, Cork

Architects: SHiPSEYBARRY Architects

Prepared by: Pedersen Focus Ltd.

Date: 28 / 2 / 20212

Pedersen Focus Ltd.
4 Combermere,
Glounthaune,
Co. Cork,
Ireland.

Architectural Visualisation

V.A.T. No. IE9581693J

Project: Proposed development at The Meadows, Bessborough, Mahon, Cork.

2nd of March, 2022

To whom it may concern,

The computer generated images of the proposed development were prepared by Pedersen Focus Ltd. Currently, there are no official rules that define a methodology to produce verified views. Pedersen Focus bases its methodology on the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition and the Technical Guidance Note 06/19, both by The Landscape Institute.

Data Collection.
Drawings and 3d model for the proposed development were provided by SHiPSEYBARRY Architects. The site survey was provided by Murphy Geospatial Ltd. Photomontage viewpoint locatins were selected by Macro Works.
Site photography and surveying of camera locations was carried out by Pedersen Focus Ltd.
Camera locations, survey data and the 3d digital model were integrated by Pedersen Focus.

3d Model.
The 3d model of the proposed development was rendered using lighting conditions corresponding to the respective site photograph. Materials for the proposed buildings were prepared according to the Architects' specifications.

Control point verification.
Each photomontage was verified with survey control points matching consistently.

Photomontage.
The photomontages were prepared using industry standard image handling software. The rendered 3d model was inserted between foreground and background elements. Site photography by Pedersen Focus were cross-referenced to help estimate the amount of mitigation provided by existing trees. In addition, a schedule of retained trees/trees to be felled was cross referenced with the provided tree survey to attempt to identify individual trees impacting the visual impact. In general, Pedersen Focus have attempted to reflect all planting shown in the photomontages realistically, however, mitigation should be considered indicative only.
View 10, 11, 15, 16 & 17 were photographed using a 24mm TiltShift lens. Shift was used in these views to adjust the position of the subject in the image area without moving the camera back; this is often helpful in avoiding the convergence of parallel lines. TiltShift lenses are commonly used in Architectural photography.
A selection of views (view 1, 2, 5, 7, 11 and 12) are presented with an additional “winter” version of the photomontages, showing a view taken with the surrounding trees generally bare.

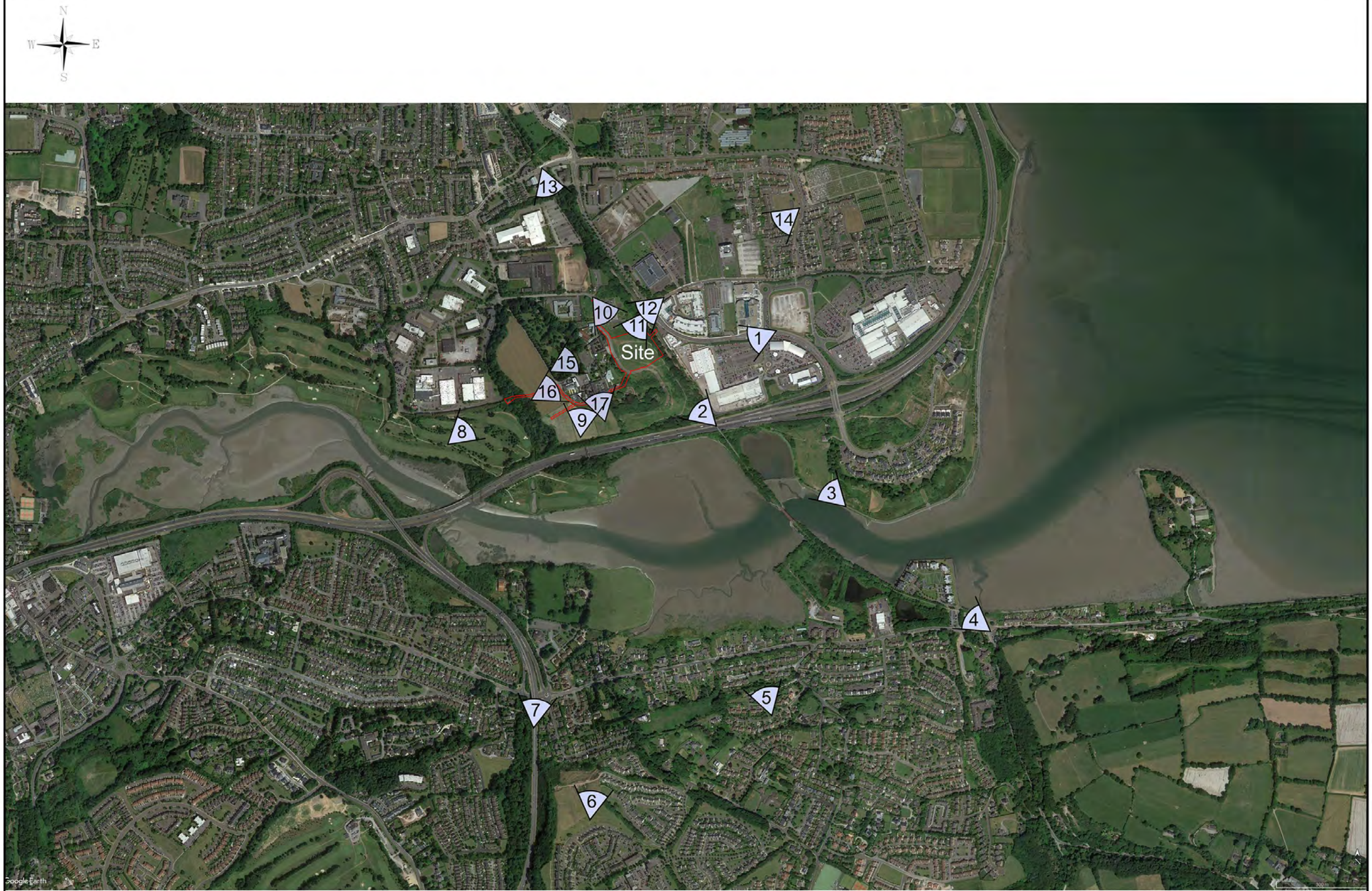
The photomontages are presented with their existing views for comparison and in an additional set of cumulative views showing the proposed development in tandem with the adjacent proposed “The Farm, Bessborough” development. Please note, the proposed bridge over the greenway on the eastern boundary is included in both the proposed developments. All photomontages are prepared in accordance with the guidelines set out by the Landscape Institute's “Guidelines for Landscape & Visual Impact Assessment”.

Jesper Pedersen, B. Eng.
Managing Director, Pedersen Focus Ltd.

T.(021) 4355 224 info@pedersen**focus**.ie www.pedersen**focus**.ie

Viewpoint	Camera / Lens	Horizontal field of view	Date	Time	Camera location. ITM Easting, Northing, (WGS84), with Malin Head elevations (OSGM15).	Distance to nearest proposed building
View 1	Canon 5DS-R / 50mm	38.7deg	14/06/2021	10.44am	572444.334, 570463.975, 10.28m	438m
View 1 winter	Canon 5DS-R / 50mm	38.7deg	19/01/2022	10.43am	572443.951, 570463.984, 10.28m	438m
View 2	Canon 5DS-R / 28mm	65.1deg	29/06/2021	10.30am	572210.551, 570158.983, 15.00m	297m
View 2 winter	Canon 5DS-R / 28mm	65.1deg	19/01/2022	11.00am	572210.404, 570159.430, 15.01m	296m
View 3	Canon 5DS-R / 50mm	38.7deg	29/06/2021	14.45pm	572654.780, 569884.167, 3.87m	811m
View 4	Canon 5DS-R / 50mm	38.7deg	14/06/2021	12.39pm	573098.123, 569479.328, 6.05m	1410m
View 5	Canon 5DS-R / 50mm	38.7deg	29/06/2021	16.05pm	572370.369, 569227.120, 50.40m	1202m
View 5 winter	Canon 5DS-R / 50mm	38.7deg	20/01/2022	12.42pm	572371.721, 569226.800, 50.32m	1202m
View 6	Canon 5DS-R / 50mm	38.7deg	14/06/2021	17.13pm	571759.739, 568931.788, 73.77m	1419m
View 7	Canon 5DS-R / 50mm	38.7deg	14/06/2021	11.52am	571604.859, 569134.996, 28.11m	1260m
View 7 winter	Canon 5DS-R / 50mm	38.7deg	27/01/2022	12.19pm	571604.472, 569127.989, 28.49m	1267m
View 8	Canon 5DS-R / 28mm	65.1deg	29/06/2021	11.11am	571294.181, 570109.675, 7.57m	661m
View 9	Canon 5DS-R / 28mm	65.1deg	29/06/2021	11.57am	571757.419, 570121.705, 8.57m	286m
View 10	Canon 5DS-R / 24mmTS	73.1deg	14/06/2021	18.33pm	571808.151, 570581.580, 19.49m	158m
View 11	Canon 5DS-R / 24mmTS	73.1deg	29/06/2021	10.20am	571972.648, 570549.904, 18.05m	87m
View 11 winter	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	10.21am	571975.599, 570545.076, 17.92m	82m
View 12	Canon 5DS-R / 28mm	65.1deg	29/06/2021	09.59am	572061.884, 570595.185, 17.03m	163m
View 12 winter	Canon 5DS-R / 28mm	65.1deg	19/01/2022	10.15am	572064.230, 570597.454, 16.98m	166m
View 13	Canon 5DS-R / 28mm	65.1deg	14/06/2021	17.45pm	571650.845, 570991.904, 15.75m	597m
View 14	Canon 5DS-R / 50mm	38.7deg	14/06/2021	11.07am	572449.737, 570862.964, 11.94m	627m
View 15	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	14.00pm	571674.025, 570335.294, 12.22m	225m
View 16	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	13.39pm	571615.227, 570239.223, 7.88m	316m
View 17	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	13.30pm	571834.178, 570141.462, 7.09m	230m

Project:	The Meadows, Bessborough		
Client:	Estuary View Enterprises 2020 Ltd.		
Drawing title:	Photo data sheet		
Date: Jan, 2022	Scale: NTS	Drawn by: JP	
Prepared by:	Pedersen Focus Ltd.		



Site red-line shown is indicative only

Drawing title: Viewpoint location map		
Date: Feb. 2022	Scale: NTS	Drawn by: JP
Prepared by: Pedersen Focus Ltd.		

View 1 - Existing

View 1 - Proposed

View 1B - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 1 Winter - Existing

View 1 Winter - Proposed.

View 1B Winter - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 2 - Existing

View 2 - Proposed

View 2B - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 2 Winter - Existing

View 2 Winter - Proposed

View 2B Winter - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 3 - Existing

View 3 - Proposed

View 3B - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 4 - Existing

View 4 - Outline of proposed development shown in red.

View 4B - Outline of proposed development shown in red, in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 5 - Existing

View 5 - Proposed

View 5B - Proposed shown in tandem with the proposed “The Farm, Bessborough” development.

View 5 Winter - Existing

View 5 Winter - Proposed

View 5B Winter - Proposed shown in tandem with the proposed “The Farm, Bessborough” development.

View 6 - Existing

View 6 - Proposed

View 6B - Proposed shown in tandem with the proposed “The Farm, Bessborough” development.

View 7 - Existing

View 7 - Outline of proposed development shown in red.

View 7B - Outline of proposed development shown in red, in tandem with the proposed “The Farm, Bessborough” development.

View 7 Winter - Existing

View 7 Winter - Proposed

View 7B Winter - Proposed shown in tandem with the proposed “The Farm, Bessborough” development.

View 8 - Existing

View 8 - Outline of proposed development shown in red.

View 8B - Outline of proposed development shown in red, in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 9 - Existing

View 9 - Proposed

View 9B - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 10 - Existing

View 10 - Proposed

View 10B - Proposed shown in tandem with the proposed “The Farm, Bessborough” development.

View 11 - Existing

View 11 - Proposed

View 11B - Proposed shown in tandem with the proposed “The Farm, Bessborough” development (greenway pedestrian bridge included in both proposed Developments).

View 11 Winter - Existing

View 11 Winter - Proposed

View 11B Winter - Proposed shown in tandem with the proposed “The Farm, Bessborough” development (greenway pedestrian bridge included in both proposed Developments).

View 12 - Existing

View 12 - Proposed

View 12B - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 12 Winter - Existing

View 12 Winter - Proposed

View 12B Winter - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 13 - Existing

View 13 - Outline of proposed development shown in red.

View 13B - Outline of proposed development shown in red, in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 14 - Existing

View 14 - Proposed

View 14B - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

View 15 Winter - Existing

View 15 Winter - Proposed. Outline of proposed development shown in red.

View 15B Winter - Outline of proposed development shown in red, in tandem with the proposed “The Farm, Bessborough” development.

View 16 Winter - Existing

View 16 Winter - Proposed. Outline of proposed development shown in red.

View 16B Winter - Outline of proposed development shown in red, in tandem with the proposed “The Farm, Bessborough” development.

View 17 Winter - Existing

View 17 Winter - Proposed

View 17B Winter - Proposed shown in tandem with the outline of the proposed “The Farm, Bessborough” development shown in yellow.

Title: Photomontages of proposed Development at The Farm, Bessborough, Mahon, Cork

Architects: SHiPSEYBARRY Architects

Prepared by: Pedersen Focus Ltd.

Date: 28 / 2 / 2022

Pedersen Focus Ltd.
4 Combermere,
Glounthaune,
Co. Cork,
Ireland.

Architectural Visualisation

V.A.T. No. IE9581693J

Project: **Proposed development at The Farm, Bessborough, Mahon, Cork.**

2nd of March, 2022

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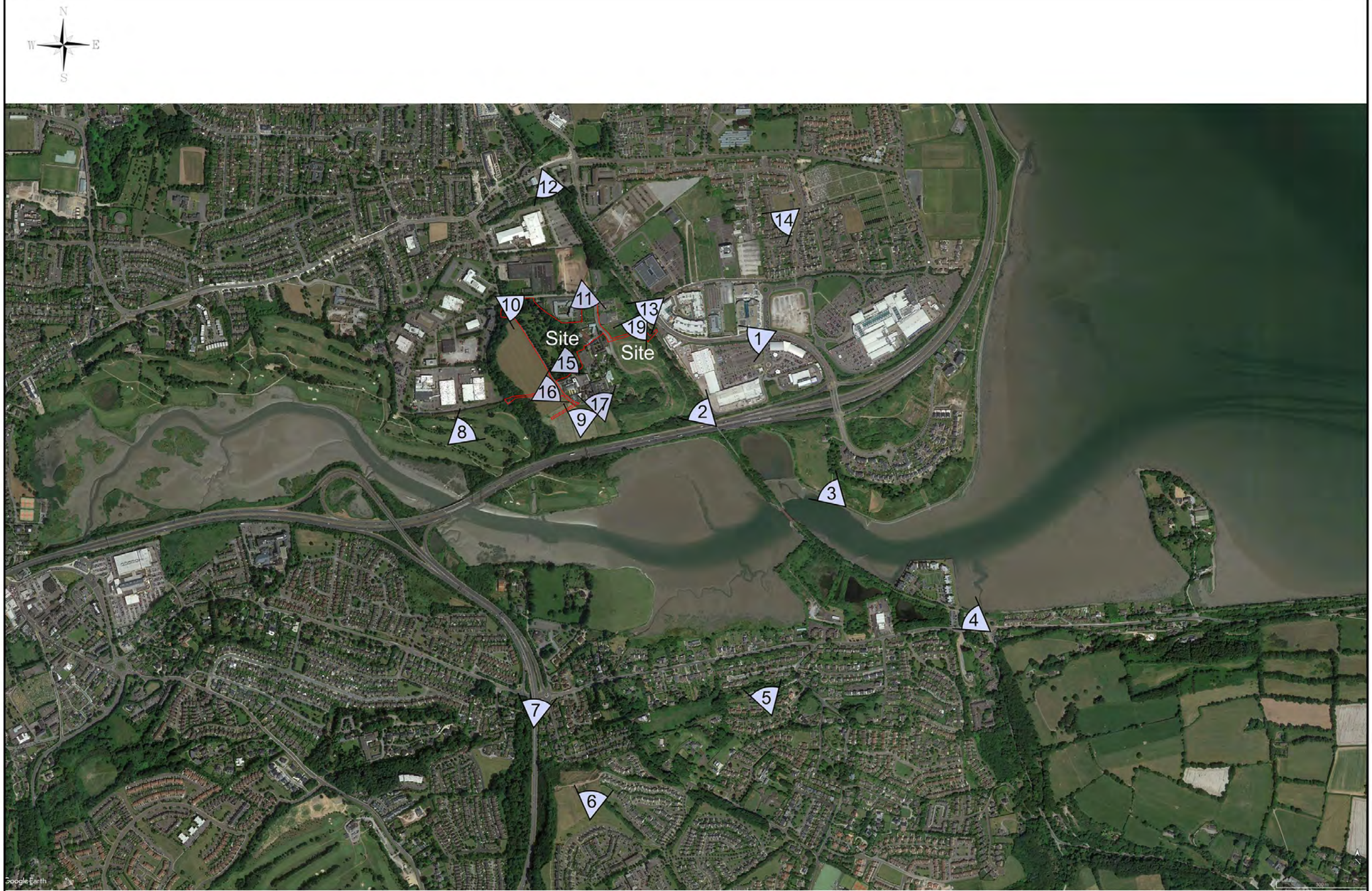
The photomontages are presented with their existing views for comparison and in an additional set of cumulative views showing the proposed development in tandem with the adjacent proposed “The Meadows, Bessborough” development. Please note, the proposed bridge over the greenway on the eastern boundary is included in both the proposed developments. All photomontages are prepared in accordance with the guidelines set out by the Landscape Institute's “Guidelines for Landscape & Visual Impact Assessment”.

Jesper Pedersen, B. Eng.
Managing Director, Pedersen Focus Ltd.

Viewpoint	Camera / Lens	Horizontal field of view	Date	Time	Camera location. ITM Easting, Northing, (WGS84), with Malin Head elevations (OSGM15).	Distance to nearest proposed building
View 1	Canon 5DS-R / 50mm	38.7deg	14/06/2021	10.44am	572444.334, 570463.975, 10.28m	638m
View 1 winter	Canon 5DS-R / 50mm	38.7deg	19/01/2022	10.43am	572443.951, 570463.984, 10.28m	638m
View 2	Canon 5DS-R / 28mm	65.1deg	29/06/2021	10.30am	572210.551, 570158.983, 15.00m	482m
View 2 winter	Canon 5DS-R / 28mm	65.1deg	19/01/2022	11.00am	572210.404, 570159.430, 15.01m	482m
View 3	Canon 5DS-R / 50mm	38.7deg	29/06/2021	14.45pm	572654.780, 569884.167, 3.87m	1005m
View 4	Canon 5DS-R / 50mm	38.7deg	14/06/2021	12.39pm	573098.123, 569479.328, 6.05m	1592m
View 5	Canon 5DS-R / 50mm	38.7deg	29/06/2021	16.05pm	572370.369, 569227.120, 50.40m	1276m
View 5 winter	Canon 5DS-R / 50mm	38.7deg	20/01/2022	12.42pm	572371.721, 569226.800, 50.32m	1276m
View 6	Canon 5DS-R / 50mm	38.7deg	14/06/2021	17.13pm	571759.739, 568931.788, 73.77m	1408m
View 7	Canon 5DS-R / 50mm	38.7deg	14/06/2021	11.52am	571604.859, 569134.996, 28.11m	1212m
View 7 winter	Canon 5DS-R / 50mm	38.7deg	27/01/2022	12.19pm	571604.472, 569127.989, 28.49m	1219m
View 8	Canon 5DS-R / 28mm	65.1deg	29/06/2021	11.11am	571294.181, 570109.675, 7.57m	501m
View 9	Canon 5DS-R / 28mm	65.1deg	29/06/2021	11.57am	571757.419, 570121.705, 8.57m	218m
View 10	Canon 5DS-R / 24mmTS	73.1deg	29/06/2021	16.29pm	571808.151, 570581.580, 19.49m	232m
View 11	Canon 5DS-R / 24mmTS	73.1deg	29/06/2021	10.20am	571972.648, 570549.904, 18.05m	85m
View 12	Canon 5DS-R / 28mm	65.1deg	29/06/2021	09.59am	572061.884, 570595.185, 17.03m	257m
View 12 winter	Canon 5DS-R / 28mm	65.1deg	19/01/2022	10.15am	572064.230, 570597.454, 16.98m	261m
View 13	Canon 5DS-R / 28mm	65.1deg	14/06/2021	17.45pm	571650.845, 570991.904, 15.75m	446m
View 14	Canon 5DS-R / 50mm	38.7deg	14/06/2021	11.07am	572449.737, 570862.964, 11.94m	709m
View 15	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	14.00pm	571674.025, 570335.294, 12.22m	66m
View 16	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	13.39pm	571615.227, 570239.223, 7.88m	160m
View 17	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	13.30pm	571834.178, 570141.462, 7.09m	219m
View 18	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	10.38am	571837.490, 570480.877, 16.83m	25m
View 19	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	10.21pm	571972.647, 570549.605, 18.05m	97m*
View 19 winter	Canon 5DS-R / 24mmTS	73.1deg	20/01/2022	10.21am	571975.599, 570545.076, 17.92m	92m*

* Distance to centre of proposed greenway bridge.

Project:	The Farm, Bessborough		
Client:	Estuary View Enterprises 2020 Ltd.		
Drawing title:	Photo data sheet		
Date: Jan, 2022	Scale: NTS	Drawn by: JP	
Prepared by:	Pedersen Focus Ltd.		



Site red-line shown is indicative only

Drawing title: Viewpoint location map		
Date: Feb. 2022	Scale: NTS	Drawn by: JP
Prepared by: Pedersen Focus Ltd.		

View 1 - Existing

View 1 - Proposed with outline of proposed development shown in red.

View 1B - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 1 Winter - Existing

View 1 Winter - Outline of proposed development shown in red.

View 1B Winter - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 2 - Existing

View 2 - Proposed

View 2B - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 2 Winter - Existing

View 2 Winter - Proposed

View 2B Winter - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 3 - Existing

View 3 - Outline of proposed development shown in red.

View 3B - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 4 - Existing

View 4 - Outline of proposed development shown in red.

View 4B - Outline of proposed development shown in red, in tandem with the outline of the proposed “The Meadows, Bessborough” development shown in yellow.

View 5 - Existing

View 5 - Proposed

View 5B - Proposed shown in tandem with the proposed “The Meadows, Bessborough” development.

View 5 Winter - Existing

View 5 Winter - Proposed

View 5B Winter - Proposed shown in tandem with the proposed “The Meadows, Bessborough” development.

View 6 - Existing

View 6 - Proposed

View 6B - Proposed shown in tandem with the proposed “The Meadows, Bessborough” development.

View 7 - Existing

View 7 - Proposed

View 7B - Proposed shown in tandem with the outline of the proposed “The Meadows, Bessborough” development shown in yellow.

View 7 Winter - Existing

View 7 Winter - Proposed

View 7B Winter - Proposed shown in tandem with the proposed “The Farm, Bessborough” development.

View 8 - Existing

View 8 - Outline of proposed development shown in red.

View 8B - Outline of proposed development shown in red, in tandem with the outline of the proposed “The Meadows, Bessborough” development shown in yellow.

View 9 - Existing

View 9 - Outline of proposed development shown in red.

View 9B - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 10 - Existing

View 10 - Outline of proposed development shown in red.

View 10B - Outline of proposed development shown in red, in tandem with the outline of the proposed “The Meadows, Bessborough” development shown in yellow.

View 11 - Existing

View 11 - Proposed

View 11B - Proposed shown in tandem with the outline of the proposed “The Meadows, Bessborough” development shown in yellow.

View 12 - Existing

View 12 - Outline of proposed development shown in red.

View 12B - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 12 Winter - Existing

View 12 Winter - Outline of proposed development shown in red.

View 12B Winter - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 13 - Existing.

View 13 - Outline of proposed development shown in red.

View 13B - Outline of proposed development shown in red, in tandem with the outline of the proposed “The Meadows, Bessborough” development shown in yellow.

View 14 - Existing

View 14 - Proposed with outline of proposed development shown in red.

View 14B - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 15 Winter - Existing

View 15 Winter - Proposed.

View 15 Winter - Proposed.

View 16 Winter - Existing

View 16 Winter - Proposed.

View 16B Winter - Proposed shown in tandem with the outline of the proposed “The Meadows, Bessborough” development shown in yellow.

View 17 Winter - Existing

View 17 Winter - Outline of proposed development shown in red.

View 17B Winter - Outline of proposed development shown in red, in tandem with the proposed “The Meadows, Bessborough” development.

View 18 Winter - Existing

View 18 Winter - Proposed

View 19 - Existing

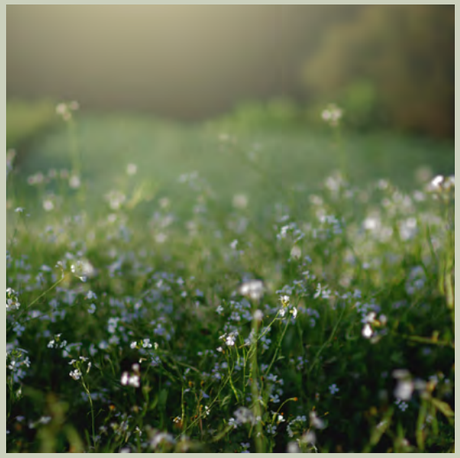
View 19 - Proposed

View 19B - Proposed shown in tandem with the proposed “The Meadows, Bessborough” development (greenway pedestrian bridge included in both proposed Developments).

View 19 Winter - Existing

View 19 Winter - Proposed

View 19B Winter - Proposed shown in tandem with the proposed “The Meadows, Bessborough” development (greenway pedestrian bridge included in both proposed Developments).



BESSBOROUGH, CORK

CHAPTER 5

Material Assets – Traffic & Transportation

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BESSBOROUGH, CORK

CHAPTER 5

Material Assets – Traffic & Transportation

CHAPTER 5

5 Material Assets – Traffic & Transport

5.1 Introduction

The structure of this Chapter is in accordance with the European Commission EIAR Guidance and draft EPA EIAR Guidelines (both 2017) and TII Document, Traffic and Transport Assessment Guidelines, 2014 and is developed using data from independently commissioned traffic counts at key junctions/locations, and local data extracted from the 2016 National Census.

5.2 Methodology

A Traffic and Transportation Assessment (TTA) has been prepared in accordance with the NRA's 2014 publication "Traffic and Transport Assessment Guidelines" and the "Guidelines for Traffic Impact Assessments" as published by the Institution of Highways & Transportation U.K. in 1994 and is included in Appendix 5-1. The purpose of a TTA is to assess the potential traffic impact of a development on the existing road network and propose any necessary mitigation measures to best accommodate the expected traffic volumes generated by the proposed development. It is also a requirement to ensure that proposals promote more efficient use of investment in transportation infrastructure, reduce travel demand and promote road-safety.

Key parameters relating to the traffic modelling carried out included: junctions to be assessed, trip generation, modal shift targets, trip distribution, and assessment years.

A total of 4 turning count surveys were undertaken as part of the study on Thursday 6th February 2020, as outlined in the following figure, Figure 5.2.1, Traffic Count Survey Locations. These surveys, undertaken prior to Covid restrictions being put in place, were carried out simultaneously using video cameras at each of the junctions for a 12-hour period.

Figure 5.2.1: Traffic Count Survey Locations

On-site measurements including lane widths, junction turning radii, lane lengths, and saturation flows were undertaken by MHL and were incorporated in the constructed models.

The aim of this TTA is to identify the characteristics of the site of the proposed development and surrounding area, examine the likely transport implications, ensure sustainable accessibility is maximised and appropriate infrastructure provided to accommodate the proposed development.

The key issues that are addressed in the TTA, with reference to the size and location of the development proposal, are as follows:

- Review of the site location, composition, and local roads network.
- Analysis of Road Safety data.

- Accessibility critique reviewing pedestrian, cycle and public transport access to the site, plus any infrastructure currently available to promote travel by sustainable means.
- A review of the relevant planning and transport policy.
- Description and justification for the proposed access arrangement, internal layout, parking provision, public transport provision, fire tender/service/delivery access, including all necessary swept-path assessments and visibility splays
- Forecast multi-modal trip rates and trip generation as agreed with the Local Authority.
- Modal split assumptions used in the trip generation process.
- The use of appropriate and agreed traffic modelling software for the assessment of individual junctions.
- Provide With/Without Development assessment for each of the critical junctions.
- Assess significance of development generated traffic upon the surrounding transport infrastructure and identify any necessary mitigation.

The scheme of six hundred and twenty (620) residential units, and a sixty (60) child creche, would be completed in a number of phases starting in 2024 and finishing in 2030. To demonstrate the gradual impact on the local road network as the separate phases are complete, the Traffic Impact Assessment includes the proposed construction years of **2024**, **2026**, and **2028**, in addition to the **Base Year (2022)**, the **Design Year +5 (2029)**, and the **Design Year +15 (2039)**.

In order to assess the impact of the proposed development on the identified study area, the key junctions have been assessed both with/without development traffic for both AM and PM peak hours. Results are presented for the following scenarios:

- 2020 Current Year Flows AM/PM
- 2024 AM/PM With/Without Dev (The Meadows – 280 residential units)
- 2028 AM/PM With/Without Dev (The Farm – 140 residential units)
- 2030 AM/PM With/Without Dev (The North Fields – 200 residential units)
- 2039 AM/PM With/Without Dev (Design Year)

The peak hour traffic periods for each junction are included in the constructed Paramics Discovery Traffic Model which will run from 07:30-09:30 and 16:30-18:30. This ensures a robust analysis of the road network is carried out.

5.2.1 Traffic Forecasting

The TII Guidelines have been followed when forecasting growth rates for background traffic for the area. Recorded background traffic was factored using TII (Transport Infrastructure Ireland) Project Appraisal Guidelines (PE-PAG-02017) for use in future year scenarios. The following table presents the factors used on recorded PCU's based on Link Based Growth Rates (Central Growth) for the Cork Metropolitan Area.

			Cars/LGV	HGV	Combined
Count %			97%	3%	100%
2020	to	2021	1.017	1.029	1.017
2020	to	2023	1.052	1.091	1.053
2020	to	2024	1.069	1.123	1.071
2020	to	2029	1.163	1.298	1.167
2020	to	2039	1.266	1.478	1.273

TII Project Appraisal Guidelines for National Roads Unit 5.3
Travel Demand Projections (PE-PAG-0217-02)

Table 5.2.2: Background Traffic Growth Rates per Annum

5.2.2 Modal Shift

This section describes the current level of modal shift (the use of sustainable modes of travel) based on available data and compares these to national targets.

The 2016 Census online SAP data was used to assess current modal shift patterns in the Mahon area, specifically the electoral division of Mahon B which encompasses the site. 32% of people in this area said they were commuting on foot, bike or using public transport.

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Population aged 5 years and over by means of travel to work, school or college

Means of Travel	Work	School or College	Total
On foot	276	305	581
Bicycle	54	20	74
Bus, minibus or coach	185	143	328
Train, DART or LUAS	6	0	6
Motorcycle or scooter	12	2	14
Car driver	1,212	32	1,244
Car passenger	111	546	657
Van	73	0	73
Other (incl. lorry)	2	0	2
Work mainly at or from home	33	0	33
Not stated	86	52	138
Total	2,050	1,100	3,150

Table 5.2.3: 2016 Modal Shift by means of travel to work, school, or college. (Electoral Division of Mahon B)

The electoral divisions of 'Mahon A', 'Mahon C', and 'Browningstown' were also analysed to ascertain their existing modal shift, ref. Table 6.2, Table 6.3, and Table 6.4 respectively. Table 6.5 provides a summary of the analysis results and indicates an average modal shift of 23% for the surrounding area. This figure more closely represents the anticipated modal shift of the proposed development due to the greater percentage of residential land use in these electoral divisions over 'Mahon B'.

PDF Excel Print

Population aged 5 years and over by means of travel to work, school or college

Means of Travel	Work	School or College	Total
On foot	158	194	352
Bicycle	68	17	85
Bus, minibus or coach	161	168	329
Train, DART or LUAS	2	1	3
Motorcycle or scooter	12	1	13
Car driver	1,395	50	1,445
Car passenger	107	650	757
Van	77	2	79
Other (incl. lorry)	8	0	8
Work mainly at or from home	47	3	50
Not stated	33	24	57
Total	2,068	1,110	3,178

Table 5.2.4: 2016 Modal Shift by means of travel to work, school, or college. (Electoral Division of Mahon A)

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Population aged 5 years and over by means of travel to work, school or college

Means of Travel	Work	School or College	Total
On foot	70	132	202
Bicycle	50	18	68
Bus, minibus or coach	76	86	162
Train, DART or LUAS	2	2	4
Motorcycle or scooter	8	6	14
Car driver	924	63	987
Car passenger	69	331	400
Van	42	3	45
Other (incl. lorry)	4	0	4
Work mainly at or from home	45	3	48
Not stated	28	9	37
Total	1,318	653	1,971

Table 5.2.5: 2016 Modal Shift by means of travel to work, school, or college. (Electoral Division of Mahon C)

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Population aged 5 years and over by means of travel to work, school or college

Means of Travel	Work	School or College	Total
On foot	24	71	95
Bicycle	16	5	21
Bus, minibus or coach	8	16	24
Train, DART or LUAS	0	0	0
Motorcycle or scooter	3	0	3
Car driver	286	17	303
Car passenger	16	133	149
Van	19	1	20
Other (incl. lorry)	2	1	3
Work mainly at or from home	15	0	15
Not stated	6	2	8
Total	395	246	641

Table 5.2.6: 2016 Modal Shift by means of travel to work, school, or college. (Electoral Division of Browningstown)

Electorial Division	No. Commuters	No. Sustainable Commuters	Modal Split %
Mahon B	3117	989	***32***
Mahon A	3128	769	***25***
Mahon C	1923	436	***23***
Browningstown	626	140	***22***

Table 5.2.7: Summary of Modal Split for adjacent Electoral Divisions

Road improvement works completed in 2021 as a part of the Skehard Road Improvement Scheme will have led to continued progress of the Mahon Modal Shift towards national targets of 45%. Improved pedestrian and cyclist facilities in addition to the extension of bus lane facilities will have the effect of reducing journey times and encouraging an increase in use.

A modal shift of 45% (implying an anticipated increase in public transport or active travel in the immediate area of 21%) for future year models is deemed to be reasonable. This modal shift increase of 21% will be applied to proposed development traffic from the opening year (when the development is fully completed) 2024, up to the design year 2039. It will not be applied to background traffic flows.

5.2.3 Trip Generation

This section describes the traffic generation from the proposed development and is based on the TRICS Database as outlined in the TTA.

The following tables present the residential development traffic for the three phases of the proposed development. This traffic has been added to existing background flows and distributed through the network to model each of the identified junctions. The results are presented in Section 5.5.3.6 of this report.

Phase 1: The Meadows		AM PEAK (07:30-09:30)		PM PEAK (16:30-18:30)	
		Arrivals	Departures	Arrivals	Departures
New Residential Trip Generation - based on TRICs database					
280	Peak Trics Trip Rates Per Unit	0.122	0.343	0.417	0.158
	Peak Trips No. Units	34	96	117	44
	TOTAL	130		161	
New Creche Trip Generation - based on TRICs database					
35	Peak Trics Trip Rates Per unit	0.412	0.418	0.368	0.456
	Peak Trips No. Units	14	15	13	16
	TOTAL	29		29	
New Residential Trip Generation - allowing for 21% modal shift increase					
	TOTAL New Residential Trips	28	79	97	36
	Total New Creche Trips (20% new trips)	3	3	3	3
	Total 2 hour peak trips	31	82	100	39

Table 5.2.8: Proposed Development Traffic in 2024, The Meadows

Phase 2: The Farm		AM PEAK (07:30-09:30)		PM PEAK (16:30-18:30)	
		Arrivals	Departures	Arrivals	Departures
New Residential Trip Generation - based on TRICs database (Unit)					
140	Peak Trics Trip Rates Per Unit	0.122	0.343	0.417	0.158
	Peak Trips No. Units	17	48	58	22
	TOTAL	65		81	
New Creche Trip Generation - based on TRICs database (Pupils)					
25	Peak Trics Trip Rates Per unit	0.412	0.418	0.368	0.456
	Peak Trips No. Units	10	10	9	11
	TOTAL	21		21	
New Residential Trip Generation - allowing for 21% modal shift increase					
	TOTAL New Residential Trips	14	40	48	18
	Total New Creche Trips (20% new trips)	2	2	2	2
	Total 2 hour peak trips	16	42	50	21

Table 5.2.9: Proposed Additional Development Traffic in 2028, The Farm

Phase 3: The North Fields		AM PEAK (07:30-09:30)		PM PEAK (16:30-18:30)	
		Arrivals	Departures	Arrivals	Departures
New Residential Trip Generation - based on TRICs database (Unit)					
200	Peak Trics Trip Rates Per Unit	0.122	0.343	0.417	0.158
	Peak Trips No. Units	24	69	83	32
	TOTAL	93		115	
New Creche Trip Generation - based on TRICs database (Pupils)					
0	Peak Trics Trip Rates Per unit	0.412	0.418	0.368	0.456
	Peak Trips No. Units	0	0	0	0
	TOTAL	0		0	
New Residential Trip Generation - allowing for 21% modal shift increase					
	TOTAL New Residential Trips	20	57	69	26
	Total New Creche Trips (20% new trips)	0	0	0	0
	Total 2 hour peak trips	20	57	69	26

Table 5.2.10: Proposed Additional Development Traffic in 2030, The North Fields (full scheme)

The above tables present the expected AM/PM traffic generation figures from the various uses within each phase of the scheme. This traffic is added to the measured background flows to develop future year traffic models of the identified junctions. The distribution of these 'new' trips onto the roads network will be in-line with recorded patterns of flow. The term 'new' trips implies that it is assumed that all residents and end users of the residential element of the scheme are new to the area.

It is assumed that a significant portion of the Creche will be used for the proposed development, however in order to carry out a robust assessment of the roads network it has been agreed with the Local Authority that 20% of traffic that would be generated by a standalone creche will be attracted to the proposed development.

Traffic from granted schemes in the area are included as per the following table. The distribution of this additional traffic is dependent on the scheme's location.

Granted Schemes		AM PEAK (07:30-09:30)		PM PEAK (16:30-18:30)	
		Arrivals	Departures	Arrivals	Departures
New Residential Trip Generation - based on TRICs database (Unit)					
201	Peak Trics Trip Rates Per Unit	0.122	0.343	0.417	0.158
	Peak Trips No. Units	25	69	84	32
	TOTAL	93		116	
New Creche Trip Generation - based on TRICs database (Pupils)					
0	Peak Trics Trip Rates Per unit	0.412	0.418	0.368	0.456
	Peak Trips No. Units	0	0	0	0
	TOTAL	0		0	
New Residential Trip Generation - allowing for 21% modal shift increase					
	TOTAL New Residential Trips	20	57	69	26
	Total New Creche Trips (20% new trips)	0	0	0	0
	Total 2 hour peak trips	20	57	69	26

Table 5.2.11: Expected Traffic Generation from granted schemes in the area

5.2.4 Trip Distribution

Traffic flow matrices have been developed for the modelled network for the following scenarios:

- Scenario 1: 2020 AM/PM Base Year Models
- Scenario 2: 2024 AM/PM Models with previously granted schemes (no development)
- Scenario 3: 2026 AM/PM with/without Phase 1 (assuming a commencement date in 2024)
- Scenario 4: 2028 AM/PM with/without Phase 2 (assuming Phase 1 completed)
- Scenario 5: 2030 AM/PM with/without Phase 3 (assuming Phase 1,2 completed)
- Scenario 6: 2039 AM/PM Design Year Models with/without (without assumes no new development on the site)

The Distribution of traffic from the proposed development is in accordance with existing recorded traffic patterns on the local roads network. This is standard practice when developing future year traffic flows of a new development.

The constructed Paramics model was validated by comparing the traffic count information to the modelled flows from Paramics. This involved running the Paramics Matrix Estimation mode through thousands of iterations to ensure that the flows are representative of actual measured flows. The GEH statistic is used to assess the accuracy of modelled flows and is the standard by which Traffic Model Assignment is validated. The reason for using the GEH statistic, rather than an absolute or relative flow difference, is that it can cope with a wide range of traffic flows. Whereas an absolute difference of 100pcu/hr can be important in a flow of 200pcu/hr it is largely irrelevant in a flow of several thousand pcu/hr. In this report the GEH statistics have been presented on a junction-by-junction basis. Individual link flow movements have also been considered.

The results of the comparative flow analysis for the Bessborough models were exceptionally good and indicate that the simulated congestion and interaction reflects the 2020 situation with an average of 100% of modelled flows achieving a GEH value under 5. As there is no route choice on the developed model these results are expected. The highest deviation from recorded flows occurs in the evening peak and is associated with a partially completed new housing development accessed adjacent to the site access road for Phases 1 & Phase 2. The GEH associated with this zone is 2.5.

The following tables present the resulting Demand Matrix for both the AM and PM peaks. The 2-hour matrices indicate a flow of 4,635 vehs for the AM peak and 5,268 vehs for the PM peak. The recorded traffic flows at Junction 2 on the main Skehard Road were used to develop an AM and PM peak hour traffic profile for use in the modelling software. The profiles applied are shown in figures 5.5.1 and 5.5.2 and are used in the Paramics software to proportion the introduction of vehicles onto the network. This ensures that the modelling picks up inter-peak peaks, for example in the AM profile peak traffic flow is at 08:30-09:00 falling back thereafter. The evening profile shows a peak approaching 17:00 and a second peak around 18:00. The use of these profiles within the model is part of the calibration process.

Zone	1	2	3	4	5	6	7	8	9	10	Total
1		78.000	90.000	206.000	583.000	41.000	6.000	80.000	171.000	58.000	1313.000
2	107.000		38.000	89.000	271.000	15.000	2.000	31.000	69.000	43.000	665.000
3	25.000	8.000		39.000	76.000	2.000	0.000	5.000	13.000	3.000	171.000
4	153.000	53.000	37.000		388.000	18.000	3.000	38.000	87.000	20.000	797.000
5	320.000	119.000	108.000	231.000		44.000	7.000	89.000	193.000	48.000	1159.000
6	49.000	13.000	3.000	9.000	40.000		0.000	4.000	0.000	4.000	122.000
7	4.000	1.000	0.000	1.000	3.000	0.000		0.000	0.000	0.000	9.000
8	51.000	14.000	3.000	9.000	41.000	22.000	12.000		0.000	4.000	156.000
9	41.000	10.000	2.000	7.000	34.000	0.000	0.000	0.000		3.000	97.000
10	44.000	30.000	5.000	12.000	41.000	2.000	0.000	3.000	9.000		146.000
Total	794.000	326.000	286.000	603.000	1477.000	144.000	30.000	250.000	542.000	183.000	4635.000

Table 5.2.12: 2020 AM 07:30-09:30 Demand Matrix

Zone	1	2	3	4	5	6	7	8	9	10	Total
1		236.000	72.000	181.000	370.000	38.000	2.000	26.000	118.000	94.000	**1137.000**
2	92.000		27.000	72.000	156.000	11.000	1.000	7.000	38.000	88.000	**492.000**
3	105.000	40.000		124.000	151.000	2.000	0.000	1.000	9.000	16.000	**448.000**
4	168.000	64.000	97.000		309.000	4.000	0.000	3.000	16.000	26.000	**687.000**
5	435.000	180.000	82.000	288.000		19.000	1.000	13.000	58.000	76.000	**1152.000**
6	27.000	9.000	4.000	12.000	29.000		0.000	4.000	0.000	3.000	**88.000**
7	27.000	9.000	4.000	12.000	29.000	4.000		0.000	0.000	3.000	**88.000**
8	107.000	38.000	18.000	50.000	114.000	12.000	1.000		0.000	15.000	**355.000**
9	149.000	53.000	25.000	70.000	160.000	0.000	0.000	0.000		21.000	**478.000**
10	104.000	124.000	10.000	27.000	61.000	3.000	0.000	2.000	12.000		**343.000**
Total	**1214.000**	**753.000**	**339.000**	**836.000**	**1379.000**	**93.000**	**5.000**	**56.000**	**251.000**	**342.000**	**5268.000**

Table 5.2.13: 2020 PM 16:30-18:30 Demand Matrix

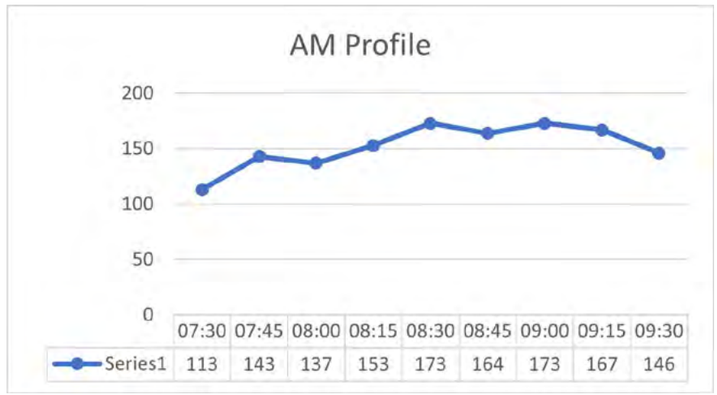

Figure 5.2.2: Recorded AM Peak traffic profile

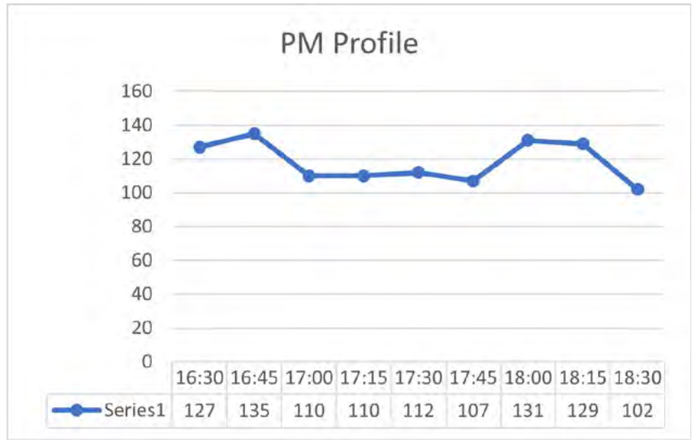

Figure 5.2.3: Recorded PM Peak traffic profile

5.2.5 Queue Length Validation

The base model was validated by comparing the queue lengths, as recorded on-site, with those in the Paramics model to ensure the integrity of the simulation. Validating the model in this way meant that it was being constructed to take into account actual real time traffic and road conditions as observed on the ground. This comparison showed that the level of queuing shown in the model accurately represents on site conditions. The following graphs present a comparison between recorded 2020 traffic queues forming at the critical junctions during peak periods and the modelled queues for the same time-period.

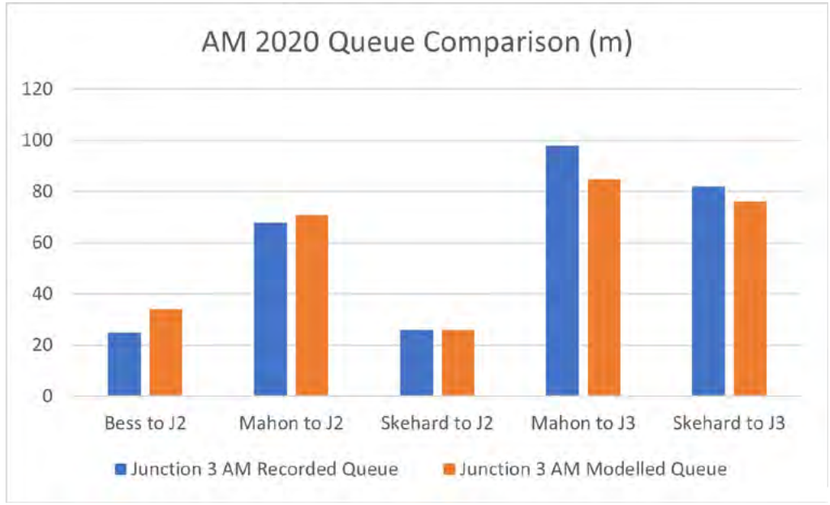

Figure 5.2.4: 2020 AM Queue Length Comparison

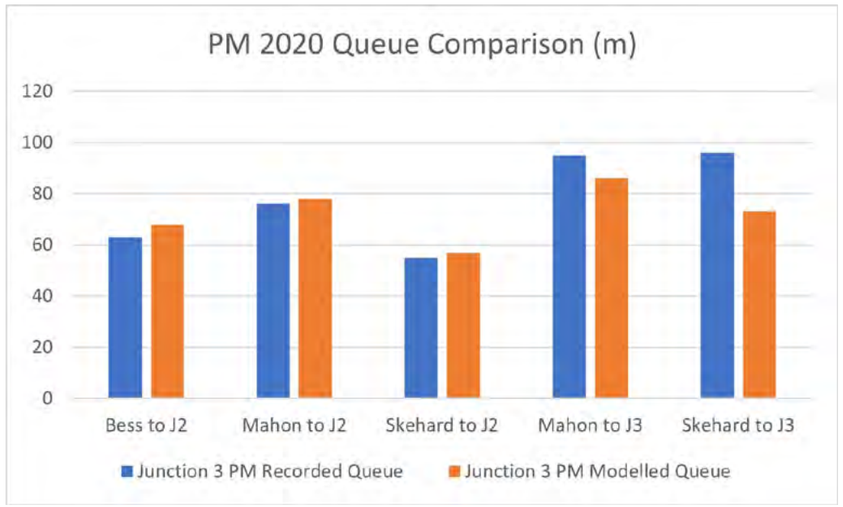

Figure 5.2.5: 2020 PM Queue Length Comparison

Evident is that the modelled queues broadly reflect the recorded 2020 situation. As previously outlined current year spot checks indicate a drop in overall traffic volumes on the network which results in reduced queues forming at the junctions. In addition, the constructed model reflects the current 'improved' layout which has seen the introduction of Bus Corridors and the use of Bus-Gates at the junctions. Signal timings and phases used in the model are based on the current observed situation. These modifications to the Base Year 2020 collected data will account for the minor discrepancies observed in the constructed model.

The constructed base year models for both peak periods are deemed to be suitable for analysing future year scenarios.

5.2.6 Key Performance Indicators

In order to compare various model scenarios from a statistical point of view a comparison of specific 'Key Performance Indicators' (KPI's) is carried out. This comparison provides a quantifiable, relative evaluation of various modelled scenarios. These KPIs include:

- **Journey Time Comparison**: Average journey times on specific routes in respective traffic models in seconds.
- **Average Network Speed**: Average speed for vehicles on the modelled network in kilometres per hour (kph)
- **Latent Demand**: Latent demand is defined as the number of vehicles still on the network at the end of a simulation period. A high latent demand can be indicative of a traffic network reaching or operating above the available capacity.
- **Average Queue Length**: Average length of queuing in metres on defined routes.

5.2.6.1 Journey Time Comparison

Specific journey paths through the network were modelled to provide a means of comparing the impact of the proposed developments on the Skehard Road, Mahon Link Road and the Bessborough Road. The following Extracts from the model show these individual routes:

Figure 5.2.6: Mahon Link to Skehard Road West

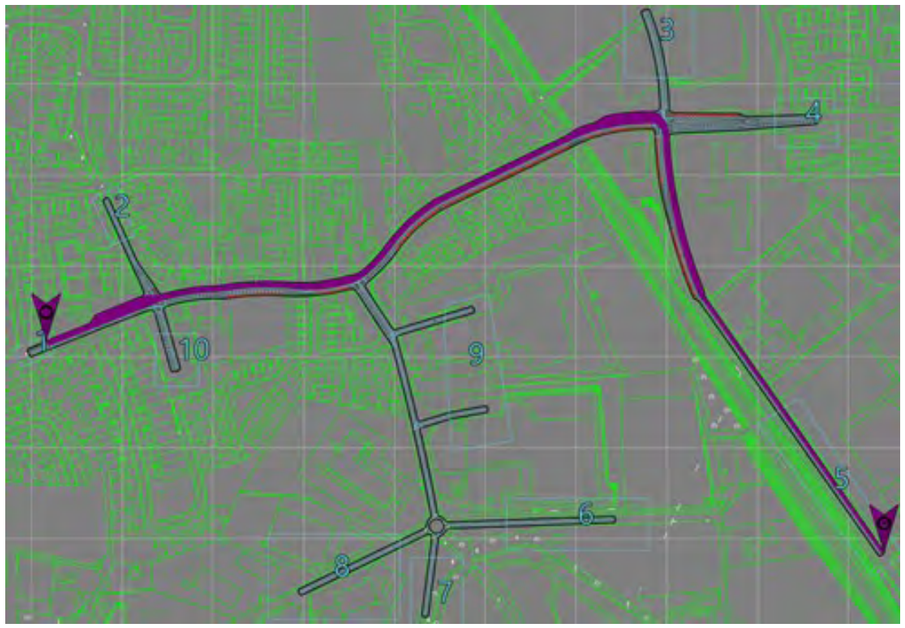

Figure 5.2.7: Skehard Road West to Mahon Link

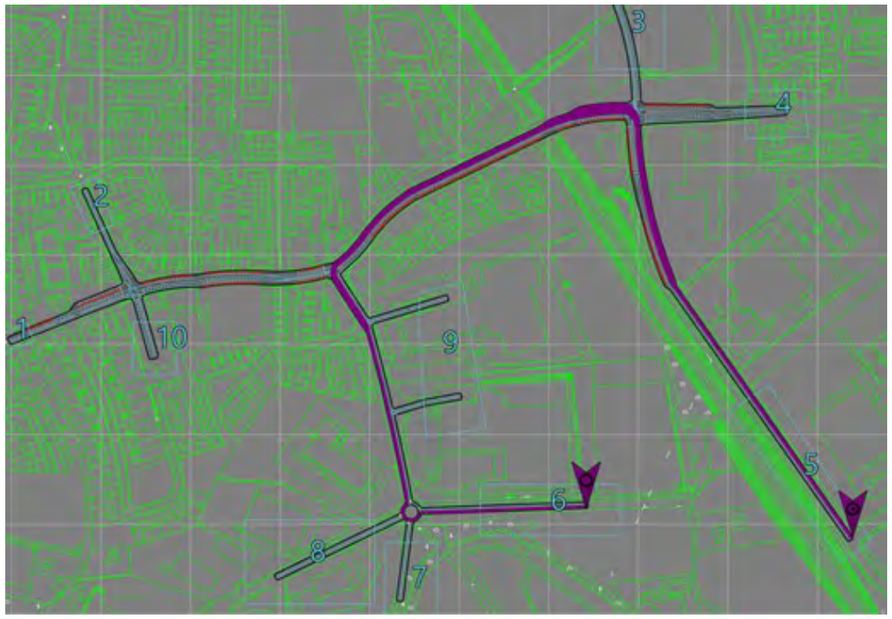

Figure 5.2.8: Bessborough to Mahon Link

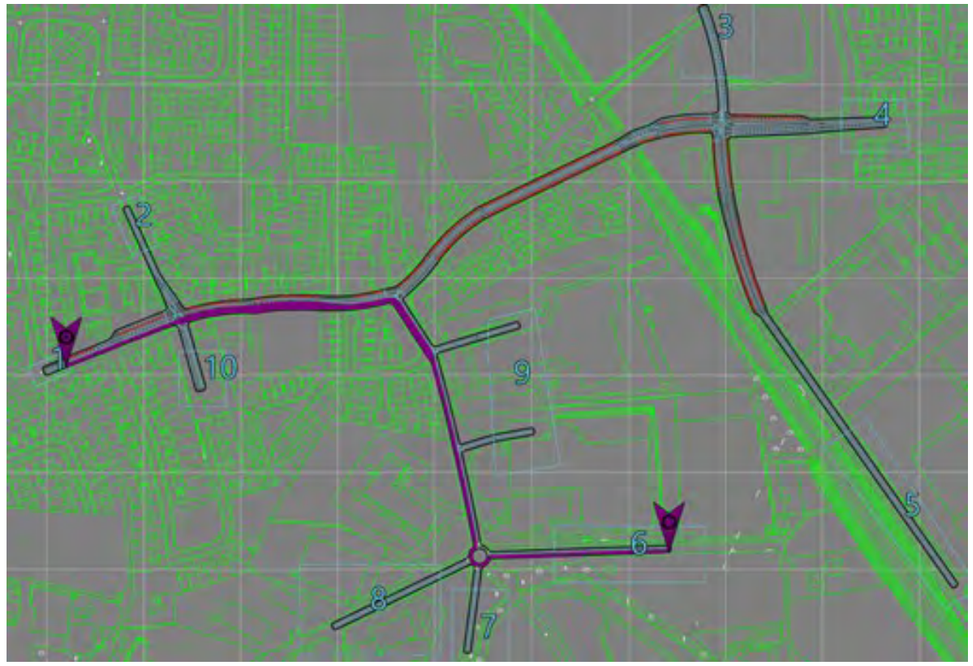

Figure 5.2.9: Bessborough to Skehard Road West

The developed models are run through 10 iterations and analysed using the Paramics Discovery Software to provide Average Journey Times in seconds along these routes. The resulting data is presented in graphical format for each of the developed scenarios. No adjustments to traffic signal timings or stages are made to improve future year scenarios implying the results are a like-for-like comparison.

5.2.6.2 Average Queue Length

Specific queue paths through the network were modelled to provide a means of comparing the impact of the proposed developments on the Skehard Road, Mahon Link Road and the Bessborough Road. The following Extracts from the model show these individual queue paths.

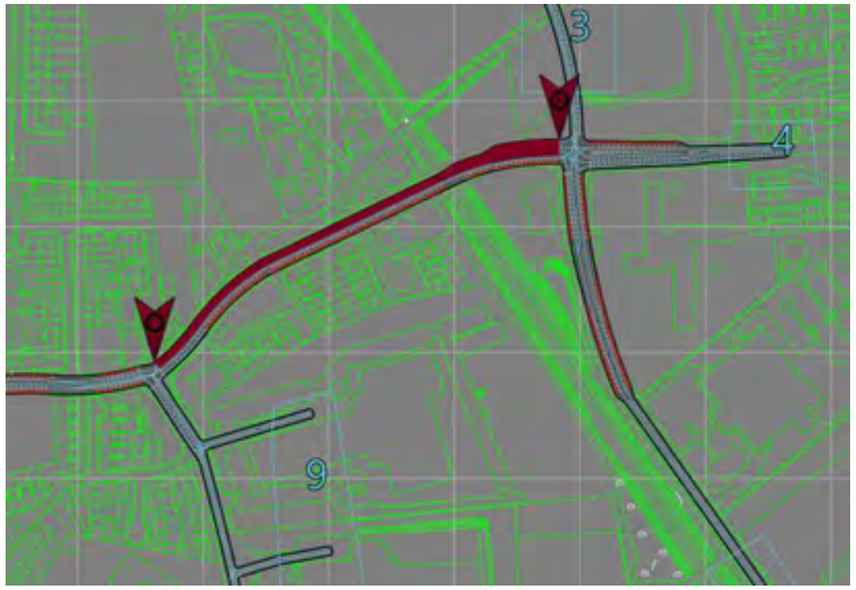

Figure 5.2.10: Skehard Road to Junction 3

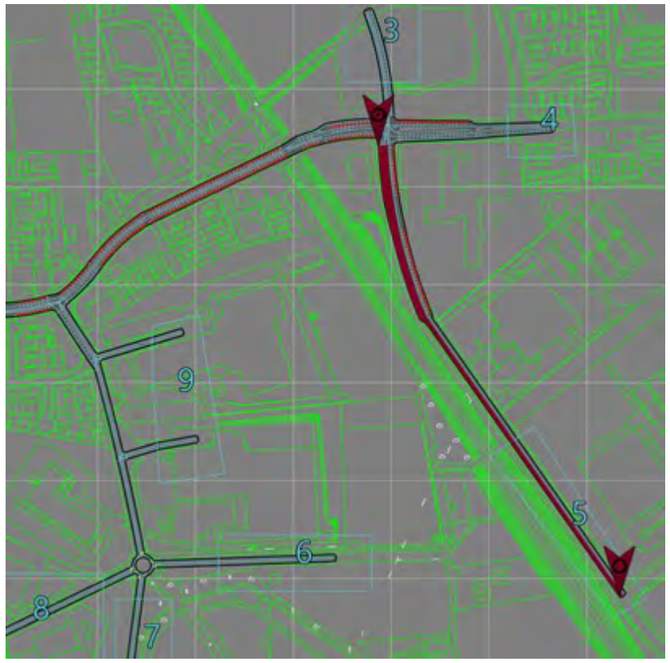

Figure 5.2.11: Mahon Link Road to Junction 3

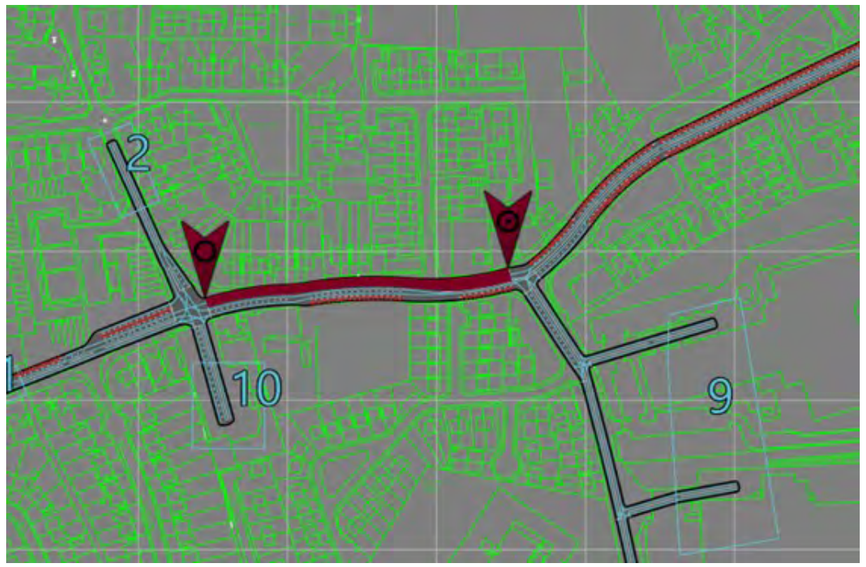

Figure 5.2.12: Skehard Road West to Junction 2

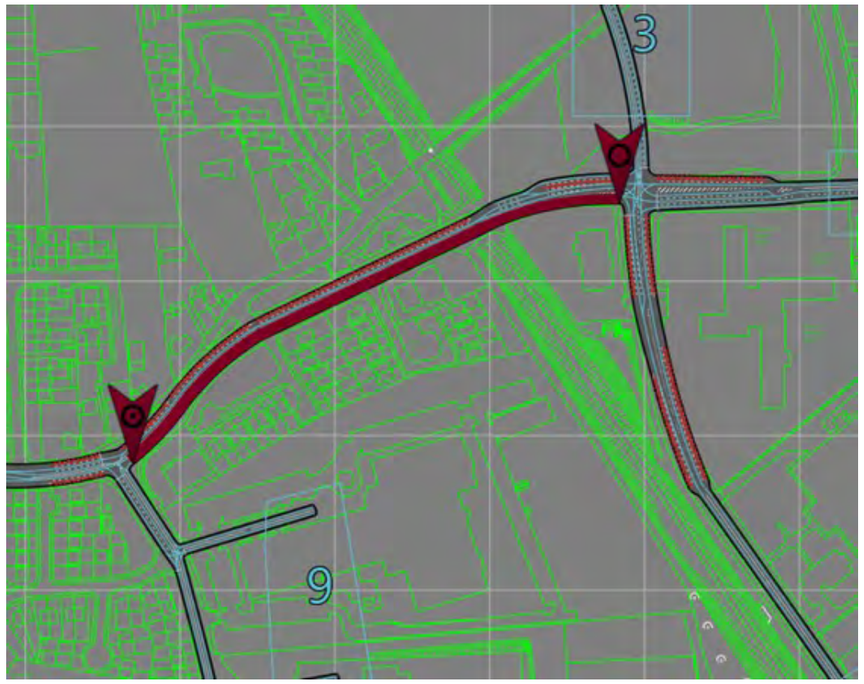

Figure 5.2.13: Mahon Approach to Junction 2

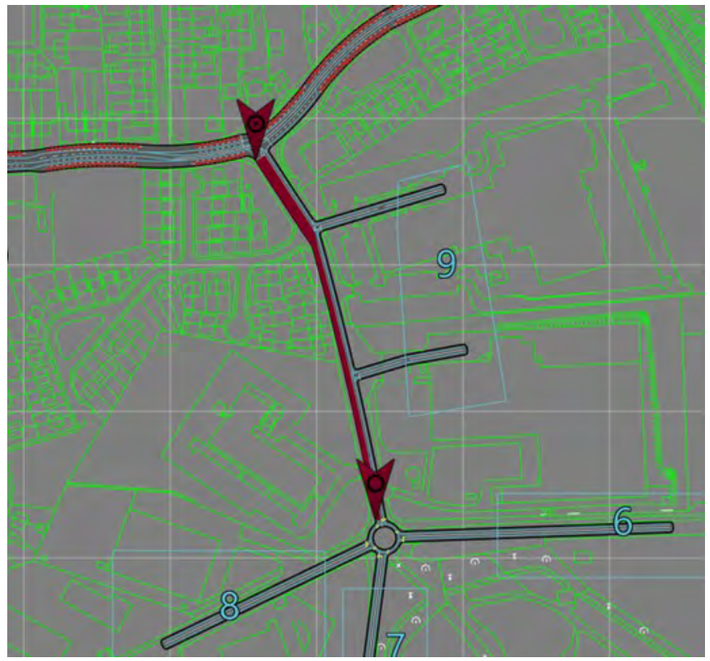

Figure 5.2.14: Bessborough Road Approach to Junction 2

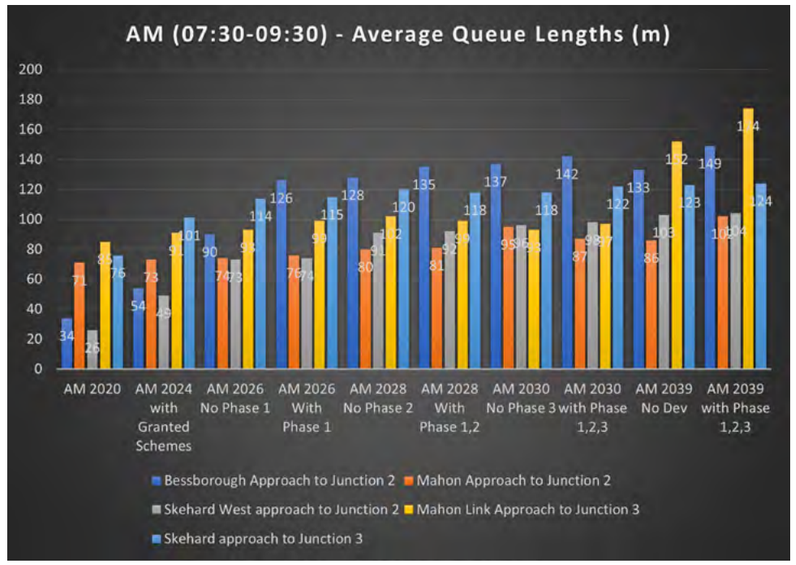

Figure 5.2.15: AM Average Queue Lengths

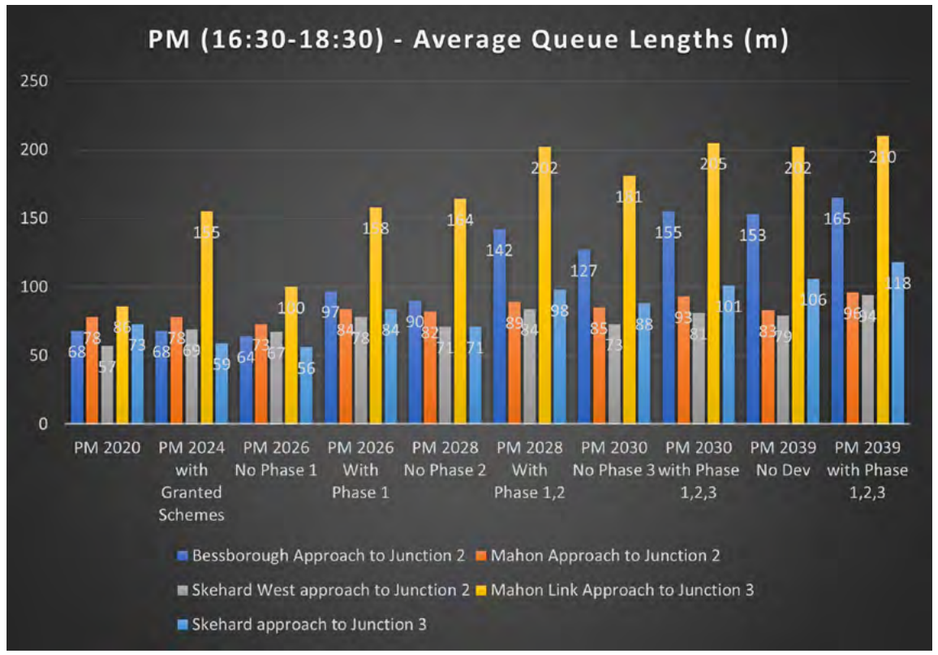

Figure 5.2.16: PM Average Queue Lengths

5.3 Description of Existing Baseline Environment

The following site-specific characteristics are noted:

- The application site is located in Bessboro, Blackrock, considered within the South-Eastern Suburbs of Cork City as defined by the Cork City Development Plan 2015-2021.
- Access to the site is by means of an existing access road currently serving the Bessboro Day Care Centre.
- Within 10 mins walk time from the site:
  - Blackrock Business Park
  - Mahon Industrial Estate
  - Mahon Point Shopping Centre
  - Mahon Retail Park
  - Mater Private Hospital
  - City Gate
  - Bus Stop Clontarf Estate (Service 202, 215, 215A, and 219)
  - Bus Stop City Gate (Service 215, 215A, and 219)
- Within 15 mins walk time from the site:
  - Mahon Golf Course
  - Aldi
  - Blackrock Hall Primary Care Centre
  - Mahon Post Office
  - Scally's Supervalu
  - Bus Stop Clover Lawn (Service 215, 215A, and 219)
  - Bus Stop Skehard Lawn (Service 215, 215A, and 219)
- Within 20 mins walk time from the site:
  - Blackrock National Hurling Club
  - Dundanion Medical Centre
  - Nagle Secondary Community College
  - Scoil na Croise Naofa Primary School
  - Ringmahon Rangers AFC
  - Bus Stop Barnstead Drive (Service 202)
  - Bus Stop Nagle Community College (Service 202)
  - Bus Stop Ringmahon Rd. (Service 202 & 219)
- Within 30 mins walk time from the site:
  - Blackrock Village
  - Blackrock Pier
  - St. Michaels Catholic Church Blackrock
  - The Marina Park
  - Pairc Ui Rinn GAA
  - Cork Constitution FC
  - Ballinlough Pitch & Putt Club
  - Beaumont Girls School
  - Bus Stop Ardmahon Estate (Service 219)

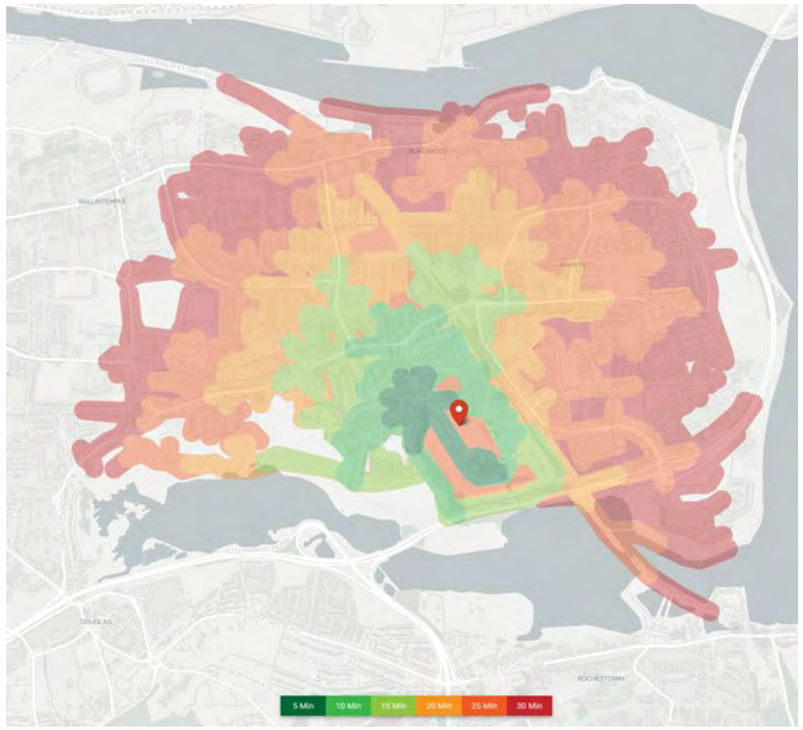

Figure 5.3.1: Walking Connectivity (Current)

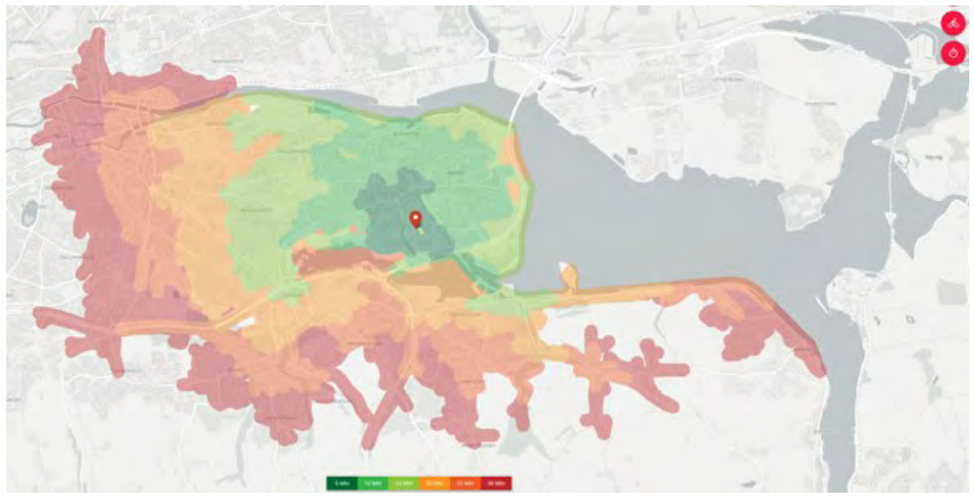

Figure 5.3.2: Cycle Connectivity (Current)

- A number of public bus routes serve the site including the 202, 215, 215A, and 219 all of which avail of the recently upgraded facilities along Skehard Rd. These routes provide a high level of service and frequency to the site. The 202 runs from Hollyhill to Mahon Point via the City Centre, the 215 links Cloghroe and Blarney to Mahon Point via the City Centre, the 215A runs from the City Centre to Mahon Point via Boreenmanna Rd., and the 219 links Mahon to UCC (via Pearse Rd.) and CIT.
- The Cork Metropolitan Area Transport Strategy 2040 (CMATS) proposes significant improvements to the public transport facilities over and above what is currently available to the new proposed scheme. In addition to the introduction of a further 100km of bus lanes to the metropolitan area, CMATS proposes the introduction of a 17km Light Rail Network which is to include stations at Mahon Point and Blackrock. With the provision of these facilities and other incentives as part of national policy, it is anticipated that a shift to public transport will occur over the construction phase of this scheme. CMATS has provided more certainty for the delivery of these enhancements. The Mahon Local Area Plan (now lapsed) states that is an objective to support the achievement of high levels of modal shift by collaborating with other agencies to improve public transport services and influence patterns of employment development to support use of sustainable modes and travel by public transport".
- The following key junctions were identified for assessment within the study.

Junction 1: Traffic Signal Controlled cross-roads junction serving R852 Skehard Rd., Church Rd. & Scally's Supervalu

This cross-roads junction serves as an important vehicular access between Mahon Point and the greater Cork City urban area. It also provides a link for the surrounding residential areas to the wider roads network.

The measured two-way AADT (Annual Average Daily Traffic) at the cross-roads junction is 20,390.

Image 5.3.1: Image of R852 Skehard Rd./Church Rd. Crossroads

Figure 5.3.3: Image of R852 Skehard Rd./Church Rd. AM Peak Flows

Figure 5.3.4: Image of R852 Skehard Rd./Church Rd. PM Peak Flows

Junction 2: Traffic Signal Controlled T-Junction at which Bessboro Rd. joins R852 Skehard Rd.

This signalised T-junction forms a part of the primary route serving the Mahon Industrial Estate and the Blackrock Business Park in addition to various commercial enterprises in the surrounding area. The junction also facilitates access to the Bessborough Centre and the Bessboro Day Care Centre.

The measured AADT (Annual Average Daily Traffic) at the T-junction is, 20,050.

Image 5.3.2: Image of Bessboro Rd./R852 T-Junction>

Figure 5.3.5: Image of Bessboro Rd./R852 AM Peak Flows

Figure 5.3.6: Image of Bessboro Rd./R852 PM Peak Flows

Junction 3: Traffic Signal Controlled cross-roads junction serving R852, Blackrock Ave., & Skehard Rd.:

This signalised junction serves as an important vehicular access to the Mahon Retail Complex and the South Ring Road. Traffic flows through the junction are significant with a measured AADT (Annual Average Daily Traffic) of 23,900.

Image 5.3.3: Image of R852/ Skehard Rd./ Blackrock Ave. Crossroads

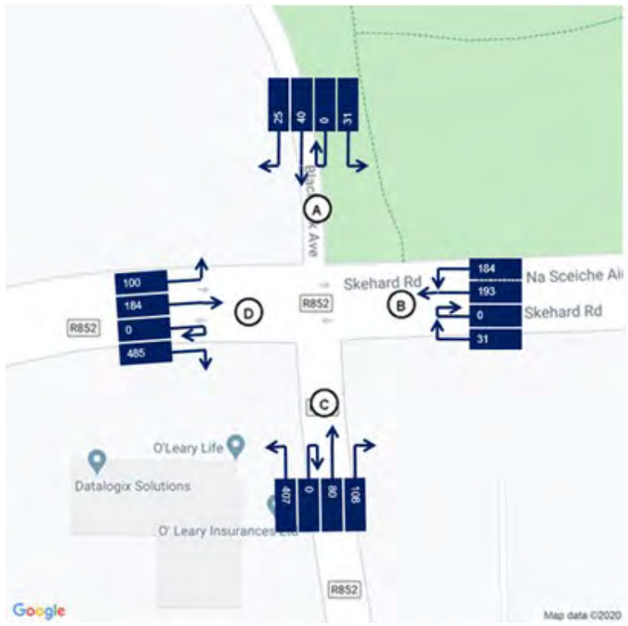

Figure 5.3.7: Image of R852/ Skehard Rd./ Blackrock Ave. AM Peak Flows

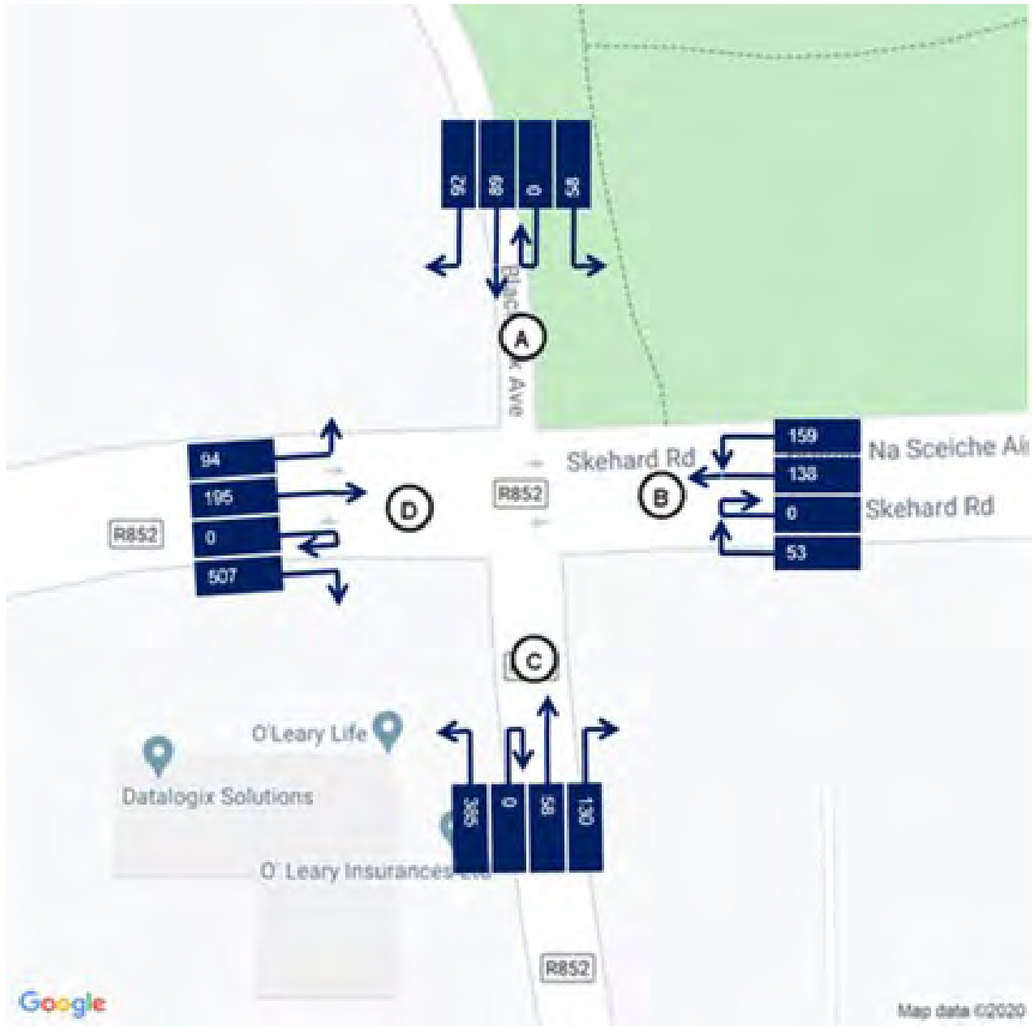

Figure 5.3.8: Image of R852/ Skehard Rd./ Blackrock Ave. PM Peak Flows

Junction 4: Mini roundabout on the junction of Bessboro Rd. and the site access road:

This mini roundabout serves as a part of the primary route to the Mahon Industrial Estate as well as forming the primary access to the proposed 620-unit development. Direct access to the Bessborough Centre is also provided for.

The measured AADT (Annual Average Daily Traffic) at the roundabout junction is 4,000.

Image 5.3.4: Image of Bessboro Rd. Mini-Roundabout

Figure 5.3.9: Image of Bessboro Rd. Mini-Roundabout AM Peak Flows

Figure 5.3.10: Image of Bessboro Rd. Mini-Roundabout PM Peak Flows

5.3.1 Existing Traffic Conditions

A variety of different data sources have been used, including:

- 12-hour classified turning counts (4 sites, refer Figure 5.2.1);
- Background OS Mapping and aerial photography;
- On-site junction measurements including saturation flows, link speeds, queue length measurements, pedestrian movements at signalled crossings and geometric data for each of the modelled junctions;

A total of 4 turning count surveys were undertaken as part of the study on Thursday 6th February 2020 prior to Covid restrictions being put in place. These surveys were carried out simultaneously using video cameras at each of the junctions for a 12-hour period. Queue length and pedestrian surveys were also conducted for the 12-hour period.

The following figures present the recorded 12-hour traffic profile, percentage of classified vehicles and turning movements for each of the modelled junctions carried out on Thursday 6th of February 2020:

Figure 5.3.11: 12 Hour Traffic Profile Junction 1: R852 Skehard Rd./Church Rd.

Figure 5.3.12: 12 Hour Traffic Profile Junction 2: Bessboro Rd./R852

Figure 5.3.13: 12 Hour Traffic Profile Junction 3: R852/Skehard Rd./Blackrock Ave.

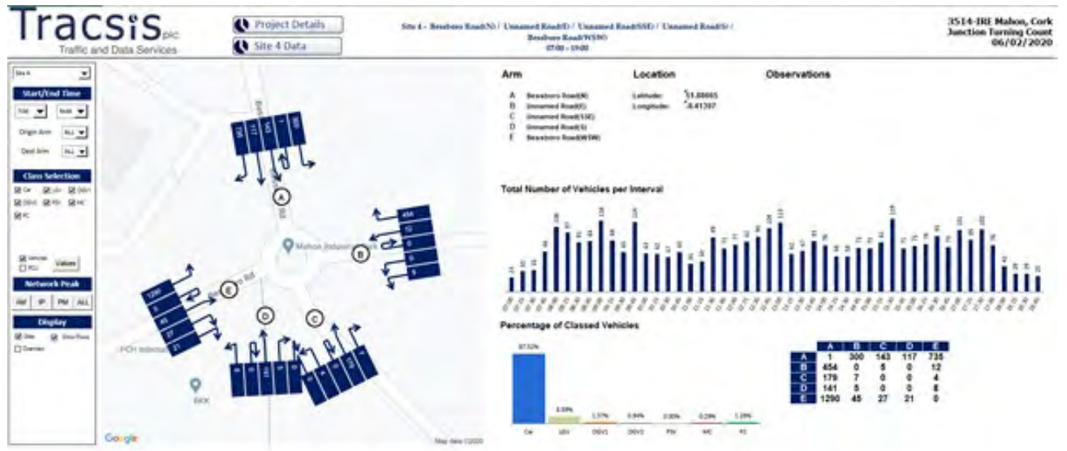

Figure 5.3.14: 12 Hour Traffic Profile Junction 4: Bessboro Rd. mini-roundabout

The data presented in the above figures shows the peak hour traffic periods for both morning and evening respectively at each junction as follows:

- Junction 1: 08:15 – 09:15 and 16:15 – 17:15
- Junction 2: 08:00 – 09:00 and 16:15 – 17:15
- Junction 3: 08:30 – 09:30 and 16:00 – 17:00
- Junction 4: 09:00 – 10:00 and 17:00 – 18:00

For the purpose of the modelling analysis, each of the above peak hour traffic periods are included in the constructed Paramics Discovery Traffic Model which will run from 07:30-09:30 and 16:30-18:30. This ensures a robust analysis of the road network is carried out.

The percentage of classified vehicles was used within the generated traffic models to accurately reflect existing conditions.

5.3.2 Committed Transport Proposals

The publication of the CMATS (Cork Metropolitan Area Transport Study) document as well as BusConnects Cork proposes major upgrades to public transport provision in the Mahon/ Bessboro area to include high frequency bus services and a Light Rail Transit route (LRT). These measures will contribute to an expected increase in modal shift towards sustainable travel resulting in a reduction in traffic generation from residential developments. As part of this assessment allowance was made for a modal shift of 40% (current sustainable travel usage in the area as per 2016 census was 23%). This represents a 17% increase in modal shift over current levels and has been applied to 'new development traffic'.

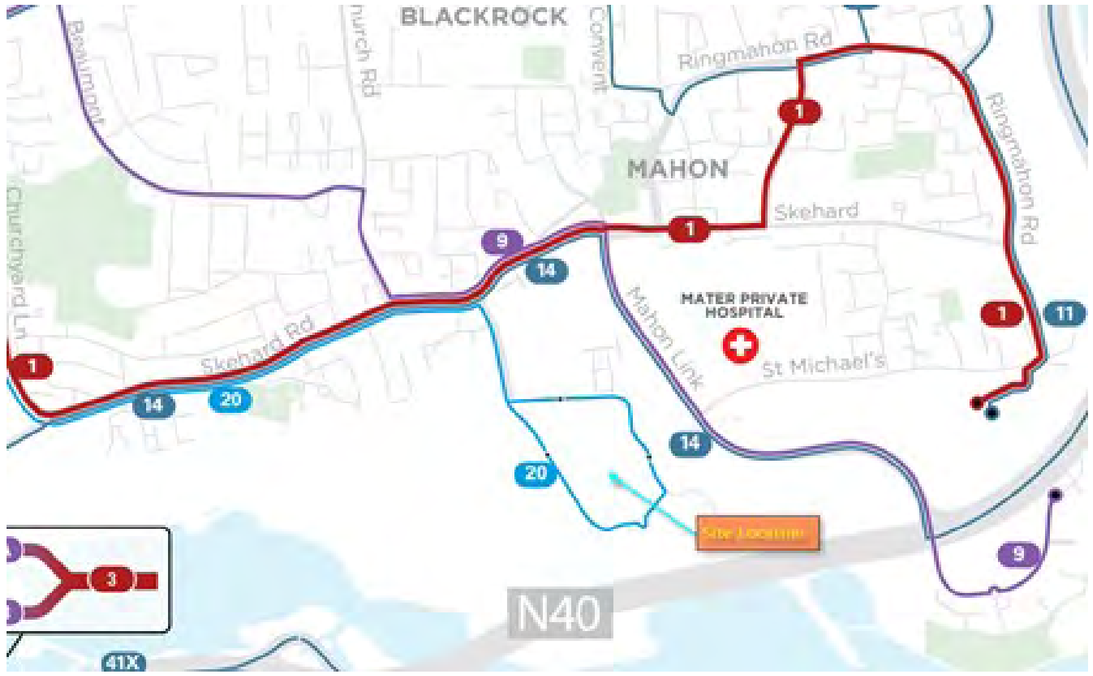

Figure 5.3.15: Extract from BusConnects Public Consultation Document

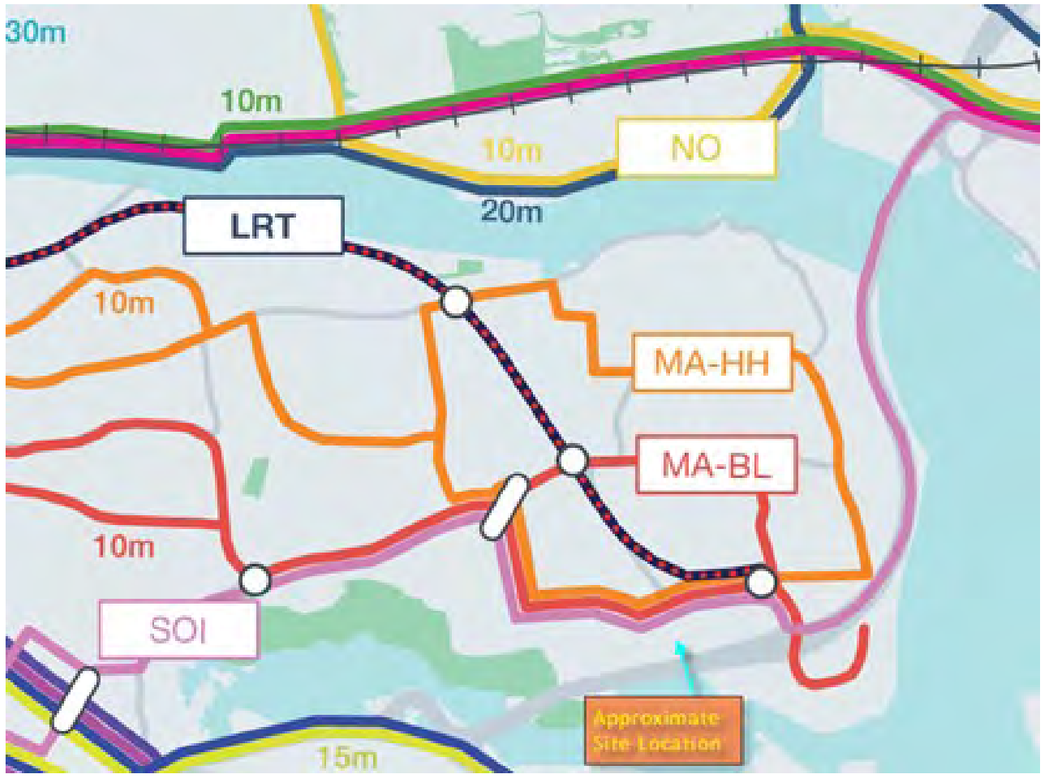

Figure 5.3.16: Extract from CMATS

5.3.3 RSA Collision Data

A review of the RSA Road Collision Statistics was undertaken for the area in the vicinity of the applicants' site.

One minor collision occurred in 2016 at a location on Bessboro Rd. approximately 110m west of the mini roundabout. The collision involved a car and a pedestrian resulting in one minor casualty.

A number of minor collisions occurred in the wider area over the available 11-year period as shown in Figure 5.3.17.

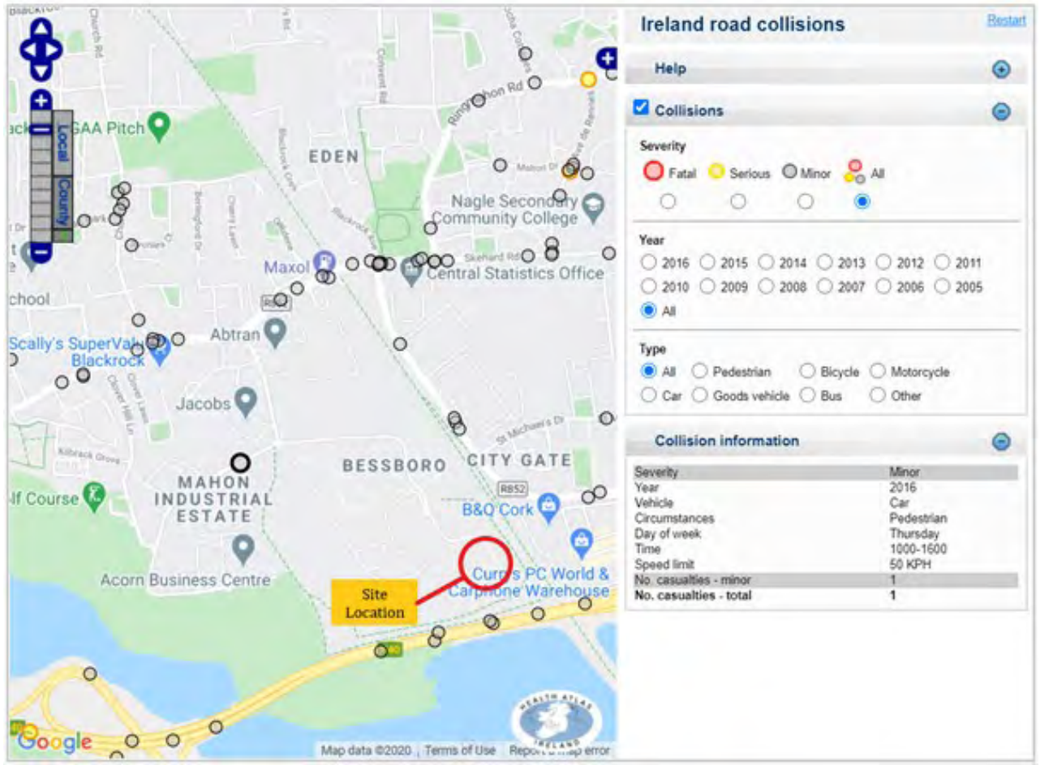

Figure 5.3.17: Collision Statistics for Roads in the vicinity of the site

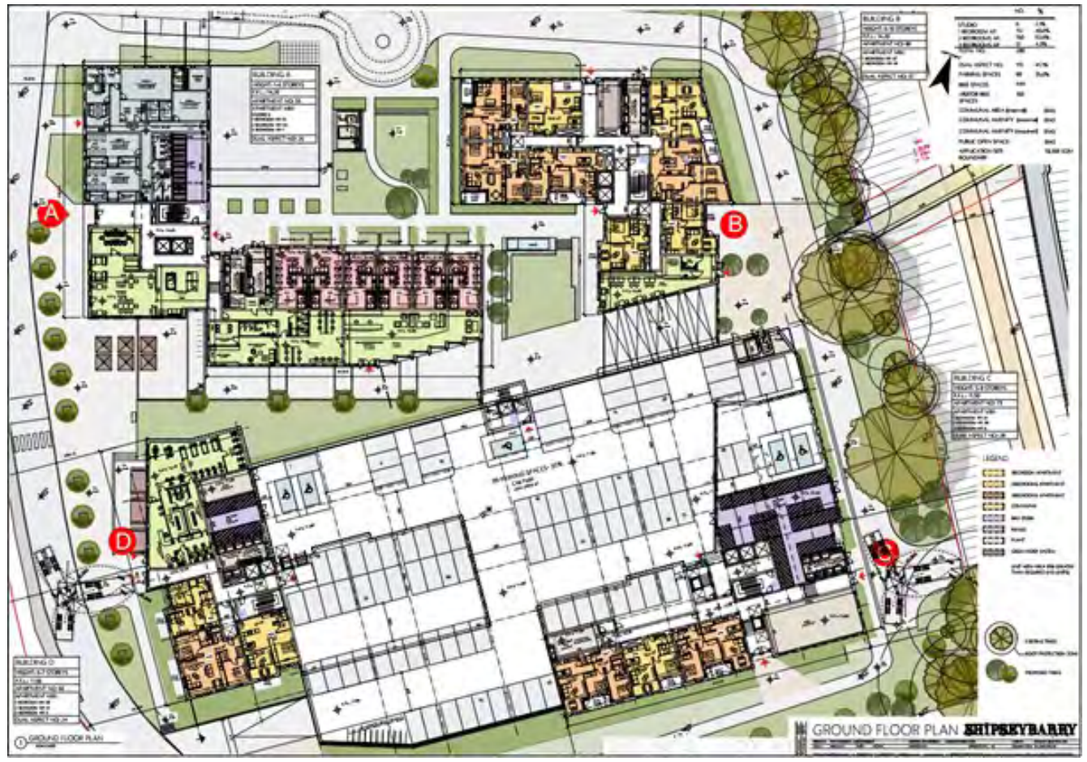

Figure 5.4.1: Proposed Site Layout – The Meadows

5.4 Proposed Development

5.4.1 Description of Proposed Development

The proposed development comprises two planning applications to An Bord Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in Chapter 2 - Project Description.

The proposed primary access to the site is from Bessboro Rd. via a local access road which currently accesses the site.

A new pedestrian/cycle bridge crossing the Blackrock Greenway, which runs along the eastern boundary of the site, is included in the proposed scheme.

The following figures present the site layout for phase 1 (The Meadows) and phase 2 (The Farm), the subject of this application.

Figure 5.4.2: Proposed Site Layout – The Farm

Figure 5.4.3: Proposed Phasing Plan

5.4.2 Phasing of Proposed Scheme

The scheme of six hundred and twenty units (620) residential units, and a sixty (60) child creche, Phase 1,2 & 3 would be completed in a number of phases starting in 2024 and finishing in 2030. To demonstrate the gradual impact on the local road network as the separate phases are complete, the Traffic Impact Assessment includes the proposed construction years of 2024, 2026, and 2028, in addition to the base year (2022), the design year +5 (2029), and the design year +15 (2039).

The proposed development will be phased as follows:

- 2024-2026 – Phase 1 280 residential units & creche
- 2026-2028 – Phase 2: 140 residential units & creche
- 2028-2030 – Phase 3: 200 residential units (Masterplan prepared)

5.5 Impact Assessment

The predicted impact, the mitigation measures required, and the residual impacts are considered under the following headings:

- Do Nothing Scenario
- Construction Phase
- Operational Phase
- Cumulative Impacts

The proposed development will impact on the surrounding roads network during construction and operational stages. It is broadly accepted that operational stage traffic will exceed that of construction stage traffic and will be potentially less manageable in terms of avoiding peak hour traffic periods. Therefore, the traffic models have been developed with operational phase traffic presenting a worst-case scenario for each junction.

The results of the analysis of the affected junctions will be presented in the following format.

5.5.1 Do Nothing Scenario

5.5.1.1 Phase 1 'The Meadows'

The local roads network has been assessed for the Do-Nothing Scenario and is presented as the 'without dev' results for each of the KPI's (Key Performance Indicators). The results are presented in graphical format to make it easy to make a direct comparison between the with/without scenarios for each of the years.

5.5.1.2 Phase 2 'The Farm'

The local roads network has been assessed for the Do-Nothing Scenario and is presented as the 'without dev' results for each of the KPI's (Key Performance Indicators). The results are presented in graphical format to make it easy to make a direct comparison between the with/without scenarios for each of the years.

5.5.1.3 Combined Phase 1 & Phase 2

The local roads network has been assessed for the Do-Nothing Scenario and is presented as the 'without dev' results for each of the KPI's (Key Performance Indicators). The results are presented in graphical format to make it easy to make a direct comparison between the with/without scenarios for each of the years.

5.5.2 Potential Traffic Impacts

5.5.2.1 Construction Stage Impact

5.5.2.1.1 Phase 1 'The Meadows'

As part of this application a Construction Environmental Management Plan (CEMP) has been developed which identified the optimum route for construction access and quantifies the expected maximum daily HGV movements to and from site (ie, 15 no. HGV's - 30 trips)). It is concluded, from a junction capacity assessment perspective, that the operational phase of the scheme will generate more traffic during the peak traffic periods than the construction stage. Operational phase junction models therefore present a worst-case scenario in terms of impact for the modelled network.

The recorded HGV (Heavy Goods Vehicles) content on the R852 Skehard Road is 7.23%. The development of the Phase 1 site will see this percentage increase to 7.66% during the construction stage of the scheme, estimated at a maximum of 15 no. HGV's/day. This equates to 30 HGV movements per day. In addition, allowance is made for a maximum of 20 workers/staff on-site (4 movements per employee including for lunch break) giving an overall construction phase traffic generation of 110 movements per day. All development traffic will arrive via the Skehard Road/Bessborough Road junction this would equate to an increase in the AADT of 1.47%

The following table presents the cut/fill requirements for the site based on the developed Phase 1 scheme and the results from site investigation works carried out to date. It is intended to re-use as much of the cut material on-site. The overall cut quantity includes 4,800cu.m of topsoil of which 1,000 cu.m will be used to 'dress' green areas within the scheme.

Summary		
Description	Cut (cu.m)	Disposed off-site (cu.m)
Site Extents	12,530w	10,330

Excess material will be exported off site over the 2-year construction period and imported material will be brought on to site as required. This material will be sourced from available quarries within the wider area and imported to site as the requirement arises based on the construction works programme. Over the 2-year construction stage for Phase 1 this would equate to approximately 1,000 HGV trips to the site for imported structural fill material. In addition, the estimated 30 HGV movements per day includes 'normal' construction related materials such as concrete, timber, pipe-work and other finishing materials.

The potential construction phase impacts on traffic will occur as site staff arrive and leave the site, material deliveries and the implementation of the Construction Stage Traffic Management Plan. It is envisaged that deliveries will use the main entrance to the site with the potential to use 'Flag-Men' to ensure that road safety considerations are accounted for all road users. The use of a road-sweeper on the Bessborough Road adjacent to the site has the potential to impact on traffic flows. It is envisaged that this will only occur during off-peak hours.

5.5.2.1.2 Phase 2 'The Farm'

As part of this application a Construction Environmental Management Plan (CEMP) has been developed which has identified the optimum route for construction access and quantifies the expected maximum daily HGV movements to and from site (ie, 15 no. HGV's - 30 trips)). It is concluded, from a junction capacity assessment perspective, that the operational phase of the scheme will generate more traffic during the peak traffic periods than the construction stage. Operational phase junction models therefore present a worst-case scenario in terms of impact for the modelled network.

The recorded HGV (Heavy Goods Vehicles) content on the R852 Skehard Road is 7.23%. The development of the Phase 1 site will see this percentage increase to 7.66% during the construction stage of the scheme, estimated at a maximum of 15 no. HGV's/day. This equates to 30 HGV movements per day. In addition, allowance is made for a maximum of 20 workers/staff on-site (4 movements per employee including for lunch break) giving an overall construction phase traffic generation of 110 movements per day. All development traffic will arrive via the Skehard Road/Bessborough Road junction this would equate to an increase in the AADT of 1.47%.

The following table presents the cut/fill requirements for the site based on the developed Phase 2 scheme and the results from site investigation works carried out to date. It is intended to re-use as much of the cut material on-site. The overall cut quantity includes 2,950cu.m of topsoil of which 1,500 cu.m will be used to 'dress' green areas within the scheme.

Summary		
Description	Cut (cu.m)	Disposed off-site (cu.m)
Site Extents	10,850	6,180

Excess material will be exported off site over the 2-year construction period and imported material will be brought on to site as required. This material will be sourced from available quarries within the wider area and imported to site as the

requirement arises based on the construction works programme. Over the 2-year construction stage for Phase 2 this would equate to approximately 1,100 HGV trips to the site for imported structural fill material. In addition, the estimated 30 HGV movements per day includes 'normal' construction related materials such as concrete, timber, pipe-work and other finishing materials.

The potential construction phase impacts on traffic will occur as site staff arrive and leave the site, material deliveries and the implementation of the Construction Stage Traffic Management Plan. It is envisaged that deliveries will use the main entrance to the site with the potential to use 'Flag-Men' to ensure that road safety considerations are accounted for all road users. The use of a road-sweeper on the Bessborough Road adjacent to the site has the potential to impact on traffic flows. It is envisaged that this will only occur during off-peak hours.

5.5.2.1.3 Combined Phase 1 & Phase 2

It is anticipated that Phase 1 of the scheme will be fully complete before the commencement of construction on Phase 2 in this scenario. This implies that operational phase traffic generation from Phase 1 will be present on the network with construction stage traffic from Phase 2. The appointed contractor for Phase 2 will be required to develop a Construction Stage Traffic Management plan to mitigate the construction stage traffic impact from phase 2. As outlined in section 5.5.2.1.2 there will be an expected increase in AADT on the roads network of 1.47% as a result of construction of Phase 2. This increase is significantly less than the anticipated traffic generation from a fully completed and operational Phase 2. The traffic modelling carried out includes a scenario for both Phase 1 and Phase 2 being fully complete.

5.5.2.2 Operational Stage Impact

5.5.2.2.1 Phase 1' The Meadows' Operational Stage Impact

The study encompassed the road network as agreed with the Local Authority which is shown in the following extract from the model.

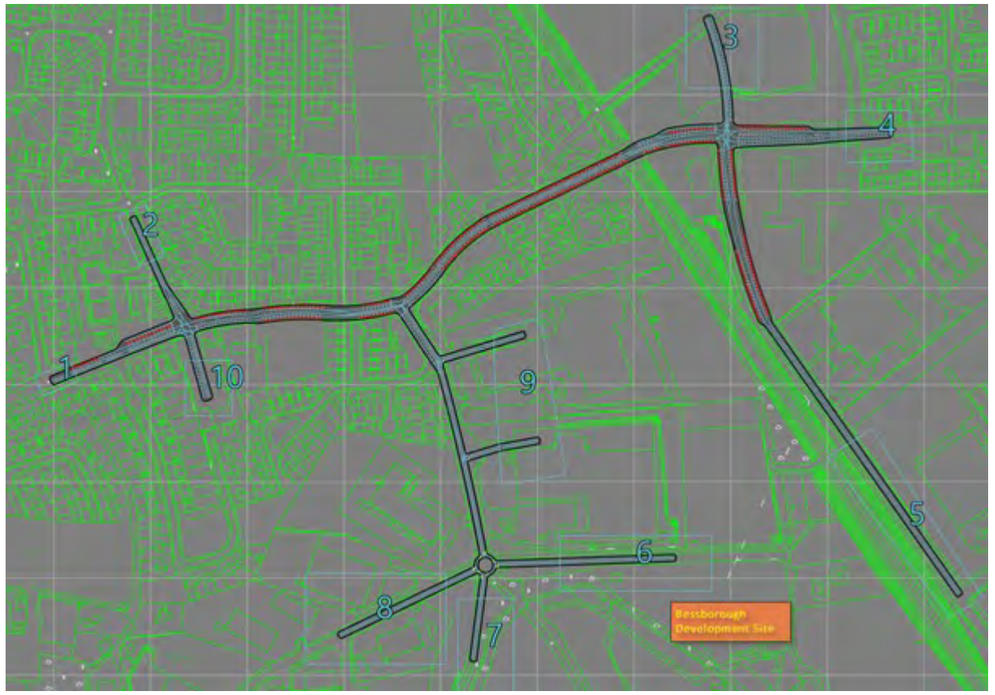

Figure 5.5.1: Extent of Modelled Network

The Base Year for the model is 2020 as agreed with the Local Authority. The following scenarios have been developed to assess the impact of the proposed phased development:

Scenario 1: 2020 AM/PM Baseline Year Models

Scenario 2: 2024 AM/PM Models with previously granted schemes (no development)

Scenario 3: 2026 AM/PM with/without Phase 1 (assuming a commencement date in 2024)

Scenario 4: 2028 AM/PM with/without Phase 2 (assuming Phase 1 completed)

Scenario 5: 2030 AM/PM with/without Phase 3 (assuming Phase 1,2 completed)

Scenario 6: 2039 AM/PM Design Year Models with/without (without assumes no new development on the site)

The effects of traffic growth on the existing road network plus the additional traffic generated by the proposed development, have been compiled to generate likely traffic volumes for the different scenarios. The resultant model outputs are estimated values for journey times, traffic queues and delays.

As per the TII guidelines in the preparation of impact assessments the baseline model represents conditions during the time of the traffic survey, with a requirement to model each opening year and a design year (15 years from the opening year). In this instance it was agreed with the Local Authority that a Base Year model, a model for granted schemes in the area (2024), models for each of the phases (with/without the phase being developed) and a design year model with/without development (2039) be constructed. These models were to run over a 2-hour peak period for both AM and PM.

The results for each scenario developed are presented in graphical format to allow ease of comparison.

5.5.2.2.1.1 Journey Time Comparison

Scenario 3 relates specifically to the development of Phase 1 'The Meadows' (2026 with/without). The journey times along each of the routes are seen to increase over time both with/without development traffic. The largest increase relates to the Bessborough Road accessing onto the Skehard Road. As part of the mitigation section of the Traffic Impact Assessment report changes to signal timings will be made to improve the operational characteristics of the network.

Figures 5.5.4 and 5.5.5 present the with/without scenarios for 2039 AM and PM Design Year. Unlike the other scenarios assessed, the without development in this instance is assuming no development on the Bessborough Site. Background traffic has been increased as per the TII Project Appraisal Guidelines and permitted developments have been included. The with development includes the 3-phases of the Bessbororough Scheme. Evident is that there is an approximate 70% increase in journey times for traffic using the Bessborough Road in the AM peak, reflecting the large volume of traffic turning east towards Mahon on the Skehard Road. The PM peak shows a 49% increase in journey time for traffic on Bessborough Road. An adjustment to the traffic signal timings will mitigate some of this impact when individual phases of the scheme are occupied.

The impact of the proposed Bessborough Scheme on Skehard Road/Mahon Link Road journey times is approximately 26% in the Design Year 2039.

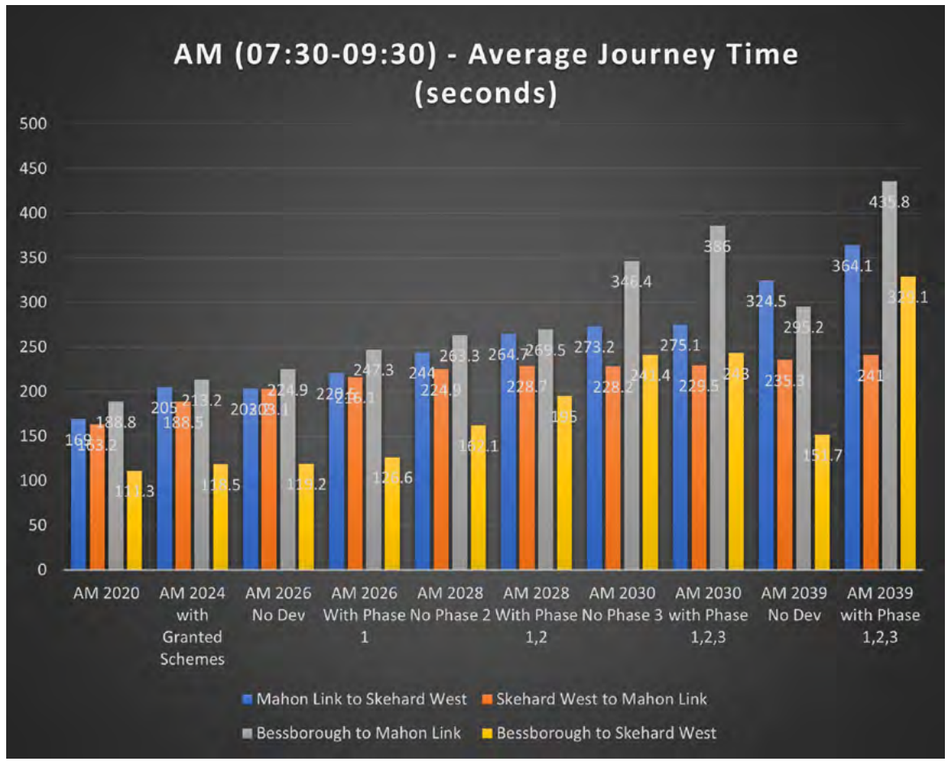

Figure 5.5.2: AM (07:30-09:30) Average Journey Time Comparison (secs)

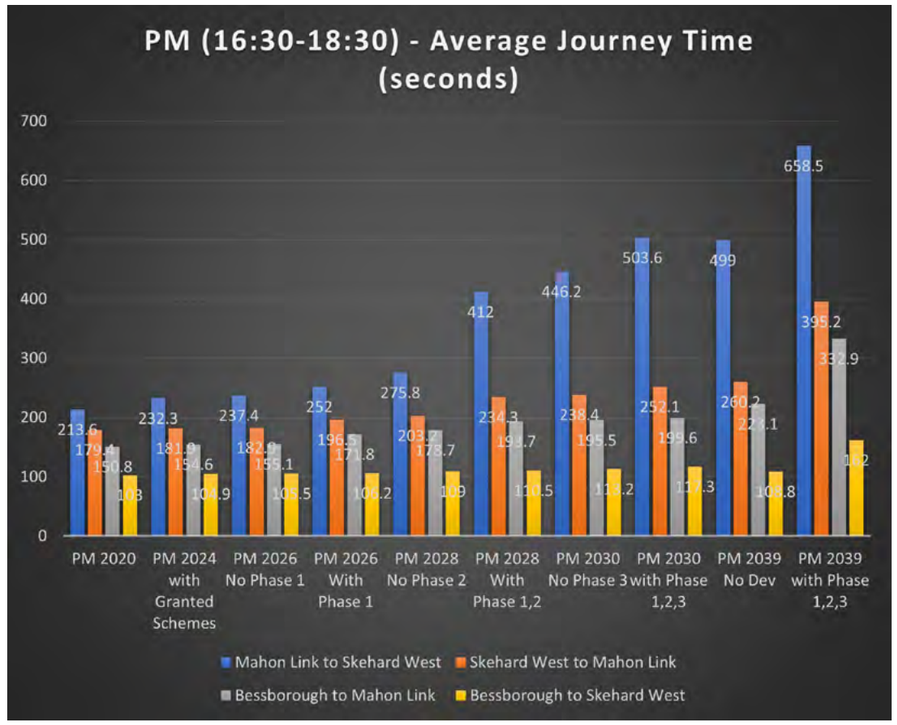

Figure 5.5.3: PM (16:30-18:30) Average Journey Time Comparison (secs)

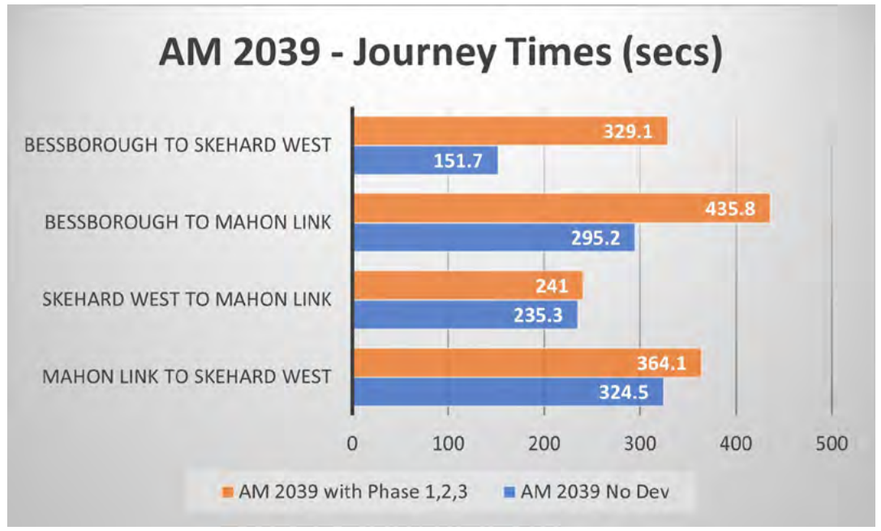

Figure 5.5.4: AM 2039 (07:30-09:30)

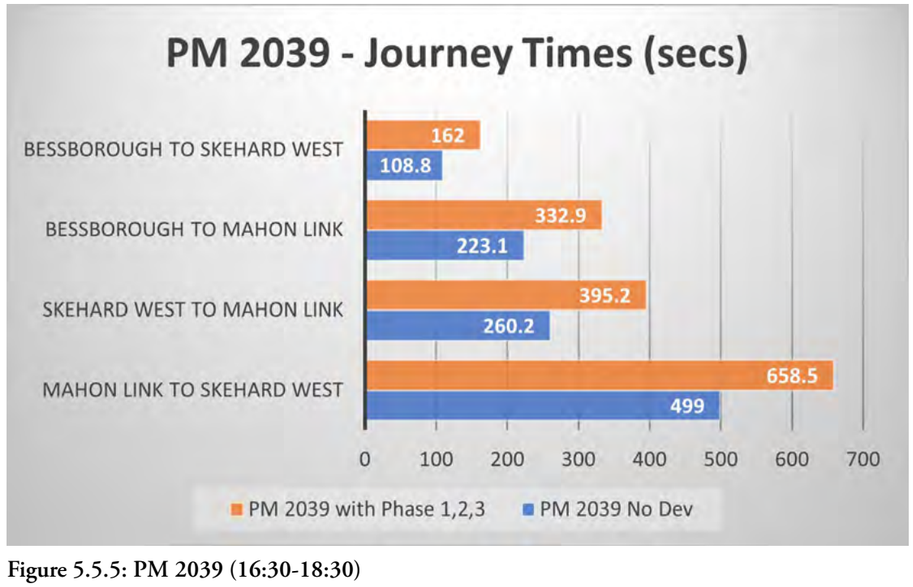

Figure 5.5.5: PM 2039 (16:30-18:30)

5.5.2.2.1.2 Average Network Speed

An assessment of the average network speed for the various data sets is presented in the following graphs. There is a steady decline in vehicular speed through the network going from 9.4425m/s to 7.4225m/s during the AM peak and 9.1625m/s to 4.6275m/s during the PM peak over the modelled time-period. This decline is reflective of the increase in traffic volumes on the network from both the development and background traffic growth. Evident is that this decline is present both with/without development.

A decrease in network speed relates directly to journey times which will encourage the use of sustainable transport modes. In this instance where significant public transport infrastructure (dedicated bus lanes) and off-road greenways exist adjacent to the site, an increase in journey time for the car should result in a positive shift towards these modes. Future year traffic models account for an annual increase in background traffic based on TII guidelines but do not include for a reduction due to anticipated increases in modal shift. It should also be noted when interpreting these results that the difference in future year with/without models reduces as the overall network begins to reach capacity.

The following KPI, Latent Demand, reflects the number of vehicles left on the network after the modelled time period has complete (vehicles that have not completed their journey). An increase in latent demand implies the modelled network is approaching capacity and modifications to signal timings will be needed to increase the throughflow of traffic at junctions. It should be noted that changes to signal timings will improve the capacity of junctions within the modelled area but may have a knock-on effect on the operation of junctions outside this zone.

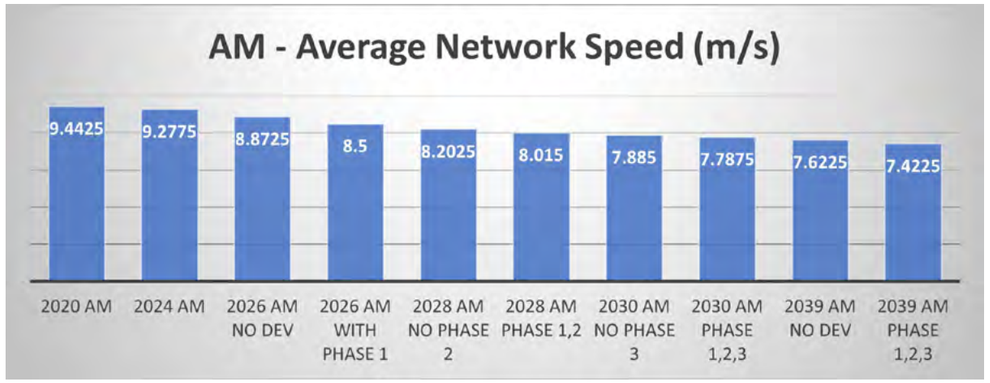

Figure 5.5.6: AM – Comparison of Average Network Speed

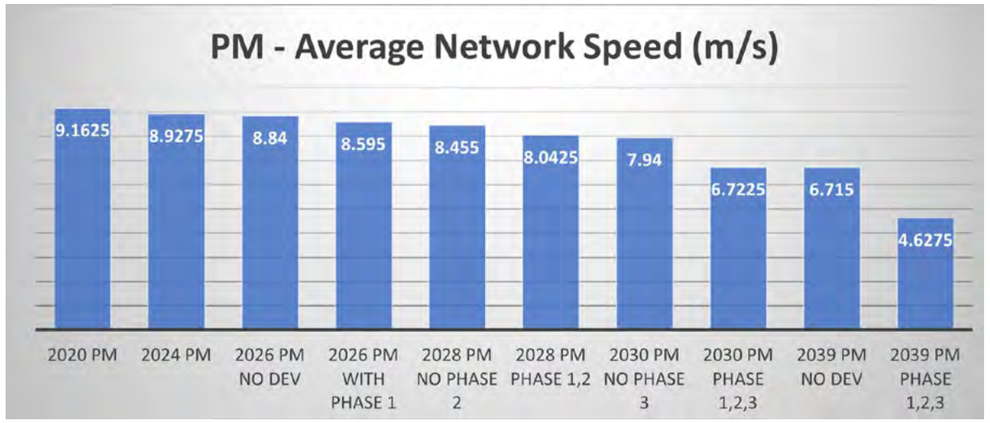

Figure 5.5.7: PM – Comparison of Average Network Speed

5.5.2.2.1.3 Latent Demand

The following graphs indicate the number of vehicles remaining on the network on completion of the modelled time-period. There is a significant jump after 2026 AM (Phase 1 in place) between 2026 and 2028 no phase 2 which steadily increases thereafter. This jump is related to the increase in traffic accessing onto Skehard Road from the Bessborough Road without a change to the signal timings. The AM peak, at present, favours traffic entering into the Bessborough Employment Area over and above traffic exiting onto Skehard Road. A re-balance of signal timings would mitigate the delay experienced on the minor arm (Bessborough Road).

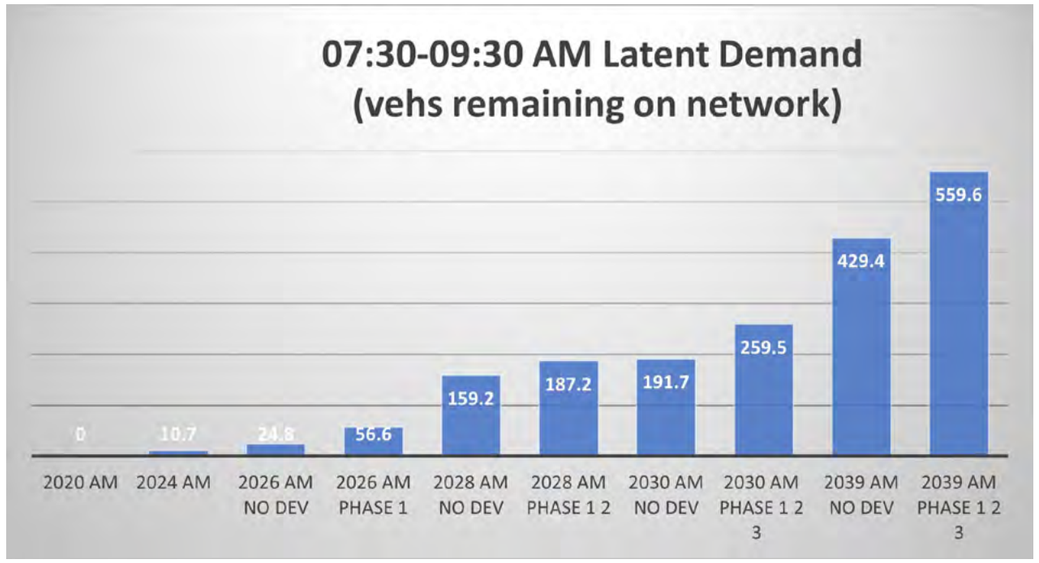

Figure 5.5.8: AM Comparison of Latent Demand

The PM shows a significant increase in latent demand in the 2039 PM between the with/without development. This is as to be expected with the full development in place and the employment area leaving via the Bessborough Road. Following mitigation this congestion should be significantly reduced.

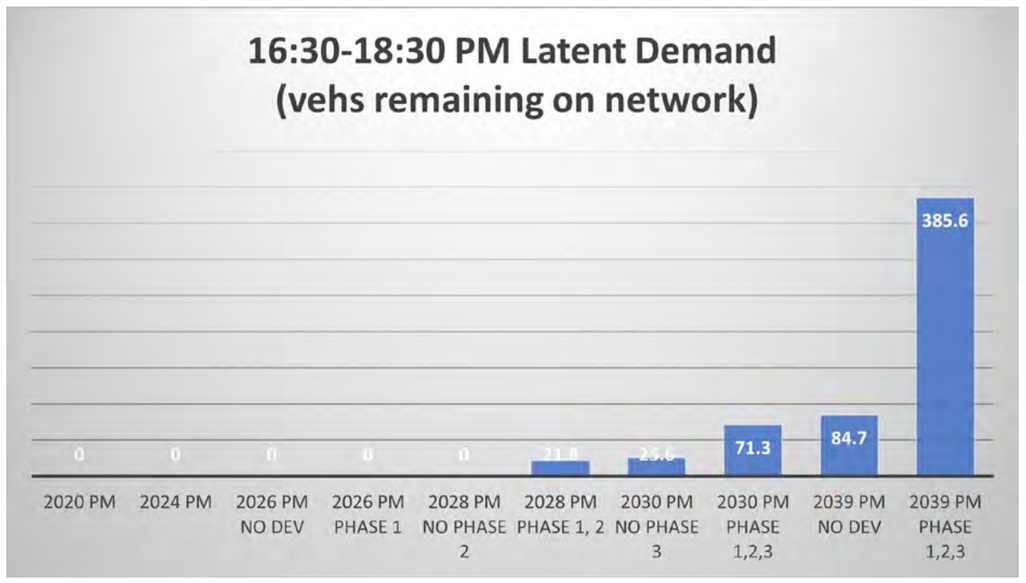

Figure 5.5.9: PM Comparison of Latent Demand>

5.5.2.2.1.4 Average Queue Length

The queue length results for each data set shows a gradual increase in queue lengths both with/without development in place. Bessborough approach to Junction 2 is the most impacted which corresponds with the other KPI's. The following two graphs present the Design Year, 2039, impacts on queue lengths comparing with/without for both peak periods. Evident is that the impact of the development is in the region of a 21% increase over and above the annual growth rate coupled with granted schemes. This level of impact in an area set for continued investment in public transport and sustainable modes of travel is appropriate.

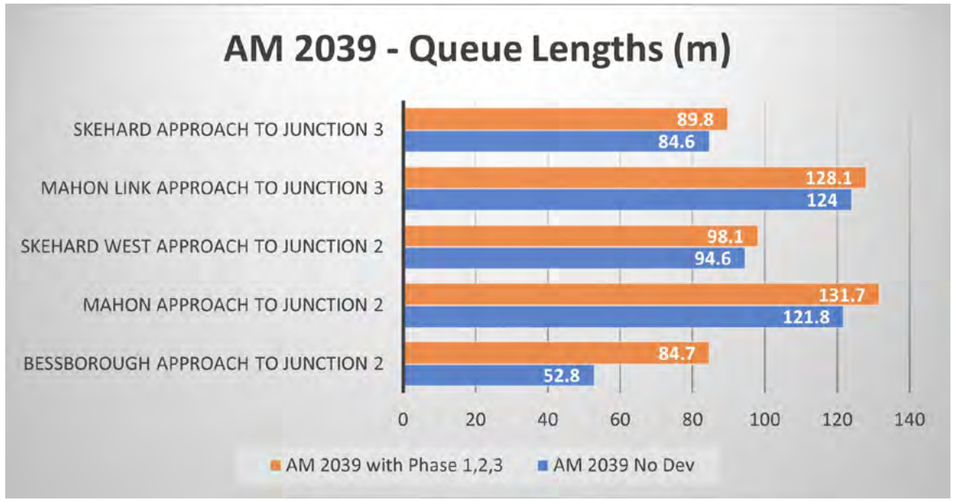

Figure 5.5.10: AM 2039 - Average Queue Lengths>

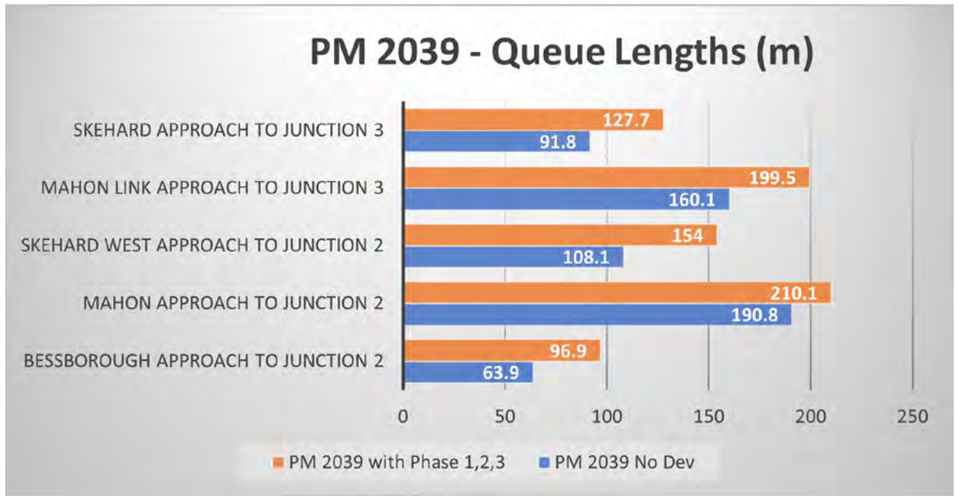

Figure 5.5.11: PM 2039 - Average Queue Lengths

5.5.2.2.2 Phase 2' The Farm' Operational Stage Impact

The study encompassed the road network as agreed with the Local Authority which is shown in the following extract from the model.

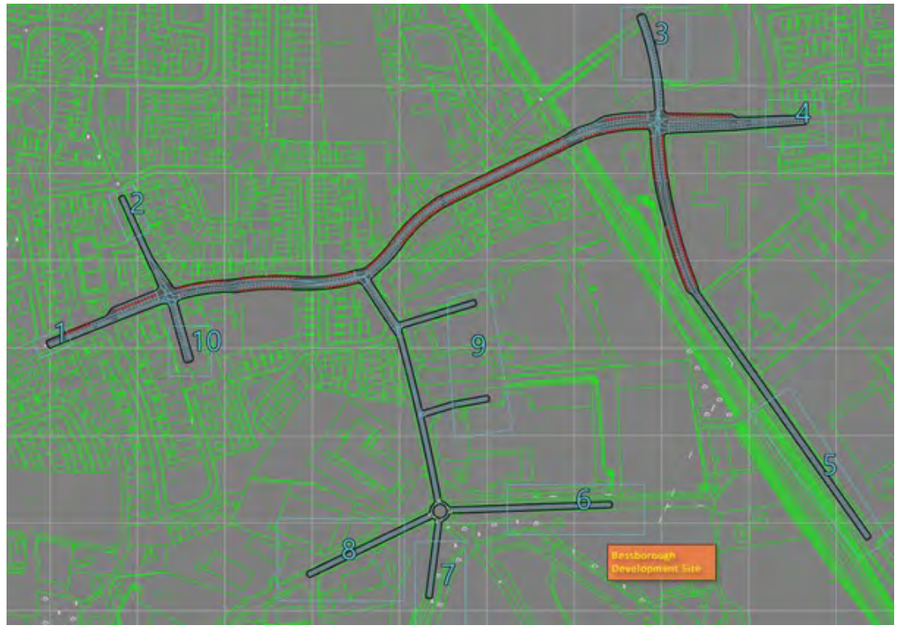

Figure 5.5.1: Extent of Modelled Network

The Base Year for the model is 2020 as agreed with the Local Authority. The following scenarios have been developed to assess the impact of the proposed phased development:

Scenario 1: 2020 AM/PM Baseline Year Models

Scenario 2: 2024 AM/PM Models with previously granted schemes (no development)

Scenario 3: 2026 AM/PM with/without Phase 1 (assuming a commencement date in 2024)

Scenario 4: 2028 AM/PM with/without Phase 2 (assuming Phase 1 completed)

Scenario 5: 2030 AM/PM with/without Phase 3 (assuming Phase 1,2 completed)

Scenario 6: 2039 AM/PM Design Year Models with/without (without assumes no new development on the site)

The effects of traffic growth on the existing road network plus the additional traffic generated by the proposed development, have been compiled to generate likely traffic volumes for the different scenarios. The resultant model outputs are estimated values for journey times, traffic queues and delays.

As per the TII guidelines in the preparation of impact assessments the baseline model represents conditions during the time of the traffic survey, with a requirement to model each opening year and a design year (15 years from the opening year). In this instance it was agreed with the Local Authority that a Base Year model, a model for granted schemes in the area (2024), models for each of the phases (with/without the phase being developed) and a design year model with/without development (2039) be constructed. These models were to run over a 2-hour peak period for both AM and PM.

The results for each scenario developed are presented in graphical format to allow ease of comparison.

5.5.2.2.2.1 Journey Time Comparison

Scenario 4 relates specifically to the development of Phase 2 'The Farm'. It should be noted that it was agreed with the Local Authority that Phase 2 '*with development*' should assume that Phase 1 was complete, to present a robust analysis of the potential impact of this Phase. If this Phase is developed as a standalone scheme, then the results of the 2026 model would reflect its impact.

The journey times along each of the routes are seen to increase overtime both with/without development traffic. The largest increase relates to the Bessborough Road accessing onto the Skehard Road. As part of the mitigation section of the Traffic Impact Assessment report changes to signal timings will be made to improve the operational characteristics of the network.

Figures 5.5.12 and 5.5.13 present the with/without scenarios for 2039 AM and PM Design Year. Unlike the other scenarios assessed, the without development in this instance is assuming no development on the Bessborough Site. Background traffic has been increased as per the TII Project Appraisal Guidelines and permitted developments have been included. The with development includes the 3-phases of the Bessbororugh Scheme. Evident is that there is an approximate 70% increase in journey times for traffic using the Bessborough Road in the AM peak, reflecting the large volume of traffic turning east towards Mahon on the Skehard Road. The PM peak shows a 49% increase in journey time for traffic on Bessborough Road. An adjustment to the traffic signal timings will mitigate some of this impact when individual phases of the scheme are occupied.

The impact of the proposed Bessborough Scheme on Skehard Road/Mahon Link Road journey times is approximately 26% in the Design Year 2039.

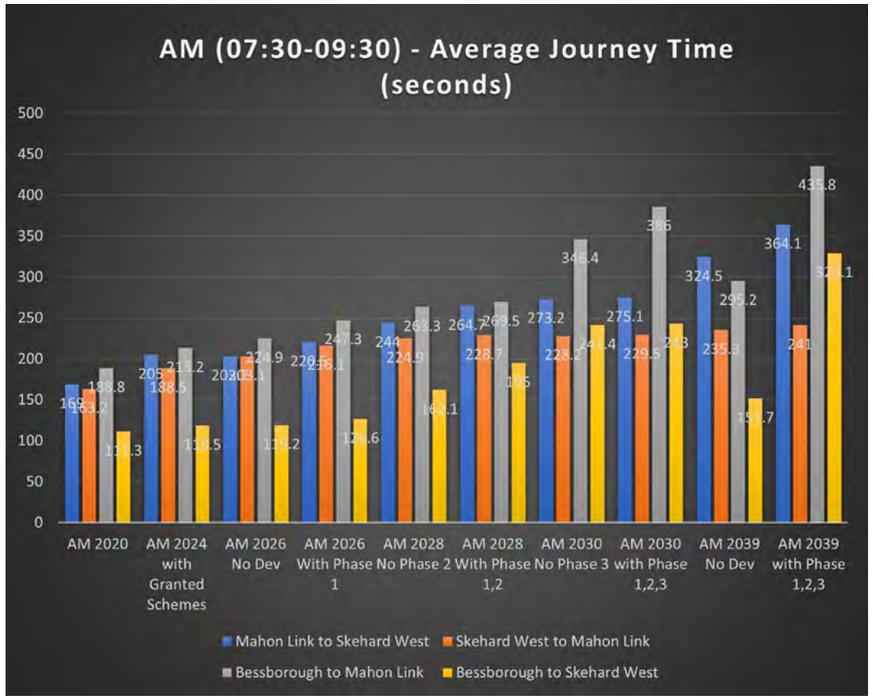

Figure 5.5.2: AM (07:30-09:30) Average Journey Time Comparison (secs)

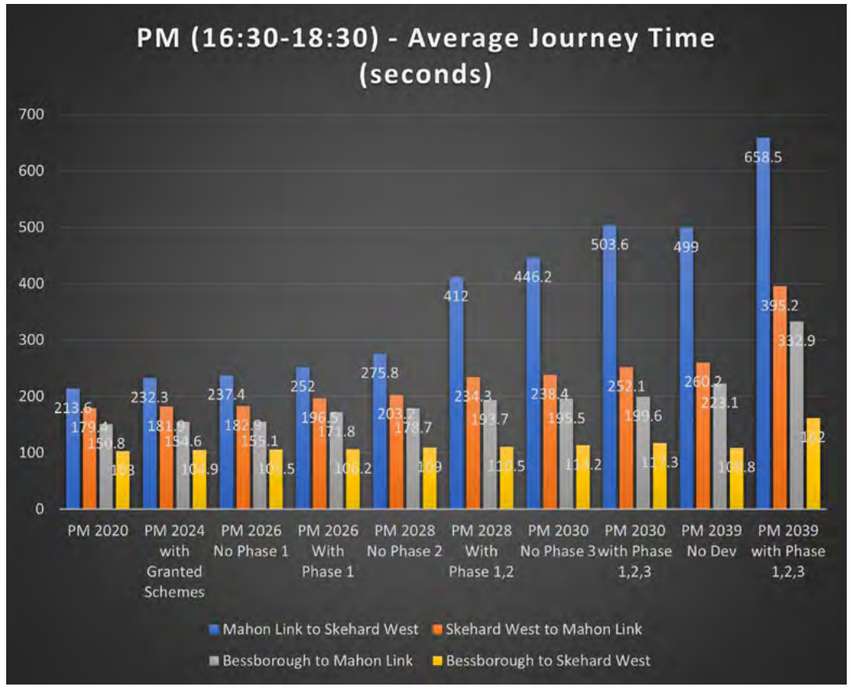

Figure 5.5.3: PM (07:30-09:30) Average Journey Time Comparison (secs)

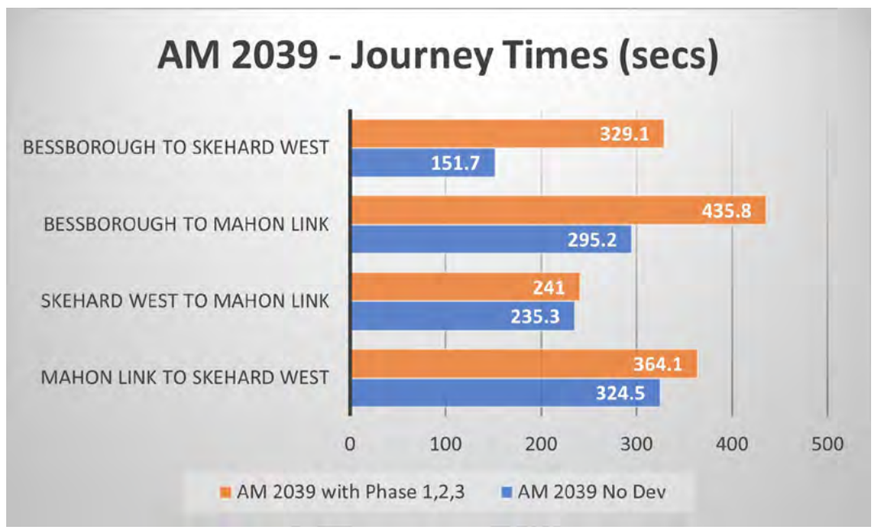

Figure 5.5.4: AM 2039 (07:30-09:30)

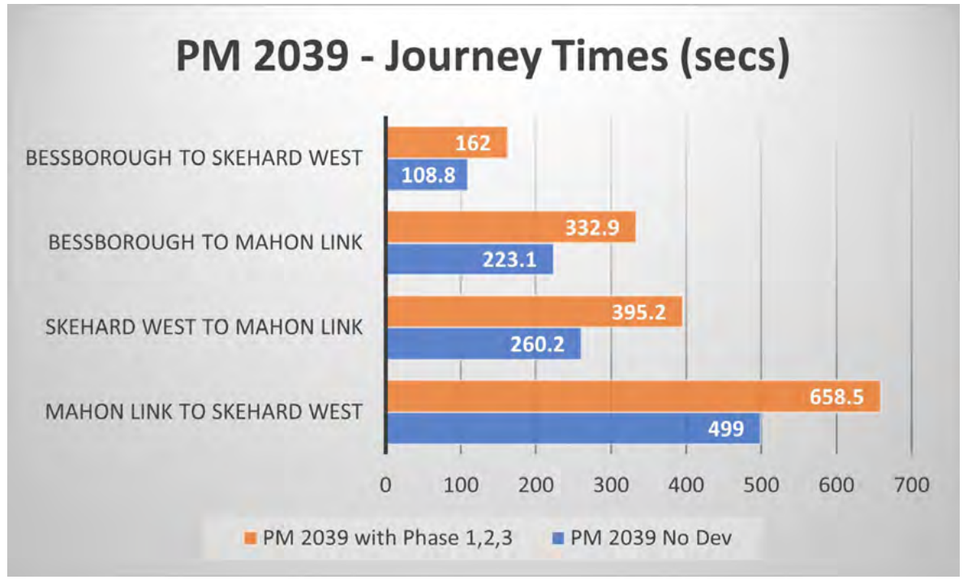

Figure 5.5.5: PM 2039 (16:30-18:30)

5.5.2.2.2.2 Average Network Speed

An assessment of the average network speed for the various data sets is presented in the following graphs. There is a steady decline in vehicular speed through the network going from There is a steady decline in vehicular speed through the network going from 9.4425m/s to 7.4225m/s during the AM peak and 9.1625m/s to 4.6275m/s during the PM peak over the modelled time-period This decline is reflective of the increase in traffic volumes on the network from both the development and background traffic growth. Evident is that this decline is present both with/without development.

A decrease in network speed relates directly to journey times which will encourage the use of sustainable transport modes. In this instance where significant public transport infrastructure (dedicated bus lanes) and off-road greenways exist adjacent to the site, an increase in journey time for the car should result in a positive shift towards these modes. Future year traffic models account for an annual increase in background traffic based on TII guidelines but do not include for a reduction due to anticipated increases in modal shift. It should also be noted when interpreting these results that the difference in future year with/without models reduces as the overall network begins to reach capacity. The following KPI, Latent Demand, reflects the number of vehicles left on the network after the modelled time-period has complete (vehicles that have not completed their journey). An increase in latent demand implies the modelled network is approaching capacity and modifications to signal timings will be needed to increase the throughflow of traffic at junctions. It should be noted that changes to signal timings will improve the capacity of junctions within the modelled area but may have a knock-on effect on the operation of junctions outside this zone.

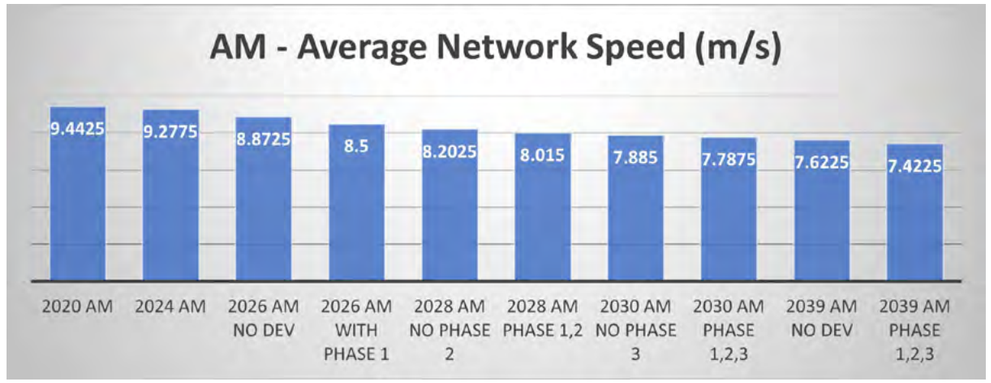

Figure 5.5.6: AM – Comparison of Average Network Speed

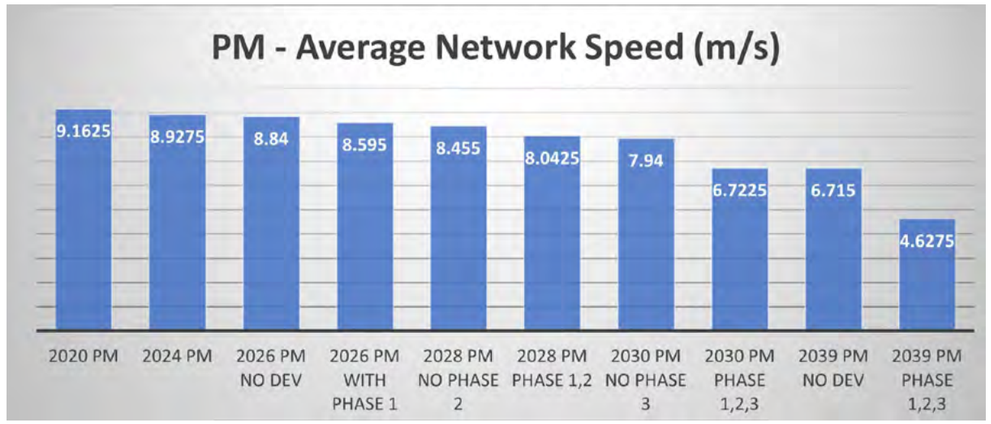

Figure 5.5.7: PM – Comparison of Average Network Speed

5.5.2.2.3 Latent Demand

The following graphs indicate the number of vehicles remaining on the network on completion of the modelled time-period. There is a significant jump in 2028 AM (Phase 2 in place) between the with/without which steadily increases thereafter. This jump is related to the increase in traffic accessing onto Skehard Road from the Bessborough Road without a change to the signal timings. The AM peak, at present, favours traffic entering into the Bessborough Employment Area over and above traffic exiting onto Skehard Road. A re-balance of signal timings would mitigate the delay experienced on the minor arm (Bessborough Road).

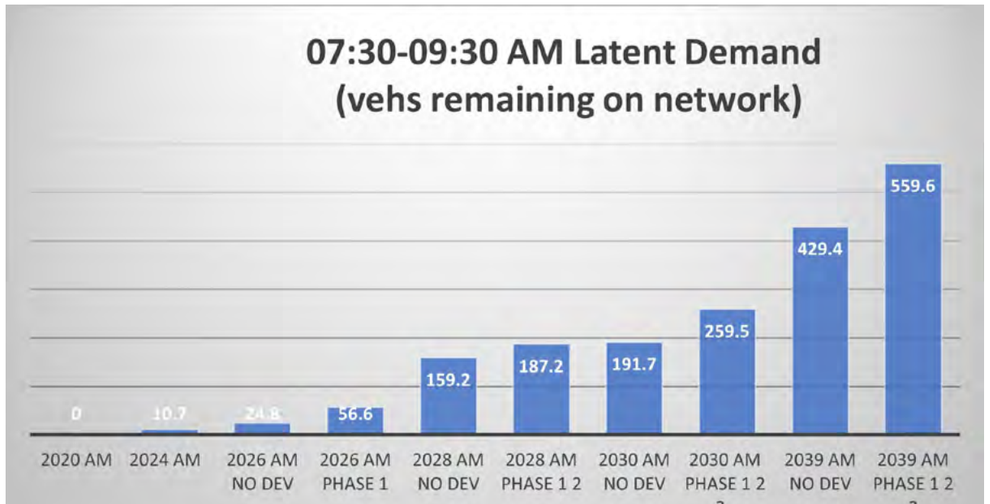

Figure 5.5.8: AM Comparison of Latent Demand

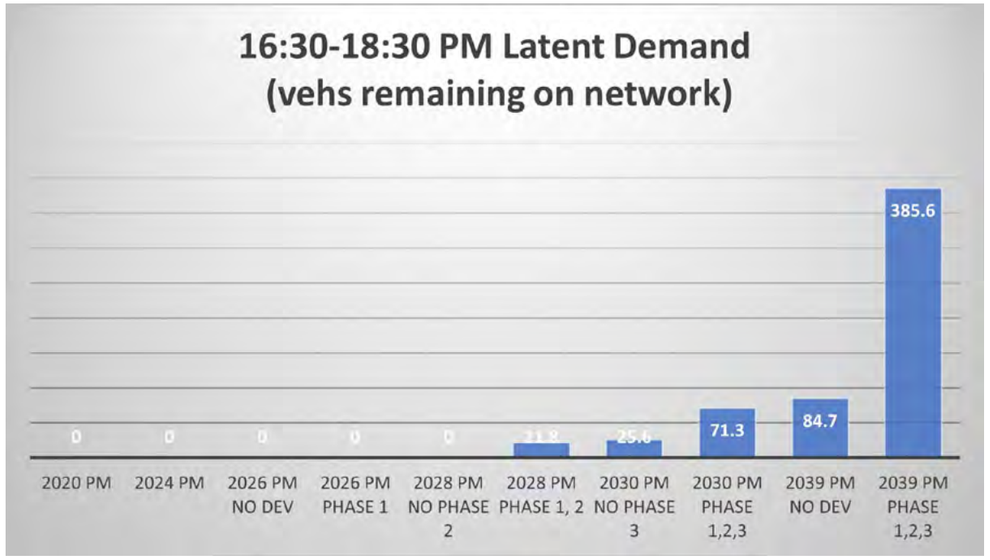

Figure 5.5.9: PM Comparison of Latent Demand

The AM peak at present is operating within capacity with 100% of vehicles being able to complete their journey within the modelled time-period.

5.5.2.2.4 Average Queue Length

The queue length results for each data set shows a gradual increase in queue lengths both with/without development in place. Bessborough approach to Junction 2 is the most impacted which corresponds with the other KPI's. The following two graphs present the Design Year, 2039, impacts on queue lengths comparing with/without for both peak periods. Evident is that the impact of the development is in the region of a 21% increase over and above the annual growth rate coupled with granted schemes. This level of impact in an area set for continued investment in public transport and sustainable modes of travel is appropriate.

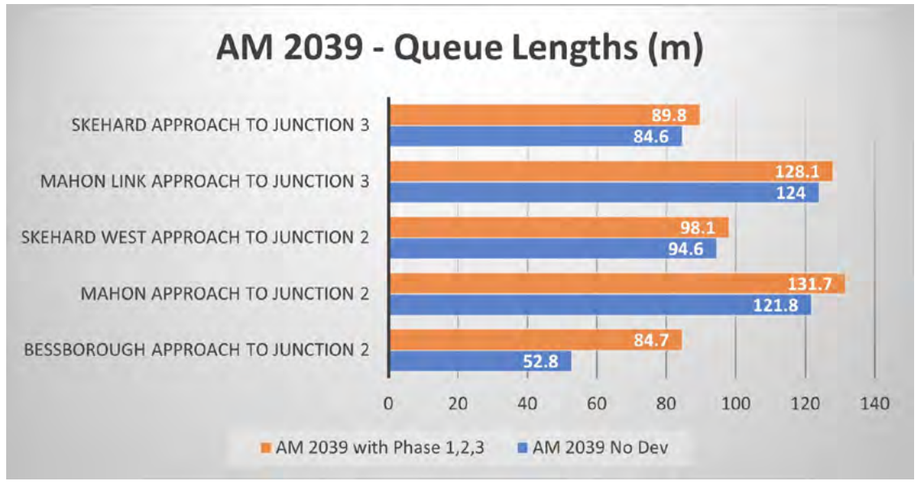

Figure 5.5.10: AM 2039 - Average Queue Lengths

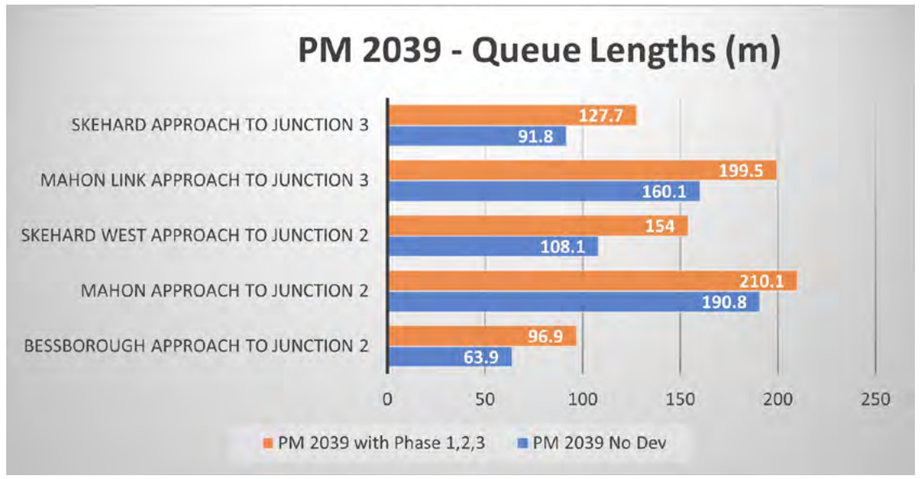

Figure 5.5.11: PM 2039 - Average Queue Lengths

5.5.2.2.5 Combined Phase 1 & 2 Operational Stage Impact

The Base Year for the model is 2020 as agreed with the Local Authority. The following scenarios have been developed to assess the impact of the proposed phased development:

Scenario 1: 2020 AM/PM Baseline Year Models

Scenario 2: 2024 AM/PM Models with previously granted schemes (no development)

Scenario 3: 2026 AM/PM with/without Phase 1 (assuming a commencement date in 2024)

Scenario 4: 2028 AM/PM with/without Phase 2 (assuming Phase 1 completed)

Scenario 5: 2030 AM/PM with/without Phase 3 (assuming Phase 1,2 completed)

Scenario 6: 2039 AM/PM Design Year Models with/without (without assumes no new development on the site)

Scenario 4 presents the results of the traffic modelling with/without the completion of Phase 2 in addition to Phase 1. The results of the models are presented in the previous section, Phase 2 Operational Stage Impact. Scenario 6 presents the results for the Design Year with no on-site development compared to the full completion of the scheme. This includes the development of Phase 3 'The North Fields'.

The results for each scenario developed are presented in graphical format to allow ease of comparison.

A summary of predicted operational phase impacts are presented in the following table for Phase 1 and Phase 2 Combined.

Mode	Cause	Impact
Operational Stage Phase 1 & Phase 2		
Traffic	Development Generated Traffic onto Roads Network	Slight Negative

5.6 Mitigation Measures, Monitoring and Residual Impacts

5.6.1 Mitigation & Monitoring

5.6.1.1 Construction Phase

5.6.1.1.1 Phase 1 'The Meadows'

The developed CEMP proposes mitigation measures to minimise the impact of constructed related traffic on the modelled roads network.

The construction stage of the proposed development will be phased as previously described with Phase 1 'The Meadows' scheduled to begin construction in 2024 for a 2-year period.

It is envisaged that working hours will be from 07.00 to 18:00, Monday to Friday (08:00 to 14:00 Saturday) for construction personnel through each phase of the development. Generally, construction workers will travel to site before the measured peak hour of 08:00 – 09:00, to be on site for a 07:00 start-time. A very limited number of construction employees are likely to travel to the site during peak hours.

It is anticipated that heavy goods vehicles, HGV's, will be restricted to movements on the local road network during the off-peak periods. It is estimated that truck movements and general deliveries would arrive/leave at a steady rate during the course of the day. Over the course of the construction period an estimated 15 HGV's will deliver to the site on a daily basis (30 trips in total).

The potential construction phase impacts on traffic will occur as site staff arrive and leave the site, material deliveries and the implementation of the Construction Stage Traffic Management Plan. It is envisaged that deliveries accessing the site have the potential to use 'Flag-Men' to ensure that road safety considerations are accounted for all road users. The use of a road-sweeper on Bessborough Road adjacent to the site has the potential to impact on traffic flows. It is envisaged that this will only occur during off-peak hours.

A number of mitigation measures are proposed to minimise the impact of this increase in HGV traffic on the existing roads network during the construction stage of each phase.

- The re-use of excavated materials generated on-site will reduce the total volume of imported material thereby reducing traffic generation.
- Adequate storage space on site will be provided to accommodate all cut material.
- Defining delivery times to site will avoid background traffic peak periods. Trucks will be equipped with dust covers when carrying dust producing materials to reduce the environmental impact of this activity.
- Construction stage site staff starting before the morning peak and finishing after the evening peak.
- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems will be put in place.
- Specific haulage routes will be identified and agreed with the Local Authority prior to commencement of construction.
- Construction Traffic Management Plan will be developed prior to the commencement of construction and will be implemented when appropriate, ie during the delivery of materials or the exportation of surplus material from site.
- Warning Signs and Advanced Warning Signs will be installed at appropriate locations in advance of the construction works.
- All site staff parking will be accommodated on-site within the designated site compound. No parking of site vehicles will be facilitated on the public road.
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will be suitable for vulnerable users including mobility impaired persons.
- All site vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site. It will be the responsibility of the main contractor to ensure that all vehicles delivering to the site are suitably licensed to use the public road and equipped for this activity.

There will be on-going monitoring of the impact of construction traffic on the wider roads network to ensure prompt action is taken in the event of an issue arising.

5.6.1.1.2 Phase 2 'The Farm'

The developed CEMP proposes mitigation measures to minimise the impact of constructed related traffic on the modelled roads network.

The construction stage of the proposed development will be phased as previously described with Phase 2 'The Farms' scheduled to begin construction in 2026 for a 2-year period.

It is envisaged that working hours will be from 07.00 to 18:00, Monday to Friday (08:00 to 14:00 Saturday) for construction personnel through each phase of the development. Generally, construction workers will travel to site before the measured peak hour of 08:00 – 09:00, to be on site for a 07:00 start-time. A very limited number of construction employees are likely to travel to the site during peak hours.

It is anticipated that heavy goods vehicles, HGV's, will be restricted to movements on the local road network during the off-peak periods. It is estimated that truck movements and general deliveries would arrive/leave at a steady rate over the course of the day. Over the course of the construction period an estimated 15 HGV's will deliver to the site on a daily basis (30 trips in total).

The potential construction phase impacts on traffic will occur as site staff arrive and leave the site, material deliveries and the implementation of the Construction Stage Traffic Management Plan. It is envisaged that deliveries accessing the site have the potential to use 'Flag-Men' to ensure that road safety considerations are accounted for all road users. The use of a road-sweeper on Bessborough Road adjacent to the site has the potential to impact on traffic flows. It is envisaged that this will only occur during off-peak hours.

A number of mitigation measures are proposed to minimise the impact of this increase in HGV traffic on the existing roads network during the construction stage of each phase.

- The re-use of excavated materials generated on-site will reduce the total volume of imported material thereby reducing traffic generation.
- Adequate storage space on site will be provided to accommodate all cut material.
- Defining delivery times to site will avoid background traffic peak periods. Trucks will be equipped with dust covers when carrying dust producing materials to reduce the environmental impact of this activity.
- Construction stage site staff starting before the morning peak and finishing after the evening peak.
- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems will be put in place.
- Specific haulage routes will be identified and agreed with the Local Authority prior to commencement of construction.
- Construction Traffic Management Plan will be developed prior to the commencement of construction and will be implemented when appropriate, ie during the delivery of materials or the exportation of surplus material from site.
- Warning Signs and Advanced Warning Signs will be installed at appropriate locations in advance of the construction works.
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- All site vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site. It will be the responsibility of the main contractor to ensure that all vehicles delivering to the site are suitably licensed to use the public road and equipped for this activity.

There will be on-going monitoring of the impact of construction traffic on the wider roads network to ensure prompt action is taken in the event of an issue arising.

5.6.1.1.3 Combined Phase 1 and Phase 2

The developed CEMP proposes mitigation measures to minimise the impact of constructed related traffic on the modelled roads network.

The construction stage of the proposed development will be phased as previously described with Phase 1 & Phase 2 being developed over a 4-year period commencing in 2024.

It is envisaged that working hours will be from 07.00 to 18:00, Monday to Friday (08:00 to 14:00 Saturday) for construction personnel through each phase of the development. Generally, construction workers will travel to site before the measured peak hour of 08:00 – 09:00, to be on site for a 07:00 start-time. A very limited number of construction employees are likely to travel to the site during peak hours.

It is anticipated that heavy goods vehicles, HGV's, will be restricted to movements on the local road network during the off-peak periods. It is estimated that truck movements and general deliveries would arrive/leave at a steady rate during the course of the day. Over the course of the construction period an estimated 15 HGV's will deliver to the site on a daily basis.

The potential construction phase impacts on traffic will occur as site staff arrive and leave the site, material deliveries and the implementation of the Construction Stage Traffic Management Plan. It is envisaged that deliveries accessing the site have the potential to use 'Flag-Men' to ensure that road safety considerations are accounted for all road users. The use of a road-sweeper on Bessborough Road adjacent to the site has the potential to impact on traffic flows. It is envisaged that this will only occur during off-peak hours.

A number of mitigation measures are proposed to minimise the impact of this increase in HGV traffic on the existing roads network during the construction stage of each phase.

- The re-use of excavated materials generated on-site will reduce the total volume of imported material thereby reducing traffic generation.
- Adequate storage space on site will be provided to accommodate all cut material.
- Defining delivery times to site will avoid background traffic peak periods. Trucks will be equipped with dust covers when carrying dust producing materials to reduce the environmental impact of this activity.
- Construction stage site staff starting before the morning peak and finishing after the evening peak.
- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems will be put in place.
- Specific haulage routes will be identified and agreed with the Local Authority prior to commencement of construction.
- Construction Traffic Management Plan will be developed prior to the commencement of construction and will be implemented when appropriate, ie during the delivery of materials or the exportation of surplus material from site.
- Warning Signs and Advanced Warning Signs will be installed at appropriate locations in advance of the construction works.
- All site staff parking will be accommodated on-site within the designated site compound. No parking of site vehicles will be facilitated on the public road.
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will be suitable for vulnerable users including mobility impaired persons.
- All site vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site. It will be the responsibility of the main contractor to ensure that all vehicles delivering to the site are suitably licensed to use the public road and equipped for this activity.

There will be on-going monitoring of the impact of construction traffic on the wider roads network to ensure prompt action is taken in the event of an issue arising.

5.6.1.2 Operational Phase

5.6.1.2.1 Phase 1 'The Meadows'

The proposed development constructed in a phased manner will add to existing traffic flows on what is already a busy network. Each of the key performance indicators shows a steady deterioration both with/without development traffic. The development is seen to have the greatest impact on the Bessborough/Skehard Road Junction, Junction 2 in the Design Year 2039 for traffic trying to access onto Skehard Road.
The Bessborough Road currently serves what is primarily an employment area implying that traffic is attracted to the area during the morning peak and leaves during the evening peak. When development traffic is added to these predominant flows the resulting queueing on Skehard Road, specifically from the west, is significant but is comparable to conditions experienced on the network prior to Covid.
The 2039 Design Year model results demonstrate the impact of the full development on the modelled network, providing a direct comparison of no development on the site with the full scheme. The 2039 results include granted schemes as well as TII annual growth rates applied to background traffic flows for both scenarios.
The latent Demand recorded in both, future year peak models, for all scenarios, indicates that the local road network is approaching capacity, particularly after 2026, Phase 1. These models do not represent possible mitigation measures that can be applied such as the following:

- Traffic signal timings and phases should be modified to cater for a change in directional flow at each of the modelled junctions.
- For the Design Year scenario (2039) an adjustment to the storage provided at right turn lanes would improve the capacity of the Junctions in question.
- Continued funding in sustainable transport solutions should mitigate the growth in traffic volumes. If successful, then the future year modelled network would more resemble the 2024 model in terms of KPI's.

Future year models were constructed to determine the extent of signal timing adjustment that could be made to the modelled network and are show in the following table.

Junction Location	Signal Timing Cycle	Year
Junction1 Church Rd	110 seconds	2026
Junction 2 Bessborough	110 seconds	2026
Junction 3 Mahon Link	120 seconds	2028

Section 5.6.1.3 presents a comparison of KPI's with these mitigation measures put in place for all scenarios.

5.6.1.2.2 Phase 2 'The Farm'

The development of Phase 2 independent of Phase 1 would have a lesser impact (smaller scaled scheme) than the development of Phase 1. The modelling results presented for Phase 1 would reflect a worst-case scenario if Phase 2 was constructed without Phase 1 in place.
Similar to Phase 1 the following mitigation is proposed:

- Traffic signal timings and phases should be modified to cater for a change in directional flow at each of the modelled junctions.
- For the Design Year scenario (2039) an adjustment to the storage provided at right turn lanes would improve the capacity of the Junctions in question.

- Continued funding in sustainable transport solutions should mitigate the growth in traffic volumes. If successful, then the future year modelled network would more resemble the 2024 model in terms of KPI's.

Future year models were constructed to determine the extent of signal timing adjustment that could be made to the modelled network. The following table presents the signal timing changes made to the mitigated models.

Junction Location	Signal Timing Cycle	Year
Junction1 Church Rd	110 seconds	2026
Junction 2 Bessborough	110 seconds	2026
Junction 3 Mahon Link	120 seconds	2028

Section 5.6.1.3 presents a comparison of KPI's with these mitigation measures put in place for all scenarios.

5.6.1.2.3 Phase 1 & Phase 2 Combined

The combination of phase 1 and 2 as well as an allowance for Phase 3, The North Fields has been modelled in Scenario 5, 2030 AM/PM. The impact of Phase 1 and Phase 2, including an allowance for granted schemes is modelled in Scenario 4, With Development.
To mitigate the impact of both Phases 1 and 2 the following measures are proposed:

- Traffic signal timings and phases should be modified to cater for a change in directional flow at each of the modelled junctions. Traffic generated by the proposed schemes will travel counter to the predominant flow recorded during morning peak at Junctions 1,2 & 3. In the evening peak development traffic will add to flows on Skehard Road.
- For the Design Year scenario (2039) an adjustment to the storage provided at right turn lanes would improve the capacity of the Junctions in question.
- Continued funding in sustainable transport solutions should mitigate the growth in traffic volumes. If successful, then the future year modelled network would more resemble the 2024 model in terms of KPI's.

Future year models were constructed to determine the extent of signal timing adjustment that could be made to the modelled network. The following table presents the signal timing changes made to the mitigated models.

Junction Location	Signal Timing Cycle	Year
Junction1 Church Rd	110 seconds	2026
Junction 2 Bessborough	110 seconds	2026
Junction 3 Mahon Link	120 seconds	2028

Section 5.6.1.3 presents a comparison of KPI's with these mitigation measures put in place for all scenarios.

5.6.1.3 Modelling Result with/without Mitigation Measures

5.6.1.3.1 Journey Time Comparison

Following the introduction of the mitigation measures the journey times over almost all scenarios have dropped significantly. This is evident when comparing Figures 5.6.1 and 5.6.2 with 5.5.10 and 5.5.11 respectively. Moreover figures 5.6.3 and 5.6.4 portray the dramatic effects the proposed mitigation measures can have.

Figures 5.6.3 and 5.6.4 present the with/without scenarios, both mitigated and unmitigated, for 2039 AM and PM Design Year. Unlike the other scenarios assessed, the without development in this instance is assuming no development on the Bessborough Site. Background traffic has been increased as per the TII Project Appraisal Guidelines and permitted developments have been included. The with development includes the 3-phases of the Bessborough Scheme.

From these figures it is evident that reductions in journey times can be achieved with the implementation of the proposed mitigation measures. In the AM there is a decrease of up to 40% of the journey time when comparing the fully completed development with the mitigated and unmitigated scenarios across the network. The PM scenarios also see a reduction in journey times achieving a decrease of 35% across the network. These reductions in journey times illustrate how effective the mitigation of adjusting the signal timings.

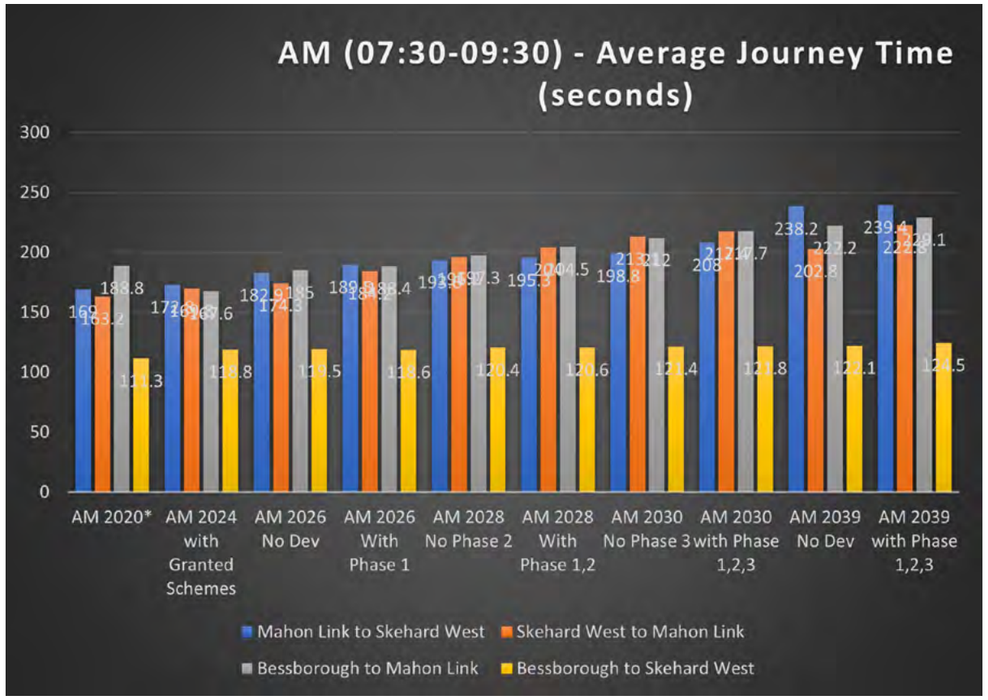


Figure 5.6.1: Mitigated AM (07:30-09:30) Average Journey Time Comparison (secs) (* - unmitigated)

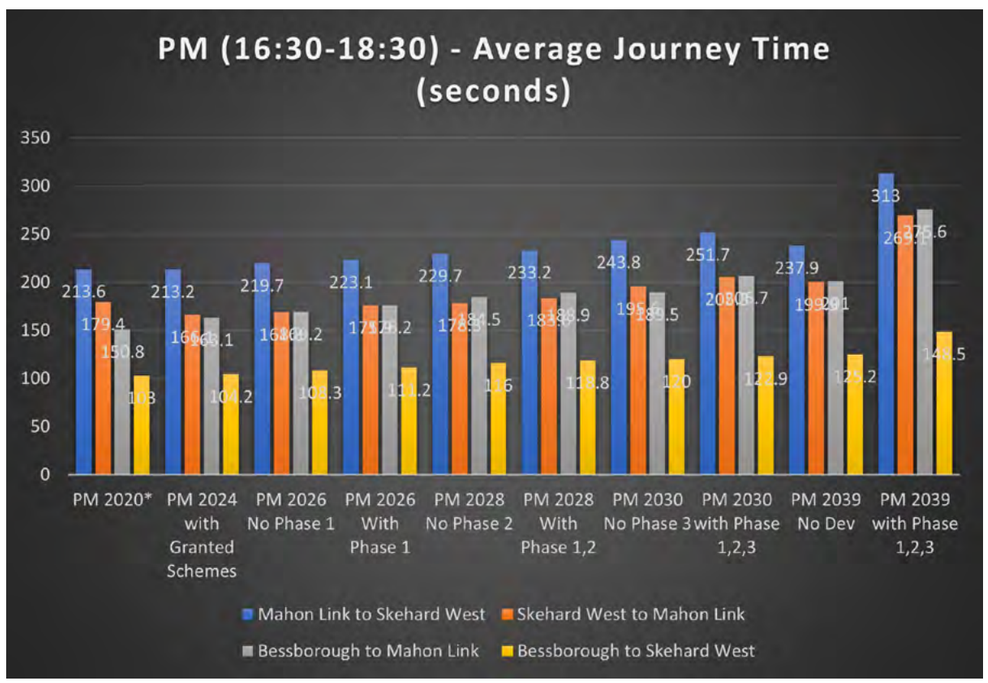


Figure 5.6.2: Mitigated PM (16:30-18:30) Average Journey Time Comparison (secs) (* - unmitigated)

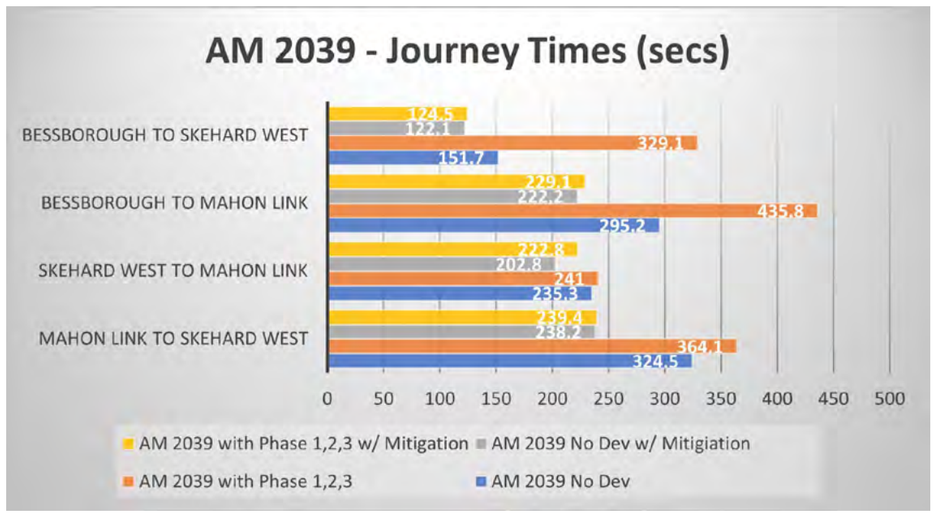


Figure 5.6.3: Mitigated comparison AM 2039 (07:30-09:30)>

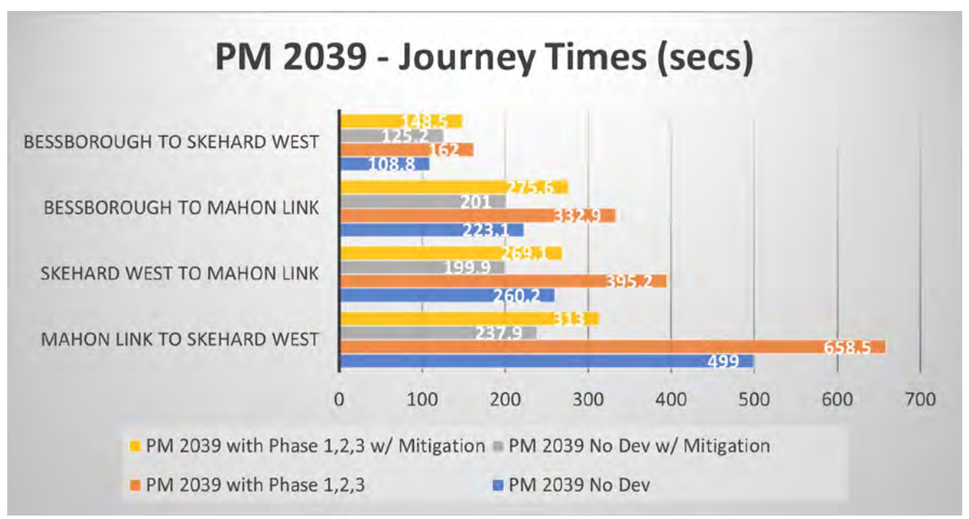


Figure 5.6.4: Mitigated comparison PM 2039 (16:30-18:30)>

5.6.1.3.2 Average Network Speed

An assessment of the average network speed for the various mitigated data sets is presented in the following graphs. There is a steady decline in vehicular speed through the network going from 9.4425m/s to 8.365m/s and this is comparable with the unmitigated case as seen in Figure 5.5.6 the average network speed declined from 9.4425m/s to 7.4225m/s during the AM peak. The mitigated scenario shows a reduction in the extent of Network Speed reduction. Similarly for the PM period, with mitigated measures in place the speed declines from 9.1625m/s to 6.4475m/s and as shown in Figure 5.5.7 the unmitigated case was 9.1625m/s to 4.6275m/s during the PM peak over the modelled time-period. The increase in network speed as a result of the mitigation measures is clear.

It should be noted that in the PM there is little to no change in network speed both with and without mitigation until after 2026. Therefore, the altering of the traffic signals for this time-period will not be required until the completion of phase 1 in 2026. Following this milestone then the mitigation measures suggested in this report should be considered for implementation.

While the network speed has been increased it is still on a steady decline. This decrease in network speed relates directly to journey times which will encourage the use of sustainable transport modes. In this instance where significant public transport infrastructure (dedicated bus lanes) and off-road greenways exist adjacent to the site, an increase in journey time for the car should result in a positive shift towards these modes. Future year traffic models account for an annual increase in background traffic based on TII guidelines but do not include for a reduction due to anticipated increases in modal shift. It should also be noted when interpreting these results that the difference in future year with/ without models reduces as the overall network begins to reach capacity.

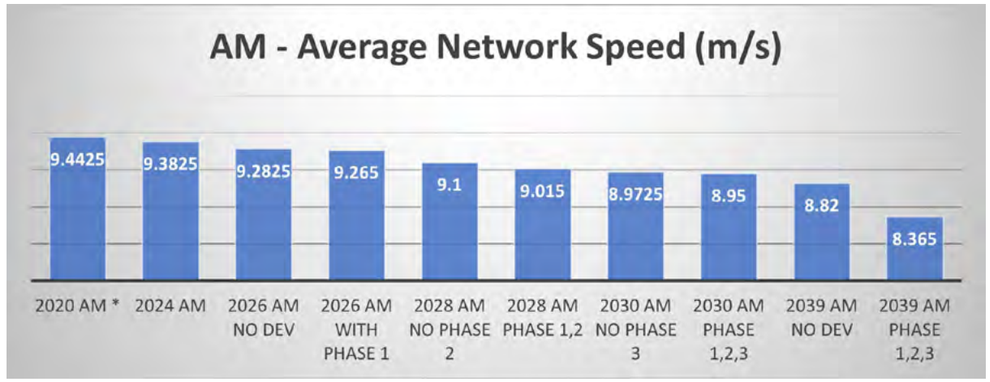


Figure 5.6.5: Mitigated AM – Comparison of Average Network Speed (m/s) (* - unmitigated)

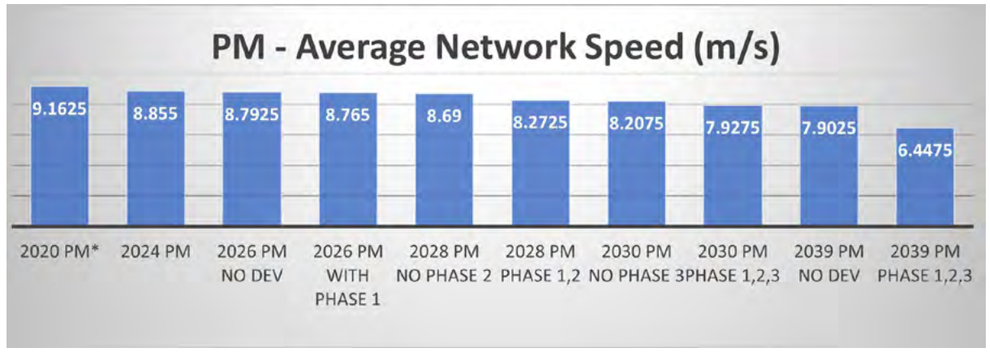


Figure 5.6.6: Mitigated PM – Comparison of Average Network Speed (m/s) (* - unmitigated)

5.6.1.3.3 Latent Demand

The Latent Demand reflects the number of vehicles left on the network after the modelled time-period has complete (vehicles that have not completed their journey). As shown in Figures 5.6.6 and 5.6.7 the latent demand in the network is greatly reduced when compared to the corresponding unmitigated values in figures 5.5.8 and 5.5.9. In the AM the latent demand for each corresponding scenario is almost halved. The latent demand in the PM has almost been significantly reduced with the proposed signal timing changes. There's a value of only 28 no. vehicles in the 2039 with Phase 1,2,3 PM scenario. This conveys that the network will be able to operate within its capacity in the PM up to and including 2039 with the full development in place.

In the AM scenario further mitigation measures should be undertaken as follows. Additional changes such as the lengthening of right turn lanes could be considered to provide additional storage on the approaches to the junctions thereby increasing junction capacity in the future. These physical changes to the network will only be required in future years if traffic growth rates continue to rise. An extension to the right-turn-lane approaching Junction 2 on Skehard Road serving Bessborough would resolve the issue of right turners blocking main through traffic observed in future year AM models (2028 onwards).

Bus-Connects proposes a significant increase in public transport provision serving this area. The Skehard Road Public Transport Route Improvement Scheme has now been completed. This scheme included the construction of bus lanes from Junction 1 through Junction 3 to Mahon Point implying that public transport users will avoid the queuing forecasted as part of the developed future year models. In addition, 'Bus-Gates' are included at each junction further prioritising public transport modes. These upgrades will encourage residents of the scheme to use sustainable transport modes and avoid the use of the private car. These measures should also result in a reduction in predicted growth rates being applied to background flows as it will be evident that travel by public transport on dedicated corridors is far more efficient than the use of the private car.

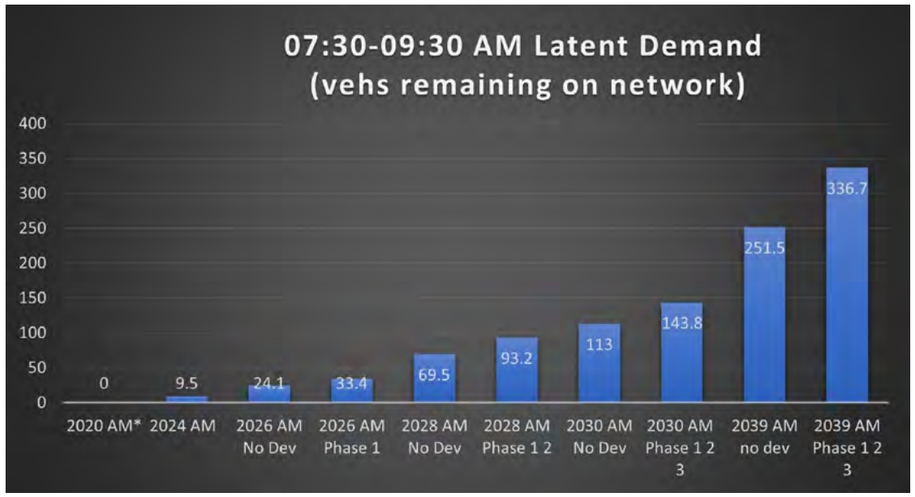


Figure 5.6.7: Mitigated AM Comparison of Latent Demand (* - unmitigated)

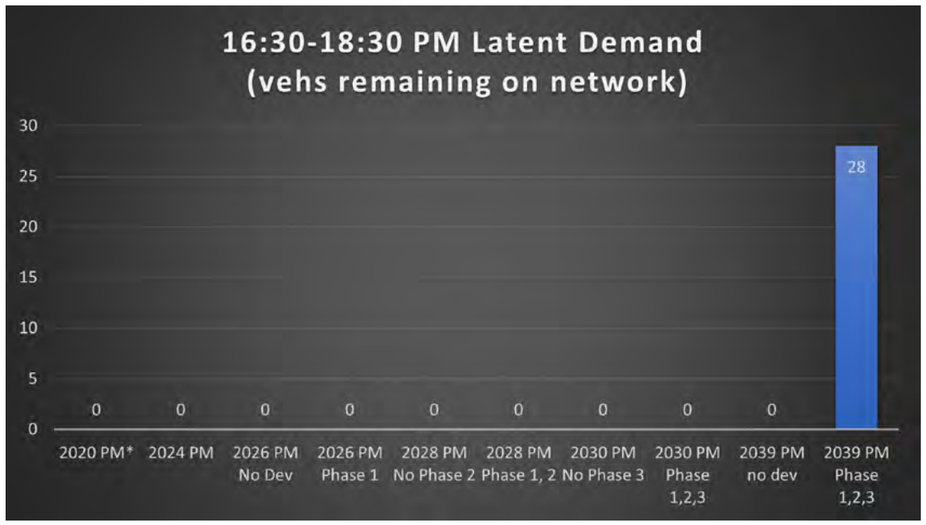


Figure 5.6.8: Mitigated PM – Comparison of Average Network Speed (m/s) (* - unmitigated)

5.6.1.3.4 Average Queue Length

As with the average journey times, the average queue lengths are also seen to decline following the introduction of the new signal times. The greatest reductions can be seen on the Mahon approach to junction 2. The following two graphs present the Design Year, 2039, impacts on queue lengths comparing with/without for both peak periods. Evident is that the impact of the mitigation measures is in the region of a 26% decrease from the unmitigated scenario. This level of reductions will greatly aid in alleviating the congestion in the area and the amount of queuing. The area will also be aided with the continued investment in public transport and other sustainable transport methods, combined with the proposed mitigation measures these queue lengths could be even further reduced. For this report it was agreed to consider the "worst case scenario" and not apply the modal shift to the existing traffic.

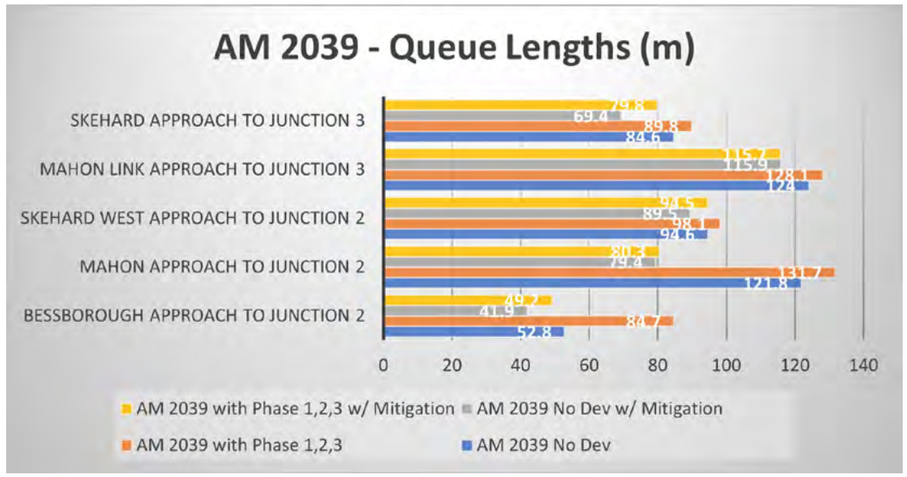


Figure 5.6.9: Mitigated comparison AM 2039 (07:30-09:30)>

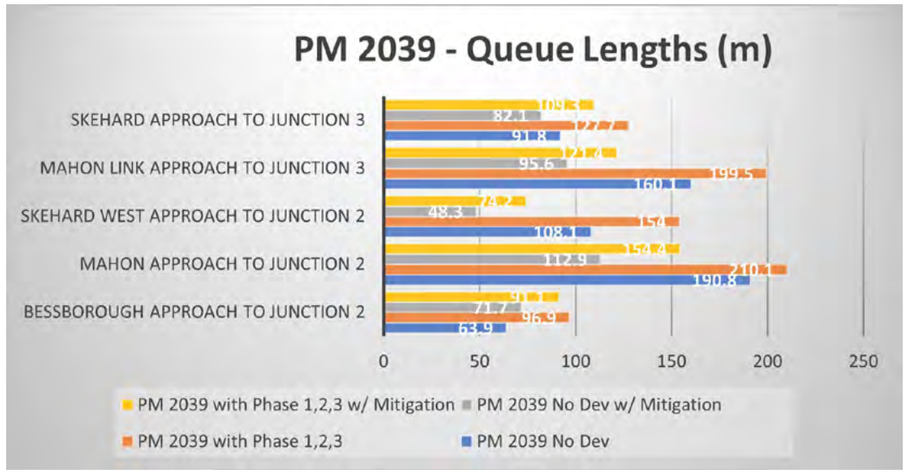


Figure 5.6.10: Mitigated comparison PM 2039 (16:30-18:30)>

5.6.2 Residual Impacts

5.6.2.1 Phase 1 'The Meadows'

Even with government modal shift targets being achieved in the future, there will remain a percentage of new trips on the roads network because of the proposed scheme, Phase 1. These new trips will add traffic to the assessed junctions reducing their operational efficiency.

5.6.2.2 Phase 2 'The Farm'

Even with government modal shift targets being achieved in the future, there will remain a percentage of new trips on the roads network because of the proposed scheme, Phase 2. These new trips will add traffic to the assessed junctions reducing their operational efficiency.

5.6.2.3 Phase 1 & 2 Combined

Even with government modal shift targets being achieved in the future, there will remain a percentage of new trips on the roads network because of the proposed scheme, Phase 1. These new trips will add traffic to the assessed junctions reducing their operational efficiency.

Mode	Cause	Quality	Mitigation	Significance	Probability	Duration of Impact
Construction Stage						
Traffic	Development based HGV and other traffic flow onto the existing roads network	Negative	Off-peak construction workers arrival/departure hours, off-peak delivery to from site, traffic signal-controlled access to the site	Slight	Likely	Temporary (duration of construction phase)
Operational Stage						
Traffic	Normal residential based traffic generated onto the existing roads network	Negative	1. Promotion of alternative modes of travel by means of providing off-road safe access to services. The site lies adjacent to the Mahon Retail and Employment Centre as well as having direct access to the adjoining greenway. 2. Changes to signal timings on the modelled junctions will improve the capacity of the network. 3. Extensions to right-turn-lanes will improve the operational characteristics of the modelled junctions.	Slight	Likely	Long-term

Residual Impacts

5.6.3 Risk of Major Accidents and Disasters

The likelihood of an accident occurring involving development traffic is unlikely with vehicular access to the site solely from Skehard Road by means of traffic signal-controlled junctions. As previously outlined the site is located in an area which has access to both public transport and cycle/pedestrian greenways. These off-road facilities provide safe access for residents of the scheme to the wider area without the need to use the roads network thereby avoiding what is a congested network.

5.7 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 6, Material Assets as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *To make best use of the City's infrastructure and material assets and to promote the sustainable development of new infrastructure to meet the future needs of the City population.*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a neutral interaction with the status of EPO 6 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in a neutral interaction for most of the material assets with EPO 6.

5.7.1 Construction Stage

5.7.1.1 Phase 1 'The Meadows'

The development of Phase 1 will involve the generation of construction traffic as previously outlined. This traffic has the potential to interact and add to traffic from adjoining 'granted' schemes currently under construction. There is also potential for additional lands in the area to be developed within the timeframe for completion of Phase 1.

5.7.1.2 Phase 2 'The Farm'

Similar to Phase 1 construction-based traffic for Phase 2 will potentially interact with traffic from a completed Phase 1 as well as from other 'granted' schemes in the area.

5.7.1.3 Phase 1 & 2 Combined

Construction-based traffic from a Phase 3 will potentially interact with traffic from a completed Phase 1 & 2 combined as well as from other 'granted' schemes in the area.

5.7.2 Operational Stage

Industry standard growth rates have been applied to background traffic for future year assessments (to account for further development within the area). These growth rates make allowance for modal shift targets as set by national policy but do not take account of site-specific measures that may be implemented to mitigate against traffic generation from a particular development. The application of these growth rates ensures a robust analysis of the surrounding roads network is carried out both with/without development.

A full list of granted permissions and current planning in the area are included in Chapter **2**.

Allowance has been made for 'granted schemes' in terms of traffic generation for all future year scenarios. This includes provision of the development of adjoining lands previously refused on appeal to An Bord Pleanala.

A review of BusConnects highlights further improvements to the public transport system which will have a positive impact on the proposed development in terms of alternative modes of travel. Evident in the following figure proposed BusConnects routes 1,9,14 & 20 are within walking distance of the site with route 20 passing through the site (refer to Appendix 5-3 Mobility Management Plan).

In terms of Accessibility & Integration the following is an inexhaustive list of amenities and facilities within walking distance:

Within 10 mins walk time from the site:

- Blackrock Business Park
- Mahon Industrial Estate
- Mahon Point Shopping Centre
- Mahon Retail Park
- Mater Private Hospital
- City Gate
- Bus Stop Clontarf Estate (Service 202, 215, 215A, and 219)
- Bus Stop City Gate (Service 215, 215A, and 219)

Within 15 mins walk time from the site:

- Mahon Golf Course
- Aldi
- Blackrock Hall Primary Care Centre
- Mahon Post Office
- Scally's Supervalu
- Bus Stop Clover Lawn (Service 215, 215A, and 219)
- Bus Stop Skehard Lawn (Service 215, 215A, and 219)

Within 20 mins walk time from the site:

- Blackrock National Hurling Club
- Dundanion Medical Centre
- Nagle Secondary Community College
- Scoil na Croise Naofa Primary School
- Ringmahon Rangers AFC
- Bus Stop Barnstead Drive (Service 202)
- Bus Stop Nagle Community College (Service 202)
- Bus Stop Ringmahon Rd. (Service 202 & 219)

Within 30 mins walk time from the site:

- Blackrock Village
- Blackrock Pier
- St. Michaels Catholic Church Blackrock
- The Marina Park
- Pairc Ui Rinn GAA
- Cork Constitution FC
- Ballinlough Pitch & Putt Club
- Beaumont Girls School
- Bus Stop Ardmahon Estate (Service 219)

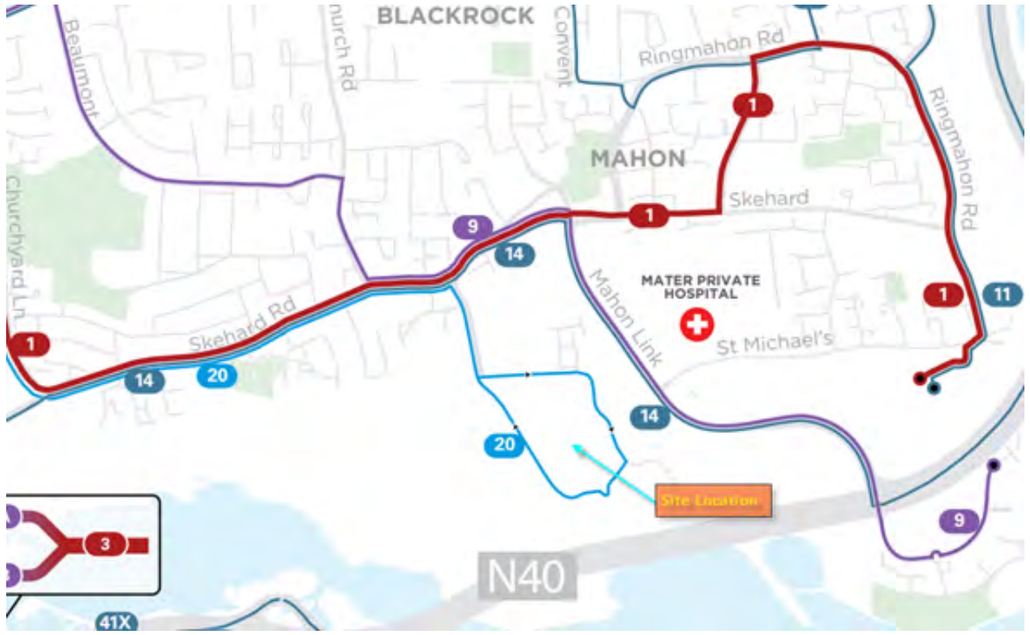


Figure 5.7.1: Extract from BusConnects Public Consultation Document

5.7.2.1 Phase 1 'The Meadows'

The cumulative impact of an operational phase 1 is contingent on other permitted developments in the area in terms of traffic generation.

5.7.2.2 Phase 2 'The Farm'

The cumulative impact of an operational phase 2 is contingent on other permitted developments in the area including a completed Phase 1 scheme.

5.7.2.3 Phase 1 & 2 Combined

The cumulative impacts of the operational phase of Phases 1 & 2 combined are dependent on other developed sites in the area. Impacts are also sensitive to background growth rates that may reduce in future years depending on the success of modal shift targets being achieved.

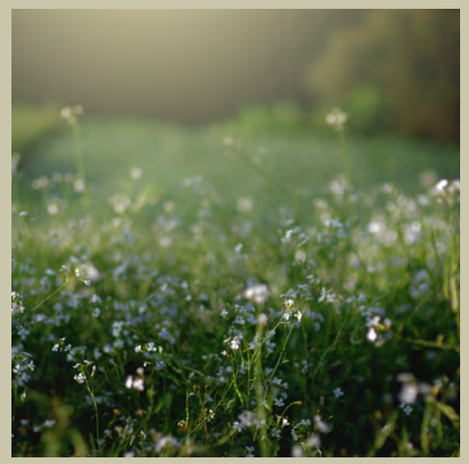
5.8 Difficulties in Compiling Information

The use of 2020 traffic figures on the modelled network because of the Covid Pandemic and the subsequent change in peoples travel patterns, implied that observed queueing and journey times carried out in 2022 showed a significant improvement over the 2020 collected data.

It was agreed with the Local Authority that the 2020 data would ensure a more robust assessment of the impact, the proposed development would have on the network, is presented. The base year models were calibrated using measured data collected simultaneously with the turning count surveys.

5.9 References

The structure of this Chapter is in accordance with the European Commission EIAR Guidance and draft EPA EIAR Guidelines (both 2017) and TII Document, Traffic and Transport Assessment Guidelines, 2014 and is developed using data from independently commissioned traffic counts at key junctions/locations, and local data extracted from the 2016 National Census.



BESSBOROUGH, CORK

CHAPTER 6

Material Assets – Services, Infrastructure & Utilities

VOLUME II | EIAR

BESSBOROUGH, CORK

CHAPTER 6

Material Assets – Services, Infrastructure & Utilities

CHAPTER 6

6 Material Assets - Services, Infrastructure and Utilities

6.1 Introduction

6.1.1 Chapter Context

This chapter of the Environmental Impact Assessment Report (EIAR) assesses and evaluates the likely significant impacts on the material assets serving the subject lands relating to foul sewage, water supply, gas supply, electricity, and telecommunications. The proposed development comprises two planning applications to An Bord Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in Chapter 2 - Project Description'.

In this chapter the characteristics of the potential impacts during the Construction and Operational phase are discussed and assessed for both Phase 1 and Phase 2. Appropriate mitigation measures to limit any significant impacts to Services, Infrastructure and Utilities are recommended and any residual impacts are also identified.

6.1.2 Methodology

Guidance

The Material Assets - Services, Infrastructure and Utilities section of the EIAR is prepared in accordance with the following guidelines:

- 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 Scoping 2017
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018
- EPA (2017). Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports.
- External Lighting Code EN132201- European Standard.

Assessment methodology

The scope of the work for the assessment involved undertaking a Desk Study, a Site Walkover, site surveys and investigations.

During the Desk Study, information on the relevant existing material assets associated with the development was derived from the following sources:

- Irish Water records;
- Cork County and Cork City Council records;
- ESB Networks records;
- Gas Networks Ireland records;
- EIR records;
- Consultations with Irish Water, Cork City and Cork County Council;
- Topographical survey;
- Site Investigations data;
- Site walkover;

Projections of Built Services use, and potential interference will be made, for both construction and operational phases of the development, and the impacts are assessed.

The methodology used to determine likely significant effects on Material Assets and the referenced impact criteria have been developed by the specialist in consideration of the EPA guidelines. Using established best practice and professional judgement, the significance of impact on Material Assets - Services, Infrastructure and Utilities is based on the criteria developed in Table 6.1.

Table 6. 1: Material assets - Services, Infrastructure and Utilities Impact Significance Criteria

Importance	Criteria
Profound	Profound impact occurs where there is a permanent disruption to a utility service or where there is significant surcharging of an existing system
Major	Major impact occurs where there is a long-term disruption to a utility service or where there is minor surcharging of an existing system
Moderate	Moderate impact occurs where there is a medium-term disruption to a utility service or where there is significant increase of flow within an existing system
Slight	Slight impact occurs where there is a short-term disruption to a utility service or where there is a minor increase of flow within an existing system
Imperceptible	Imperceptible impact occurs where there is a temporary disruption to a utility service or where there is a no quantifiable increase of flow within an existing system

6.2 Description of Existing Baseline Environment

6.2.1 Surface Water Drainage

There is an existing 1350mm diameter Cork City Council trunk storm sewer to the west of the site which runs in a north-south direction, see Figure 6.1. This storm sewer crosses under the South Ring Road (N40) before discharging to the River Douglas Estuary, see Figure 6.2.

There is a 450mm diameter storm sewer located in the road which forms the western boundary of the Phase 1 site. This storm sewer runs north to south in the road before turning in a westerly direction and increasing in size to 750mm diameter before it connects to the 1350mm diameter storm sewer mentioned above. These Infrastructure works were associated with a previous planning permission (03/27028). The proposal is that the discharge from the site will be to the 750mm diameter pipe.

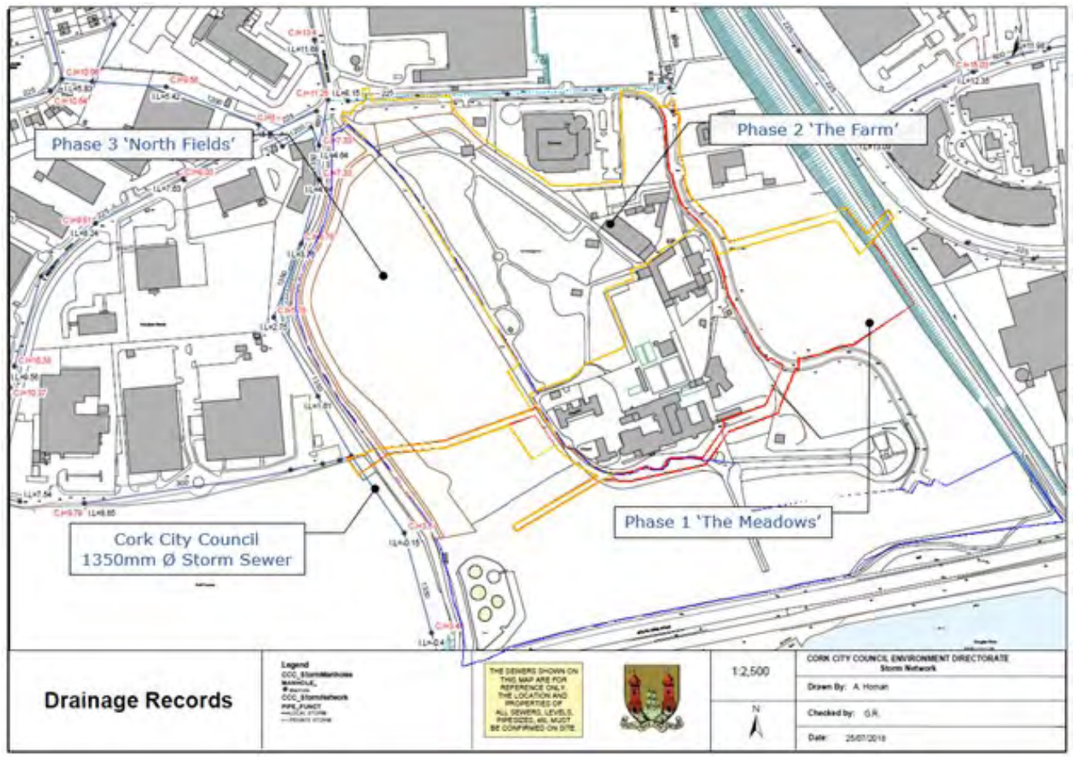


Figure 6.1 Cork City Council Storm Network

6.2.2 Foul Water Drainage

There is an existing 375/450mm diameter public foul sewer to the west of the site. This sewer connects to the existing Bessborough pumping station. See figure 6.2 for the pump station location.

From the pumping station the flows are pumped to the Ballinure Header Chamber. The 350mm diameter foul rising main crosses the southern part of the site before running along the old railway line to the east. From the Ballinure Header Chamber the sewer falls by gravity across the harbour to Carrigrennan Wastewater Treatment Plant (WWTP). See Appendix 6-3 for Irish Water map of locations mentioned above.

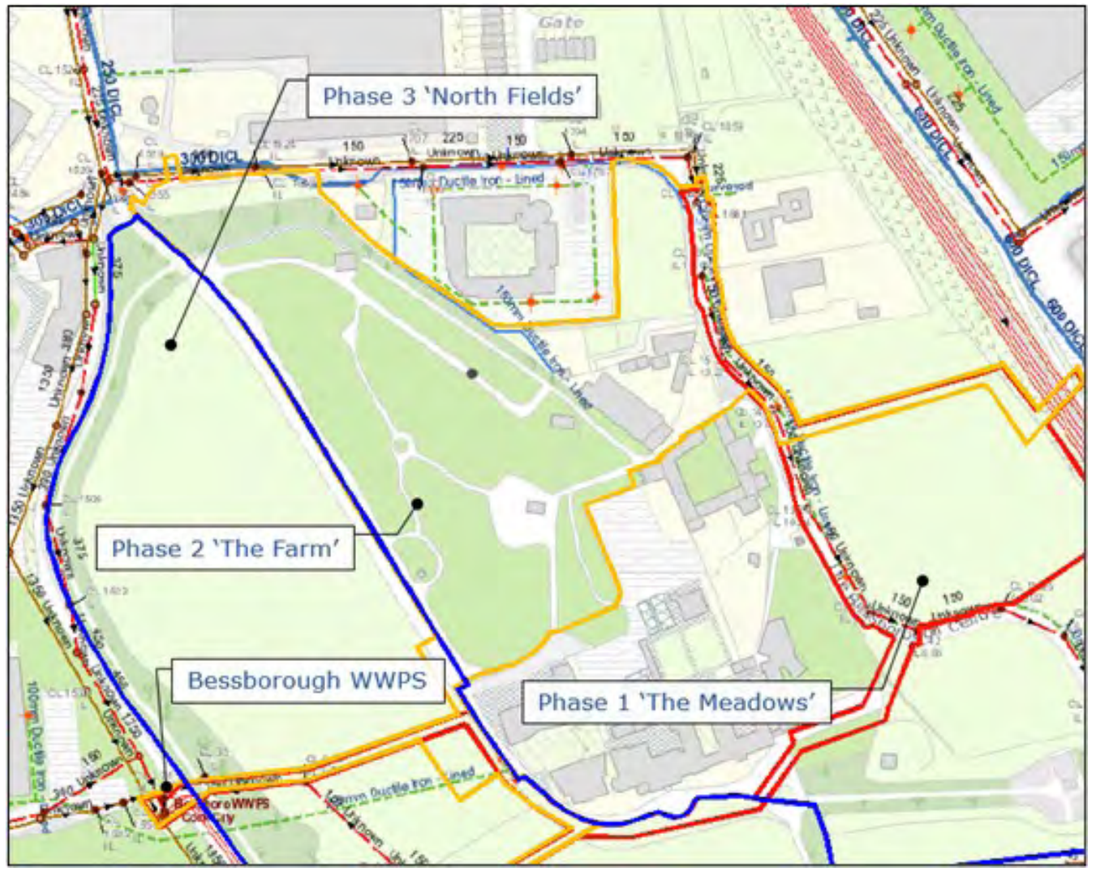


Figure 6.2: Bessborough WWPS Location

There is a 150mm diameter foul sewer located in the road which forms the western boundary of the Phase 1 site which runs north to south in the road before turning in a westerly direction and ultimately connecting to the pumping station mentioned above. These Infrastructure works were associated with a previous planning permission (03/27028). Refer to figure 6.3.

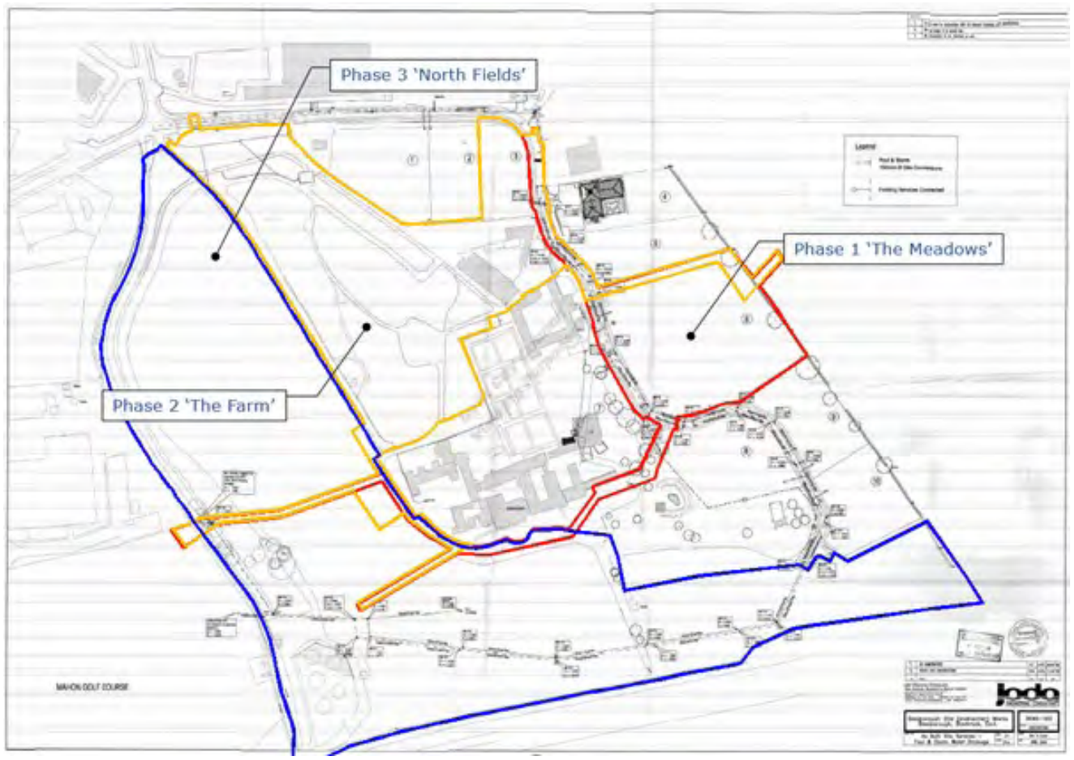


Figure 6.3: As Constructed Records of Existing Drainage Network

6.2.3 Potable Water

Existing watermains within and in the vicinity of the site are depicted in Figure 6.4.

The available water main records indicate there are a number of ductile iron watermains in the vicinity of the proposed development area.

There are 600mm and 1200mm diameter trunk mains to the south of the site. There is a 150mm diameter main in the road which forms the western boundary of the Phase 1 site. This main runs south to north before turning in a westerly direction and increasing downstream to a 300mm diameter main.

The existing buildings in the area are served from this 150mm diameter main.

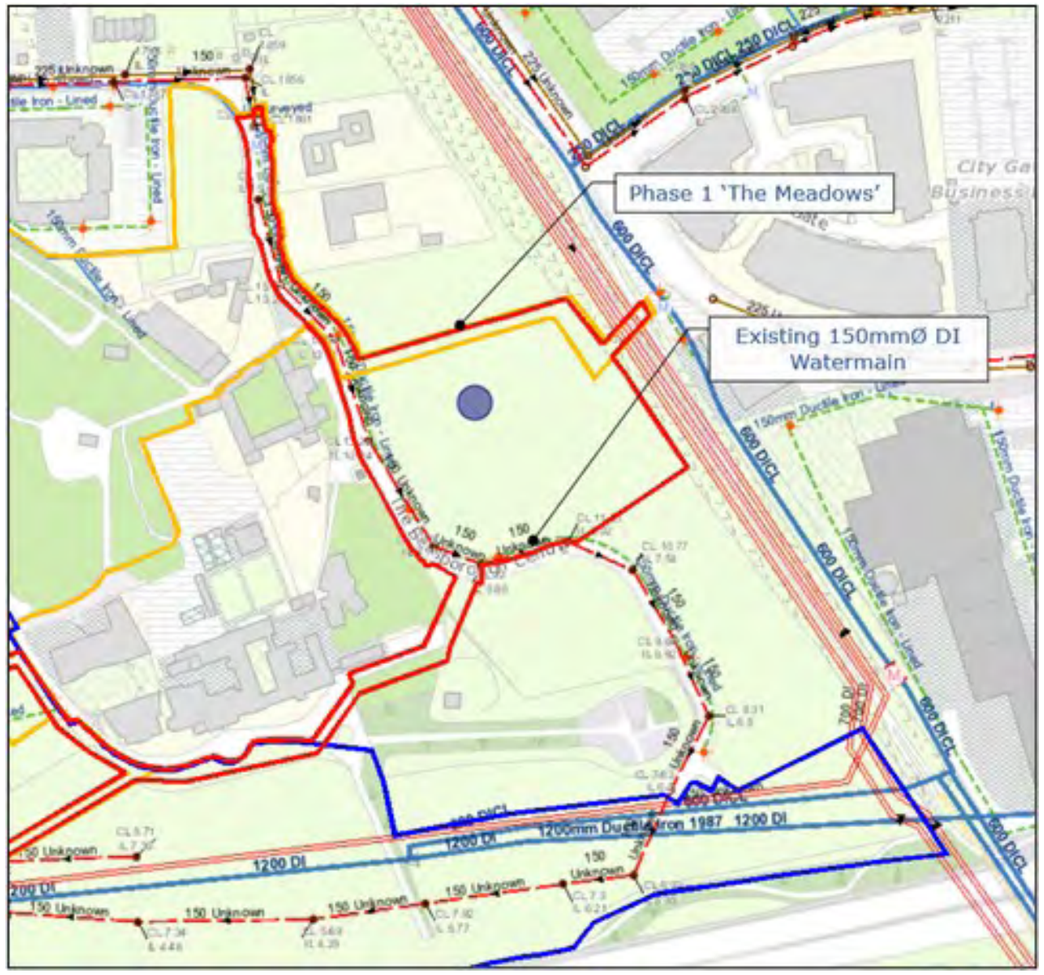


Figure 6.4: Existing Watermains

6.2.4 Power

From utility maps received from ESB Networks (see Appendix 6-4), the areas adjacent to the proposed development area are served by extensive networks of Low Voltage and Medium Voltage underground power supplies. There are no overhead lines indicated on the utility maps.

6.2.5 Gas

From utility maps received from Gas Networks Ireland (see Appendix 6-5), there are a number of PE supplies serving the existing buildings adjacent to the development site. The network in the area is a medium pressure network (4-bar).

6.2.6 Telecommunications

From utility maps received from EIR (see appendix 6-6), there are telecommunications networks serving the existing buildings adjacent to the development.

Also, from the Department of Environment, Climate and Communications online mapping the area surrounding the proposed development is serviced by High-Speed Broadband.

6.2.7 External Lighting

Refer to the External Lighting Analysis Reports (see Appendix 6-7) for Phase 1 'The Meadows' and Phase 2 'The Farm' by DKPartnership for details of existing public lighting.

The existing Bessborough Avenue and access road are both currently served by external lighting with the columns positioned generally on the eastern side of the Avenue and along the western site of the access road. The installation of a new external lighting scheme, to include the internal roads and public plaza is proposed within the scheme.

6.3 Characteristics of the Proposed Development

6.3.1 Phase 1 – The Meadows

In summary, the proposed development consists of construction of a mixed-use residential development of 280 apartments set out in 4 blocks comprising of the following;

- 12 no. 3-bedroom apartments
- 150 no. 2-bedroom apartments
- 112 no. 1-bedroom apartments
- 6 no. studio apartments

A detailed description of the proposed development is contained in Section 2 of the EIAR.

Surface Water Drainage

The proposed surface water network will include a drainage pipe network, attenuation storage and SuDS features. The restricted discharge from the site will be conveyed in a new surface water pipe laid from the western boundary of The Meadows in a westerly direction across the Bessborough site to connect to an existing 750mm diameter surface water sewer upstream of its connection to the 1350mm diameter surface water pipe which discharges to the Douglas Estuary south of the N40. A legal wayleave is in place across the Bessborough lands immediately to the west of The Meadows development to facilitate this connection. See drawings 21207-JBB-PH1-XX-DR-C-4001 & 4007 in Appendix 6-8 for details..

Foul Water Drainage

Wastewater collection within the proposed development will be via a network of 150mm and 225mm diameter gravity sewers, which will direct the flows to the southwest corner of the site. A new gravity sewer will then convey the flows in a westerly direction and will connect directly to the Bessborough pumping station. A legal wayleave is in place across the Bessborough lands immediately to the west of the Meadows development to facilitate this connection. See drawings 21207-JBB-PH1-XX-DR-C-4001 & 4007 in Appendix 6-8 for details..

Foul Water from the proposed development will ultimately discharge to the Carrigrennan WWTP for treatment and disposal. This discharge will incrementally increase over a four to five-year period as the development is completed and occupied with a final estimated daily discharge of 131 m^3/day.

The above demand assessments are based on Irish Water's design parameters for domestic housing as follows:

- Average occupancy = 2.7 persons/dwelling
- Per-capita consumption = 150 litres/person/day
- Peaking factor = 6
- Infiltration = 10% of unit consumption

And for commercial premises as follows;

- Per-capita consumption Creche/Café/Gym = 50 litres/person/day
- Per-capita consumption Workspace = 100 litres/person/day
- Peaking factor = 4.5
- Infiltration = 10% of unit consumption

A Pre-Connection Enquiry was submitted to Irish Water, the response to which confirmed that the proposed development can be serviced by the existing wastewater infrastructure network in the area. A copy of the confirmation is included in Appendix 6-1.

The Confirmation of Feasibility (COF) states that sufficient capacity is available in the IW network to facilitate a wastewater connection of 280 units. IW have advised that the proposed connection shall be made directly to the Bessborough Wastewater Pumping Station (WWPS) via a new inlet sewer. The WWPS is located adjacent to the western boundary of the overall Bessborough site. See Figure 6.2 for location.

The COF states that the Bessborough WWPS is almost at design loading capacity. Irish Water has a project underway to replace the existing pumps which will increase the pump rate and provide sufficient capacity to accommodate this development. This upgrade project is scheduled to be completed by Q4 2022 and the proposed connection could be completed as soon as possibly practicable after this date.

Gravity sewers are designed using Micro-Drainage WINDES design software to ensure self-cleansing velocities will be achieved on all pipe runs.

The proposed foul water drainage system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Wastewater Infrastructure' (Irish Water);
- 'Wastewater Infrastructure Standard Details' (Irish Water);
- Building Regulations, Technical Guidance Document Part H 'Drainage and Waste Water Disposal'; and
- IS EN752, "Drain and Sewer Systems Outside Buildings";

Odours will be generated within the foul drainage system and will require venting in accordance with Irish Water standard details which will ensure the odour issue is an imperceptible impact at the connection point to the existing foul sewer network.

Potable Water

A 150mm diameter ductile iron watermain is located in the existing road that forms the western boundary of the Meadows development.

A Pre-Connection Enquiry was submitted to Irish Water, the response to which confirmed that the proposed development can be serviced by the existing water infrastructure network in the area. A copy of the confirmation is included in Appendix 6-1.

The Confirmation of feasibility states that sufficient capacity is available in the IW network to facilitate a water connection of 280 units. IW have advised that the connection is to be made to the existing 150mm diameter ductile iron watermain located in the roadway adjacent to the western boundary of the site. See drawing 21207-JBB-PH1-XX-DR-C-03001 in Appendix 6-8 for details)..

The proposed water supply system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Water Infrastructure' (Irish Water);
- 'Water Infrastructure Standard Details' (Irish Water); and
- Building Regulations, Technical Guidance Document Part B 'Fire Safety';

This increase in water supply demand will happen incrementally over a four to five-year period as the housing development is completed and occupied with an estimated ultimate daily demand of 135 m^3/day.

The above demand assessment is based on Irish Water's design parameters as follows:

- Average occupancy = 2.7 persons/dwelling
- Per-capita consumption = 150 litres/person/day
- Average day / peak week demand factor = 1.25

The demand assessment is rather conservative as the above parameters are applied to all residential units i.e., 1, 2 and 3-bedroom apartments.

The new site watermain network has been designed to adequately serve the firefighting requirements of the development.

Fire hydrants will be provided such that each building will be within 45m of a hydrant and these hydrants will be provided so as to be fully accessible to the fire service.

Sluice valves will be installed on all principal watermain connections to ensure that sections of the development can be isolated for maintenance and repair as required.

A water-meter will be installed on the main connections, subject to detailed agreement with Irish Water/Cork City Council.

Power

All power supply related works will be carried out in accordance with ESB Networks relevant guidelines and requirements. The Maximum Import Capacity (MIC) for The Meadows is 916 kVA with two sub stations located on the site. There are no diversions of existing overhead lines required.

Gas

All current energy analysis for the development have been based on electric heat pumps. Although not totally excluded it is unlikely a gas supply will be required. To the west of the site, there is an existing 4 bar medium pressure pipe that will supply the development if required. If it is required any alterations to the existing gas supply network for the development of the subject site, will be agreed in advance of construction with Gas Networks Ireland. All gas supply related works will be carried out in accordance with Gas Networks Ireland relevant guidelines.

Telecommunications

All telecommunications related works will be carried out in accordance with infrastructure provider guidelines and requirements.

External Lighting

An external lighting design has been prepared by DKPartnership. Please refer to External Lighting Analysis Report for Phase 1 'The Meadows' in Appendix 6-7.

The external lighting was designed with specific design considerations:

A – As per the guidelines set out by the European standard EN132201 for external lighting applied to the main carriage way, minor road, parking areas and adjoining footpath.

B - For the preservation of possible bat habitats in the tree dominated areas the spillage of external lighting illumination is to be minimised as directed by Chapter 9.

EN132201 external lighting data and targets

We note that the proposed lighting design covers the existing access road into the development site, the site circulation road, adjacent public carparking, foot bridge and cycle & foot path / pedestrian areas using the proposed fittings listed below in line with the Local Authority requirements (Cork City Council), EN 1332201 class P3 and the bat roosting/ foraging areas. The final illumination calculation results are derived using the following 3 types of light fittings;

- Type A Phillips BGP307 34W, 3000K on a 6m pole > Main circulation road around phase 1.
- Type B Existing Phillips FGS224 SOX55W, 55W SOX, 2500K on a 8m pole > Main access road to development site.
- Type C Phillips BGP760 17W, 3000K on a 4.5m pole > Pedestrian and cycle pathways.

Bat Mitigation Measures

The external (public) lighting design meets the criteria set out in EN13201 for lighting class P3 and is deemed to be in compliance with the applied standards and recommendations. We further note the external lighting design meets the criteria required to lower any disturbance to bat habitats as a result of artificial lighting to a minimum.

6.3.2 Phase 2 – The Farm

In summary, the proposed development consists of construction of a mixed-use residential development of 140 apartments set out in 3 blocks comprising of the following:

- 1 no. 3-bedroom apartments
- 69 no. 2-bedroom apartments
- 70 no. 1-bedroom apartments
- A detailed description of the proposed project is contained in Section 2 of the EIAR.

Surface Water Drainage

Wastewater collection within the proposed development will be via a network of 150mm and 225mm diameter gravity sewers, which will direct the flows to the southwest corner of the site. From there a new gravity sewer will then convey the flows in a southerly direction and will connect to the foul sewer from the Phase 1 'The Meadows' which connects directly to the Bessborough wastewater pumping station. See drawings 21207-JBB-PH2-XX-DR-C-4002 & 4006 in Appendix 6-9 for details.

Foul Water Drainage

Wastewater collection within the proposed development will be via a network of 150mm and 225mm diameter gravity sewers, which will direct the flows to the southwest corner of the site. From there a new gravity sewer will then convey the flows in a southerly direction and will connect to the foul sewer from the Phase 1 'The Meadows' which connects directly to the Bessborough wastewater pumping station. See drawings 21207-JBB-PH2-XX-DR-C-4002 & 4006 in Appendix 6-9 for details.

Foul Water from the proposed development will ultimately discharge to the Carrigrennan WWTP for treatment and disposal. This discharge will incrementally increase over a four to five-year period as the development is completed and occupied with a final estimated daily discharge of 72 m^3/day.

The above demand assessments are based on Irish Water's design parameters for domestic housing as follows:

- Average occupancy = 2.7 persons/dwelling
- Per-capita consumption = 150 litres/person/day
- Peaking factor = 6
- Infiltration = 10% of unit consumption

And for commercial premises as follows;

- Per-capita consumption Creche/Café/Gym = 50 litres/person/day
- Per-capita consumption Workspace = 100 litres/person/day
- Peaking factor = 4.5
- Infiltration = 10% of unit consumption

A Pre-Connection Enquiry was submitted to Irish Water, the response to which confirmed that the proposed development can be serviced by the existing wastewater infrastructure network in the area. A copy of the confirmation is included in Appendix 6-2.

The Confirmation of Feasibility states that sufficient capacity is available in the IW network to facilitate a wastewater connection of 140 units. IW have advised that the proposed connection shall be made directly to the Bessborough Wastewater Pumping Station (WWPS) via a new inlet sewer. The WWPS is located adjacent to the western boundary of the overall Bessborough site. See Figure 6.2 for location.

The COF states that the Bessborough WWPS is almost at design loading capacity. Irish Water has a project underway to replace the existing pumps which will increase the pump rate and provide sufficient capacity to accommodate this development. This upgrade project is scheduled to be completed by Q4 2022 and the proposed connection could be completed as soon as possibly practicable after this date. Gravity sewers are designed using Micro-Drainage WINDES design software to ensure self-cleansing velocities will be achieved on all pipe runs.

The proposed foul water drainage system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Wastewater Infrastructure' (Irish Water);
- 'Wastewater Infrastructure Standard Details' (Irish Water);
- Building Regulations, Technical Guidance Document Part H 'Drainage and Waste Water Disposal'; and
- IS EN752, "Drain and Sewer Systems Outside Buildings";

Odours will be generated within the foul drainage system and will require venting in accordance with Irish Water standard details which will ensure the odour issue is imperceptible impact at the connection point to the existing foul sewer network

Potable Water

A Pre-Connection Enquiry was submitted to Irish Water, the response to which confirmed that the proposed development can be serviced by the existing water infrastructure network in the area. A copy of the confirmation is included in Appendix 6-2.

The Confirmation of feasibility states that sufficient capacity is available in the IW network to facilitate a water connection of 140 units. IW have advised that the connection is to be made to the existing 300mm diameter ductile iron watermain in Bessborough Road to the north of the site. See drawing 21207-JBB-PH2-XX-DR-C-03002 in Appendix 6-9 for details).

The proposed water supply system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Water Infrastructure' (Irish Water);
- 'Water Infrastructure Standard Details' (Irish Water); and
- Building Regulations, Technical Guidance Document Part B 'Fire Safety';

This increase in water supply demand will happen incrementally over a four to five-year period as the housing development is completed and occupied with an estimated final daily demand of 80 m^3/day.

The above demand assessment is based on Irish Water's design parameters as follows:

- Average occupancy = 2.7 persons/dwelling
- Per-capita consumption = 150 litres/person/day
- Average day / peak week demand factor = 1.25

The demand assessment is rather conservative as the above parameters are applied to all residential units i.e., 1, 2 and 3-bedroom apartments.

The new site watermain network has been designed to adequately serve the firefighting requirements of the development.

Fire hydrants will be provided such that each building will be within 45m of a hydrant and these hydrants will be provided so as to be fully accessible to the fire service.

Sluice valves will be installed on all principal watermain connections to ensure that sections of the development can be isolated for maintenance and repair as required.

A water-meter will be installed on the main connections, subject to detailed agreement with Irish Water/Cork County Council.

Power
All power supply related works will be carried out in accordance with ESB Networks relevant guidelines and requirements. The Maximum Import Capacity (MIC) for The Farm is 578 kVA with one sub station located on the site. There are no diversions of existing overhead lines required.

Gas
All current energy analysis for the development have been based on electric heat pumps. Although not totally excluded it is unlikely a gas supply will be required. To the north and east of the site, there is an existing 4 bar medium pressure pipe that will supply the development if required. If it is required any alterations to the existing gas supply network for the development of the subject site, will be agreed in advance of construction with Gas Networks Ireland. All gas supply related works will be carried out in accordance with Gas Networks Ireland relevant guidelines.

Telecommunications
All telecommunications related works will be carried out in accordance with infrastructure provider guidelines and requirements.

External Lighting
An external lighting design has been prepared by DKPartnership. Please refer to External Lighting Analysis Report for Phase 2 'The Farm' in Appendix 6-7.
The external lighting was designed with specific design considerations:

A – As per the guidelines set out by the European standard EN132201 for external lighting applied to the main carriage way, minor road, parking areas and adjoining footpath.

B - For the preservation of possible bat habitats in the tree dominated areas the spillage of external lighting illumination is to be minimised as directed by Chapter 9.

EN132201 external lighting data and targets
We note that the proposed lighting design covers the existing access road into the development site, the site circulation road, adjacent public carparking, foot bridge and cycle & foot path / pedestrian areas using the proposed fittings listed below in line with the Local Authority requirements (Cork City Council), EN 1332201 class P3 and the bat roosting/ foraging areas. The final illumination calculation results are derived using the following 3 types of light fittings;

- Type A Phillips BGP307 34W, 3000K on a 6m pole > Main circulation road around phase 1.
- Type B Existing Phillips FGS224 SOX55W, 55W SOX, 2500K on a 8m pole > Main access road to development site.
- Type C Phillips BGP760 17W, 3000K on a 4.5m pole > Pedestrian and cycle pathways.

Bat Mitigation Measures
The external (public) lighting design meets the criteria set out in EN13201 for lighting class P3 and is deemed to be in compliance with the applied standards and recommendations. We further note the external lighting design meets the criteria required to lower any disturbance to bat habitats as a result of artificial lighting to a minimum.

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6.4 Potential Impact of the Proposed Development

6.4.1 Do nothing Scenario

6.4.1.1 Phase 1 – The Meadows

In the 'do nothing' scenario, the subject lands are likely to remain undeveloped and in this context, there would be no predicted impacts on these material assets.

6.4.1.2 Phase 2 – The Farm

In the 'do nothing' scenario, the subject lands are likely to remain undeveloped and in this context, there would be no predicted impacts on these material assets.

6.4.1.3 Combined Phase 1 and Phase 2

In the 'do nothing' scenario, the subject lands are likely to remain undeveloped and in this context, there would be no predicted impacts on these material assets.

6.4.2 Impacts on Material Assets Infrastructure and Utilities

6.4.2.1 Construction Phase

6.4.2.1.1 Phase 1 – The Meadows

Surface Water Drainage
The installation of the surface water sewers for the development will be conducted in parallel with the other services. This will mainly involve the construction of the drainage network using trench excavation. The potential negative impact on the local infrastructure during the construction phase of the development would therefore be temporary and imperceptible.

Damage to existing underground and over ground infrastructure resulting in possible contamination of the existing systems (including watercourses) with construction related materials. Any negative impact would be temporary, short term and slight.

Foul Water Drainage
The installation of the foul sewers for the development will be conducted in parallel with the other services. This will mainly involve the construction of the drainage network using trench excavation. The potential negative impact on the local infrastructure during the construction phase of the development would therefore be temporary and imperceptible.

The foul sewer for the development will be connected to the existing foul drainage network outside the site at the existing wastewater pumping station, as detailed in Figure 6.2. The pumping station will require an increased pump rate to facilitate the proposed development and subsequent phases. These upgrade works are scheduled to be completed

by Irish Water by Q4 2022. The potential negative impact on the local foul drainage network would be short term and slight and confined to the works required to construct the connection, details of which will be agreed with Irish Water.

The site compound will require a temporary foul connection. The likely negative impact of this connection will be temporary and imperceptible and will be subject to a Connection Agreement with Irish Water.

Potable Water

Provision of a new water main distribution network would involve construction activities within the subject lands mainly involving trench excavations conducted in parallel with the other services. The potential negative impact on the local public water supply network would be short term and slight..

There is a risk of a temporary short-term disruption to the quality of local public water supply during the construction. The likely negative impact of this will be slight and short term when new connections are made to existing pipework and temporary shutdowns are required to facilitate such connections. All such temporary shutdowns will be operated under agreement with Irish Water with appropriate procedures put in place to advise local users of the likely short-term impacts (such as temporary discolouration/temporary water-supply interruptions/etc.).

The site compound will require a temporary water connection. This likely negative impact of this temporary connection will be temporary and imperceptible and will be subject to a Connection Agreement with Irish Water.

Power, Gas and Telecommunications

The installation of the utilities for the development will be conducted in parallel with the other services and will primarily involve construction of ducting and chambers using open excavation. Any negative impact on the local network would be short term and imperceptible..

There may be a potential temporary loss of connection to the ESB infrastructure while carrying out works to provide connection to the proposed development. This likely negative impact may be characterised as a temporary, regionally short term, moderate impact.

There may be a potential temporary loss of connection to the Gas Networks Ireland infrastructure while carrying out works to provide connection (if one is required) to the proposed development. This likely negative impact may be characterised as a temporary, regionally short term, moderate impact.

There may be a potential temporary loss of connection to the telecommunications infrastructure while carrying out works to provide connection to the proposed development. This likely negative impact may be characterised as a temporary, locally short term, minimal impact.

The site compound will require a temporary power and telecommunications connection. The likely negative impact of the provision of this supply will be temporary and negligible.

6.4.2.1.2 Phase 2 – The Farm

Surface Water Drainage

The installation of the surface water sewers for the development will be conducted in parallel with the other services. This will mainly involve the construction of the drainage network using trench excavation. The potential negative impact on the local infrastructure during the construction phase of the development would therefore be temporary and imperceptible.

Damage to existing underground and over ground infrastructure resulting in possible contamination of the existing systems (including watercourses) with construction related materials. Any negative impact would be temporary, short term and slight.

Foul Water Drainage

The installation of the foul sewers for the development will be conducted in parallel with the other services. This will mainly involve the construction of the drainage network using trench excavation. The potential negative impact on the local infrastructure during the construction phase of the development would therefore be temporary and imperceptible.

The foul sewer for the development will be connected to the existing foul drainage network outside the site at the existing wastewater pumping station, as detailed in Figure 6.2. The pumping station will require an increased pump rate to facilitate the proposed development and subsequent phases. These upgrade works are scheduled to be completed by Irish Water by Q4 2022. The potential negative impact on the local foul drainage network would be short term and slight and confined to the works required for the connection, details of which will be agreed with Irish Water.

The site compound will require a temporary foul connection. This likely negative impact of this connection will be temporary and imperceptible and will be subject to a Connection Agreement with Irish Water.

Potable Water

Provision of a new water main distribution network would involve construction activities within the subject lands mainly involving trench excavations conducted in parallel with the other services. The potential negative impact on the local public water supply network would be short term and slight.

There is a risk of a temporary short-term disruption to the quality of local public water supply during the construction. The likely negative impact of this will be slight and short term when new connections are made to existing pipework and temporary shutdowns are required to facilitate such connections. All such temporary shutdowns will be operated under agreement with Irish Water with appropriate procedures put in place to advise local users of the likely short-term impacts (such as temporary discolouration/temporary water-supply interruptions/etc.).

The site compound will require a temporary water connection. This likely negative impact of this temporary connection will be temporary and imperceptible and will be subject to a Connection Agreement with Irish Water.

Power, Gas and Telecommunications

The installation of the utilities for the development will be conducted in parallel with the other services and will primarily involve construction of ducting and chambers using open excavation.

There may be a potential temporary loss of connection to the ESB infrastructure while carrying out works to provide connection to the proposed development. This likely negative impact may be characterised as a temporary, regionally short term, moderate impact.

There may be a potential temporary loss of connection to the Gas Networks Ireland infrastructure while carrying out works to provide connection (if one is required) to the proposed development. This likely negative impact may be characterised as a temporary, regionally short term, moderate impact.

There may be a potential temporary loss of connection to the telecommunications infrastructure while carrying out works to provide connection to the proposed development. This likely negative impact may be characterised as a temporary, locally short term, minimal impact.

The site compound will require a temporary power and telecommunications connection. The likely negative impact of the provision of this supply will be temporary and negligible.

6.4.2.1.3 Combined Phase 1 and Phase 2

The Phase 1 and 2 developments are planned to be constructed sequentially so the individual impacts noted above will take effect over a period of time, with many of the Phase 1 impacts repeated again when the Phase 2 development is taking place.

However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place. Examples of this include the connection of a new foul sewer inlet to the existing wastewater pumping station to the west of the site and connection of a stormwater sewer to the existing 1350mm stormwater sewer through the site. In this context the individual impacts noted for Phase 1 and 2 will be reduced or eliminated.

6.4.2.2 Operational Phase

6.4.2.2.1 Phase 1 – The Meadows

Surface Water Drainage

There is adequate capacity in the existing surface water drainage network to cater for attenuated surface water runoff from the development particularly given the proximity of the connection point to the final discharge at the Douglas estuary. Any impact without mitigation will be permanent but slight.

The increased impermeable areas will reduce local ground water recharge and potentially increase surface water runoff if not attenuated to greenfield runoff rate. Any impact will be permanent and slight without mitigation.

Accidental hydrocarbon leaks along roads and subsequent discharge into piped surface water drainage network. Any unlikely negative impact would be temporary and slight.

Foul Water Drainage

The impact of the proposed development on the foul drainage network will be to increase the quantity of foul water entering the collection network and discharging to Carrigrennan WWTP for treatment and disposal. The estimated discharge on completion of the development site is approximately 72 m^3/day. The potential impact from the operational phase of the development on the existing wastewater treatment plant at Carrigrennan will be long-term and minimal.

The development will add to the environmental and financial costs associated with treatment and disposal at the Carrigrennan WWTP. Any such impact will be permanent and minimal.

Following a Pre-Connection Enquiry, Irish Water issued a Confirmation of Feasibility for the proposed development. Given that the overall development will take place and become occupied in phases the load on the existing foul sewer network will increase slowly over a period of four to five years, providing the time required for any upgrades, if required. As such the impact of the proposed development on the existing foul sewer network will be long term and minimal.

There exists a minor risk associated with the possibility of leakage from damaged foul sewers and drains within the development site. Any foul water leakage will result in minor contamination of groundwater in the area. Any negative impact would be temporary and minimal.

Potable Water

The impact of the operational phase of the proposed development on the public water supply is likely to be to increase the demand on the existing water supply by approximately 135 m^3/day. As such additional water quantities would need to be treated and supplied through the existing network to the site. This will result in extra cost as well as increasing abstraction volumes from the existing source. Any potential impact of the proposed development on the public water supply network is likely to be permanent and minimal.

Power, Gas and Telecommunications

The impact of the operational phase of the proposed development on the power supply network would be the requirement for a Maximum Import Capacity (MIC) of 916 kVA with two sub stations located on the site.

The impact of the operational phase of the proposed development on the gas supply (if required) would be the requirement for an additional gas load to accommodate the development of the lands.

The impact of the operational phase of the proposed development on the telecommunications network would be to increase the demand on the existing network.

The potential negative impact of the proposed development on the Power, Gas and Telecommunications networks is likely to be permanent and minimal.

6.4.2.2.2 Phase 2 – The Farm

Surface Water Drainage

There is adequate capacity in the existing surface water drainage network to cater for attenuated surface water runoff from the development particularly given the proximity of the connection point to the final discharge at the Douglas estuary. Any impact will be permanent and minimal.

The increased impermeable areas will reduce local ground water recharge and potentially increase surface water runoff if not attenuated to greenfield runoff rate. Any unlikely impact will be permanent and minimal.

Accidental hydrocarbon leaks along roads and subsequent discharge into piped surface water drainage network. Any unlikely impact would be temporary and minimal.

Foul Water Drainage

The impact of the proposed development on the foul drainage network will be to increase the quantity of foul water entering the collection network and discharging to Carrigrennan WWTP for treatment and disposal. The estimated discharge on completion of the development site is approximately 72 m^3/day. The potential impact from the operational phase of the development on the existing wastewater treatment plant at Carrigrennan will be long-term and minimal.

The development will add to the environmental and financial costs associated with treatment and disposal at the WWTP. Any impact will be permanent and minimal.

Following a Pre-Connection Enquiry, Irish Water issued a Confirmation of Feasibility for the proposed development. Given that the overall development will take place and become occupied in phases the load on the existing foul sewer network will increase slowly over a period of four to five years, providing the time required for any upgrades, if required. As such the impact of the proposed development on the existing foul sewer network will be long term and minimal.

There 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. Any impact would be temporary and minimal.

Potable Water

The impact of the operational phase of the proposed development on the public water supply is likely to be to increase the demand on the existing water supply by approximately 80 m^3/day. As such additional water quantities would need to be treated and supplied through the existing network to the site. This will result in extra costs as well as increasing abstraction volumes from the existing source. Any potential impact of the proposed development on the public water supply network is likely to be permanent and minimal.

Power, Gas and Telecommunications

The impact of the operational phase of the proposed development on the power supply network would be the requirement for a Maximum Import Capacity (MIC) of 578 kVA with one substation located on the site.

The impact of the operational phase of the proposed development on the gas supply (if required) would be the requirement for an additional gas load to accommodate the development of the lands.

The impact of the operational phase of the proposed development on the telecommunications network would be to increase the demand on the existing network.

The potential impact of the proposed development on the Power, Gas and Telecommunications networks is likely to be permanent and minimal.

6.4.2.2.3 Combined Phase 1 and Phase 2

The Phase 1 and 2 developments are planned to be constructed sequentially so the individual impacts noted above will take effect over a period of time, with many of the Phase 1 impacts repeated when the Phase 2 development is taking place.

However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place. Examples of this include the connection of a new foul sewer inlet to the existing wastewater pumping station to the west of the site and connection of a stormwater sewer to the existing 1350mm stormwater sewer through the site. In this context the individual impacts noted for Phase 1 and 2 will be reduced or eliminated.

6.5 Mitigation Measures, Monitoring and Residual Impacts

6.5.1 Mitigation measures for the proposed development

6.5.1.1 Construction Phase

6.5.1.1.1 Phase 1 – The Meadows

Mitigation measures proposed in relation to the drainage, water, power and telecommunications services infrastructure include the following:

- An “Outline Construction and Environmental Management Plan” has been prepared and will be further developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the “Construction Management Plan”.
- 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 before being brought into operation.
- 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.
- The construction compound’s potable water supply shall be protected from contamination by any construction activities or materials.
- The permanent connection to serve the development, will be carried out under an agreed methodology and with full notification to existing Irish Water customers who will be affected by the short-term interruptions to water supply which will occur while making these connections.
- Where possible, backup network supply to any services will be provided. Relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.
- Connections to the existing gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.
- The storm sewer network is designed to flow under public roads and open spaces to ensure unimpeded access is available to the pipe network (including hydrocarbon interceptors and silt traps) at all times to allow for monitoring and maintenance.
- Monitoring of the impacts of the various connections and installations during the construction phase will be carried out in accordance with the requirements of the various infrastructure owners.
- With appropriate mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the construction phase of the development.

6.5.1.1.2 Phase 2 – The Farm

Mitigation measures proposed in relation to the drainage, water, power and telecommunications infrastructure include the following:

- An “Outline Construction and Environmental Management Plan has been prepared and will be further developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the “Outline Construction and Environmental Management Plan”.
- 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.
- The construction compound’s potable water supply shall be protected from contamination by any construction activities or materials.
- The permanent connection to serve the development, will be carried out under an agreed methodology and with full notification to existing Irish Water customers who will be affected by the short-term interruptions to water supply which will occur while making these connections.
- Where possible, backup network supply to any services will be provided. Relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.
- Connections to the existing gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

- The storm sewer network is designed to flow under public roads and open spaces to ensure unimpeded access is available to the pipe network (including hydrocarbon interceptors and silt traps) at all times to allow for monitoring and maintenance.
- Monitoring of the impacts of the various connections and installations during the construction phase will be carried out in accordance with the requirements of the various infrastructure owners
- With mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the construction phase of the development.

6.5.1.1.3 Combined Phase 1 and Phase 2

The Phase 1 and 2 developments are planned to be constructed sequentially so the mitigation measures referenced for each phase above will be put in place as each phase progresses.

However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place. Examples of this include the connection of a new foul sewer inlet to the existing wastewater pumping station to the west of the site and connection of a stormwater sewer to the existing 1350mm stormwater sewer through the site. In this context the individual impacts noted for Phase 1 and 2 will be reduced or eliminated.

With mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the construction of the two phases of the development.

6.5.1.2 Operational Phase

6.5.1.2.1 Phase 1 – The Meadows

Mitigation measures proposed during the operational stage include the following:

All new drainage lines (foul and surface water) will be pressure-tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational.

Regular maintenance of the drainage network including the petrol interceptor, flow control and surface water attenuation system will ensure that they are operating correctly.

It is envisaged that the development will take place and be occupied on a phased basis and therefore the downstream foul sewerage system (foul sewer network and wastewater treatment facility) will be loaded gradually and incrementally.

Water conservation methods such as the use of low flush toilets and low flow taps will be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development. Such water conservation methods will reduce the loading on the foul sewer network and the treatment works at Carrigrennan WWTP.

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical, gas and telecommunications infrastructure.

With mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the operational phase of the development.

6.5.1.2.2 Phase 2 – The Farm

Mitigation measures proposed during the operational stage include the following:

All new drainage lines (foul and surface water) will be pressure-tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational.

Regular maintenance of the drainage network including the petrol interceptor, flow control and surface water attenuation system will ensure that they are operating correctly.

It is envisaged that the development will take place and be occupied on a phased basis and therefore the downstream foul sewerage system (foul sewer network and wastewater treatment facility) will be loaded gradually and incrementally.

Water conservation methods such as the use of low flush toilets and low flow taps will be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development. Such water conservation methods will reduce the loading on the foul sewer network and the treatment works at Carrigrenan WWTP.

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical, gas and telecommunications infrastructure.

With mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the operational phase of the development.

6.5.1.2.3 Combined Phase 1 and Phase 2

The Phase 1 and 2 developments are planned to be occupied sequentially so the mitigation measures referenced for each phase above will be put in place as each phase becomes fully occupied.

With mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the occupation of the two phases of the development.

6.5.2 Residual Impacts

6.5.2.1 Phase 1 – The Meadows

Foul Water Drainage

The development will generate additional foul sewage flows to the existing foul sewage network and municipal wastewater treatment facilities, but the volume of these additional flows is minor in the context of the capacity of the existing network and treatment facilities. Irish Water have provided us with figures (2020) for Carrigrennan WWTP

- The peak hydraulic capacity at the Carrigrennan WWTP is 359,592 m^3/day
- The annual max flow to the WWTP is 266,498 m3/day
- The annual mean flow to the WWTP is 126,805 m3/day
- The Organic capacity at the WWTP is 413,200 PE
- The collected load at the WWTP (peak week) is 241,480 PE

Based on the above there is significant spare capacity at the WWTP to accept the flows from the proposed development.

Following mitigation measures proposed there will be no residual impacts on foul water infrastructure after construction work is completed.

Following mitigation measures proposed the residual impacts on foul water infrastructure during operation are long term but minimal for the existing municipal wastewater treatment plant and long term but minimal for the existing foul sewer network.

Potable Water

Potable water will be provided by connecting to the public water mains which are fed from the existing Irish water network. Within the site the water will be distributed via a network of 100mm and 150mm diameter water main pipes, the design and construction of the network will be in accordance with the Water Supply Code of Practice published by Irish Water. The development will generate additional water demand on the existing water supply network and municipal water treatment facilities, although the volume of these additional flows is minor in the context of the capacity of the existing network and treatment facilities.

The additional demand arising from the development is minor in the context of the capacity of the existing water supply network in the area and therefore the residual impacts on existing potable water infrastructure during the operational phase of the development will be long term but minimal.

Power, Gas and Telecommunications

No significant residual impacts from either the construction or operational phases of the development are likely, as a consequence of the connection to the Power, Gas and Telecommunications networks.

6.5.2.2 Phase 2 – The Farm

Foul Water Drainage

The development will generate additional foul sewage flows to the existing foul sewage network and municipal wastewater treatment facilities, but the volume of these additional flows is minor in the context of the capacity of the existing network and treatment facilities. Irish Water have provided us with figures (2020) for Carrigrennan WWTP

- The peak hydraulic capacity at the Carrigrennan WWTP is 359,592 m^3/day
- The annual max flow to the WWTP is 266,498 m3/day
- The annual mean flow to the WWTP is 126,805 m3/day
- The Organic capacity at the WWTP is 413,200 PE
- The collected load at the WWTP (peak week) is 241,480 PE

Based on the above there is significant spare capacity at the WWTP to accept the flows from the proposed development.

Following mitigation measures proposed there will be no residual impacts on foul water infrastructure after construction work is completed

Following mitigation measures proposed the residual impacts on foul water infrastructure during operation are long term but minimal for the existing municipal wastewater treatment plant and long term but minimal for the existing foul sewer network.

Potable Water

Potable water will be provided by connecting to the public water mains which are fed from the existing Irish Water network. Within the site the water will be distributed via a network of 100mm and 150mm diameter water main pipes, the design and construction of the network will be in accordance with the Water Supply Code of Practice published by Irish Water. The development will generate additional water demand on the existing water supply network and municipal water treatment facilities, although the volume of these additional flows is minor in the context of the capacity of the existing network and treatment facilities.

The additional demand arising from the development is minor in the context of the capacity of the existing water supply network in the area and therefore the residual impacts on potable water infrastructure during the Operational Phase of the development will be long term but minimal.

Power, Gas and Telecommunications

No significant residual impacts from either the construction or operational phases of the development are likely, as a consequence of the connection to the Power, Gas and Telecommunications networks.

6.5.2.3 Combined Phase 1 and Phase 2

The Phase 1 and 2 developments are planned to be occupied sequentially so the mitigation measures referenced for each phase above will be put in place as each phase becomes fully occupied.

With mitigation measures in place, no significant residual impacts on material assets are predicted as a consequence of the occupation of the two phases of the development.

6.6 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 6, Material Assets as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *To make best use of the City's infrastructure and material assets and to promote the sustainable development of new infrastructure to meet the future needs of the City population.*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a neutral interaction with the status of EPO 6 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in a neutral interaction for most of the material assets with EPO 6.

6.6.1 Construction Phase

A number of developments are proposed and permitted in the vicinity of the proposed development and the potential for cumulative impacts with these projects were considered. These include:

Table 6.2 Potential cumulative Effects (permitted proposed developments)

Application	Description	Outcome/Current Status
Cork City Council Ref: 17/37565	Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping drainage and amenity areas	Granted by way of Material Contravention of City Development Plan on 24/04/2018 Crawford Gate Development. Last phase recently completed
Cork City Council Ref: 18/37820	The demolition and removal of the existing warehouse/ distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three-storey apartment block (comprising 20 no. apartments) and 1 no. creche.	Granted by way of Material Contravention of City Development Plan on 28/02/2019 Construction underway
Cork City Council Ref: 21/40481	Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works..	Conditional Grant on the 22/12/2021
Cork City Council Ref: 2140453	Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvill	Conditional Grant on 17/1/2022
Cork City Council Ref: 2140453	Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works.	Conditional Grant on 17/1/2022
Cork City Council	Phase – 3 'North Fields' Construction of 200 no. apartments consisting of 5 no. 3-bedroom apartments, 100 no. 2-bedroom apartments, 92 no. 1-bedroom apartments, and 3 no. studio apartments.	Proposed future development

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021:

Table 6.3 Potential cumulative Effects (Refused proposed development)

Application Reference	Applicant(s)	Description	Outcome/Current Status
An Bord Pleanala Ref: ABP-308790-20	MWB Two Limited	Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 25/05/2021 on basis of prematurity related to resolution of matters concerning a potential burial ground on the site.
Cork City Council Ref: 2039705/ ABP-309560-1	MWB Two Limited	Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 15/07/2021 as would result in Haphazard form of Development. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential. At the time of writing this EIAR, the zoning in the operative CDP supports the principle of development on the ABP-308790-20 lands. It is included here on that basis.

6.6.1.1 Phase 1 – The Meadows

No significant cumulative impacts on the material assets infrastructure and utilities are anticipated during the construction phase of the Phase 1 – 'The Meadows' development as long as mitigation measures outlined are put in place.

Therefore, the significance of the impact of the Phase 1 – 'The Meadows' development construction activities is imperceptible and is considered not to change in combination with the other projects.

6.6.1.2 Phase 2 – The Farm

No significant cumulative impacts on the material assets infrastructure and utilities are anticipated during the construction phase of the Phase 2 – 'The Farm' development as long as mitigation measures outlined are put in place.

Therefore, the significance of the impact of the Phase 2 – 'The Farm' development construction activities is imperceptible and is considered not to change in combination with the other projects.

6.6.1.3 Combined Phase 1 and Phase 2

Based on the combined assessment of impacts on material assets infrastructure and utilities of the Phase 1 – 'The Meadows' and Phase 2 – 'The Farm' and other developments listed in tables 6.1 and 6.2, it is concluded that these two phases will not act in combination with those projects to result in likely significant construction phase cumulative impacts on the material assets infrastructure and utilities.

Therefore, no significant combined cumulative impacts were identified during the construction phase of the proposed development.

6.6.1.4 Combined Masterplan Area (including Phases 1-3)

There are no predicted cumulative impacts on material assets infrastructure and utilities arising from the construction phase of the combined masterplan area in combination with other developments in the vicinity listed in tables 6.1 and 6.2.

6.6.2 Operational Phase

Assessing the cumulative impacts of the operational phase of the development is similarly contingent on other permitted developments in the area as listed in 6.6.1.

6.6.3 Phase 1 – The Meadows

No significant cumulative impacts on material assets infrastructure and utilities are anticipated during the operational phase of the Phase 1 – 'The Meadows' development as long as mitigation measures outlined are put in place.

All developments will be required to manage sites and include a regime of inspection and maintenance of the installed infrastructure. Therefore, the cumulative impact is concluded to be neutral and imperceptible in relation to water.

6.6.4 Phase 2 – The Farm

No significant cumulative impacts on material assets infrastructure and utilities are anticipated during the operational phase of the Phase 2 – 'The Farm' development as long as mitigation measures outlined are put in place.

All developments will be required to manage sites and include a regime of inspection and maintenance of the installed infrastructure. Therefore, the cumulative impact is concluded to be neutral and imperceptible in relation to water.

6.6.4.1 Combined Phase 1 and Phase 2

Based on the combined assessment of impacts on material assets infrastructure and utilities of the Phase 1 – 'The Meadows' and Phase 2 – 'The Farm' and other developments listed in Tables 6.1 and 6.2, it is concluded that these two phases will not act in combination with those projects to result in likely significant operational phase cumulative impacts on the material assets infrastructure and utilities.

Therefore, no significant combined cumulative impacts were identified during the operational phase of the proposed development.

6.6.4.2 Combined Masterplan Area (including Phases 1-3)

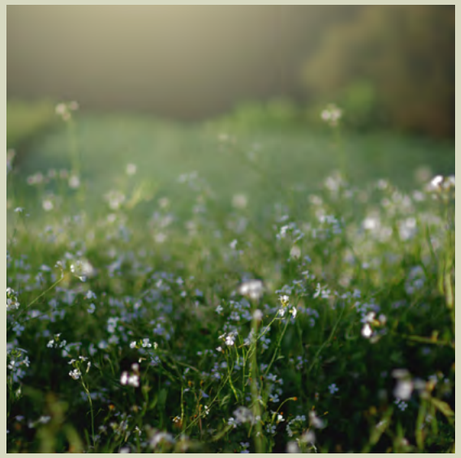
There are no predicted cumulative impacts on material assets infrastructure and utilities arising from the operational phase of the combined masterplan area in combination with other developments in the vicinity listed in tables 6.1 and 6.2.

6.7 Difficulties in Compiling Information

No difficulties were encountered during the preparation of this chapter of the EIAR.

6.8 References

- Environmental Protection Agency. "Advice Notes for Preparing Environmental Impacts Statements", (EPA 2015).
- Environmental Protection Agency. "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports" (EPA 2017).
- Environmental Protection Agency. "Guidelines on the information to be contained in EIS" (EPA 2002).
- Environmental Protection Agency (2003) Advice Notes on Current Practices in the Preparation of Environmental Impact Statements. (EPA 2003).
- ESB Networks. Code of Practice for Avoiding Danger from Overhead Electricity Lines (ESB 2019).
- CIRIA Environmental Good Practice on Site 3rd Edition, (C692), (CIRIA Publications, 2010).
- CIRIA Control of water pollution from construction sites, guidance for consultants and contractors, (C532), (CIRIA Publications, 2001).
- Electronic Sources.



BESSBOROUGH, CORK

CHAPTER 7

Land, Soils & Geology

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CHAPTER 7

Land, Soils & Geology

CHAPTER 7

7 Land and Soils

7.1 Introduction

7.1.1 Chapter Context

This chapter of the Environmental Impact Assessment Report (EIAR) assesses and evaluates the likely significant impacts on the existing Land, soils, and geology aspects, associated with the proposed Strategic Housing development located at Bessborough, Ballinure, Blackrock, Cork.

The proposed development comprises two planning applications to An Board Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in 'Chapter 2 – Project Description'. Note: Hydrogeology is assessed separately in Chapter 8 Water (Hydrology and Hydrogeology). In this chapter the characteristic of the potential impacts during the Construction and Operational phase are discussed and assessed for both Phase 1 and Phase 2. Appropriate mitigation measures to limit any significant impacts to land, soil and geology are recommended and any residual impacts are also identified.

7.1.2 Methodology

7.1.2.1 Guidance

The Land and Soils section of the EIAR is prepared in accordance with the following guidelines:

- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Reports (European Commission, 2017);
- Environmental Impact Assessment of Projects Guidance on Scoping 2017;
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements by the Institute of Geologists of Ireland (IGI, 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018;
- EPA (2017). Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports.

The principal attributes to be assessed include the following:

- Land use;
- Soil cover and classification;
- Quaternary sediments;
- Bedrock geology

7.1.2.2 Assessment methodology

As detailed in EPA (2017) Draft Guidelines on the information to be contained in Environmental Impact Assessment Report, where more specific definitions exist within a specialised factor or topic these should be used in preference to the generalised definitions. This impact assessment methodology is in accordance with the guidance outlined in Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements published by the Institute of Geologists of Ireland (IGI) in 2013. The potential impact of the proposed project on Land & Soils has been assessed by classifying the importance of the relevant attributes, quantifying the likely magnitude of any impact on these attributes, and determining the significance of the impact.

Using the information from the Appendix C2 NRA Guidance, Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013), an estimation of the Importance of the feature for geology within the study area is assessed using the criteria set out in the Table 7. 1.

Table 7.1: Criteria foe Rating Site Importance of Geological Features

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

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

Estimation of the Magnitude of the impact on the feature (geology attribute) from the proposed development is given in Table 7. 2.

Table 7.2: Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Geology Attribute (NRA, 2008)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves. Irreversible loss of high proportion of local high fertility soils. Removal of entirety of geological heritage feature. Requirement to excavate / remediate entire waste site. Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves. Removal of part of geological heritage feature. Irreversible loss of moderate proportion of local high fertility soils. Requirement to excavate / remediate significant proportion of waste site. Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves. Removal of small part of geological heritage feature. Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils. Requirement to excavate / remediate small proportion of waste site. Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes.
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature.
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature.
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature.

Determining the Significance of the impact on the feature (geology attribute) based on the Importance of the feature and the Magnitude of the impact is given in Table 7. 3

Table 7.3: Rating of Significant Environmental Impacts at EIS Stage (NRA, 2008)

Importance of Attribute	Magnitude of Impact			
	Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Profound/ Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/ Moderate

7.1.2.3 Source of information

The information on land and soil underlying the proposed development site was obtained through assessing databases and archives available. The following are the sources of datasets for this chapter:

- Geological Survey of Ireland (GSI) On-line Geological datasets and maps;
- Environmental Protection Agency (EPA) – database information and website mapping;
- Ordnance Survey Ireland (OSI) - aerial photographs and historical mapping;
- Teagasc – soil and subsoils database;
- Preliminary Ground Investigation Bessborough SHD – Priority Geotechnical Ltd; 2022.

7.2 Description of Existing Baseline Environment

The receiving environment for study area (Phase 1 'The Meadows' and Phase 2 'The Farm') are discussed in terms of land cover, soils, quaternary sediments, and bedrock geology and established and established initially from desktop assessment. It should be noted that this assessment was supplemented by means of a preliminary ground investigation which was carried out to establish subsurface conditions at the proposed project site by Priority Geotechnical Ltd in January 2022 as detailed below in section 7.4. The proposed development is located at Bessborough, Ballinure, Blackrock, Cork. Phase 1 'The Meadows' is located to the east, Phase 3 'The North Field' site is located to west and Phase 2 'The Farm' is located in the central part of the overall proposed masterplan.

The national route N40 Ring Road (located approximately 110m to the south) runs along the southern boundary of the study area. Access to and from the site is via an existing access road, Bessborough Road. The Passage Railway Greenway (trail primarily used as pedestrian and cycle path) is located to the eastern boundary of study area. The Bessborough Centre is located to the western boundary of the Phase 1 'The Meadows'. The Mahon Industrial Estate and the Mahon Municipal Golf Course is located to the west of Phase 2 'The Farm'. Douglas River estuary is located 180m to the south of the Phase 1 'The Meadows' and 220m to the south of the Phase 2 'The Farm' which flows in the easterly direction and discharges to Lough Mahon.

Figure 7. 1: Site location

7.2.1 Land Use

According to the EPA Mapping using the "Corine 2018" land cover data indicates that the predominant land use of the Phase 1 'The Meadows' and Phase 2 'The Farm' site is 'discontinuous urban fabric' (Code_18_112) which comprises of artificial surfaces. The lands surrounding the site have different cover types consisting of residential dwellings, institutional buildings, commercial, industrial areas and open space/amenity uses. The land to the east of the site has land cover described as 'industrial or commercial units' (Code_18_121) which also comprises of artificial surfaces and land to further southwest of the site has land cover described as 'sports and leisure facilities' (Code_18_142) with land cover comprising of artificial non-agricultural vegetated areas. 'Intertidal flats' (Code_18_423) that are coastal wetlands are located to the south of the proposed development.

Historical OSI maps (1837) shows the Site as being undeveloped land and the railway line had not yet been laid. Between 1888 and 1913 the site was used as farms and the rail line had been developed. The 1995-2005 aerial photographs show the older buildings of Bessborough House to the west and some of the newer buildings to the east of the development site.

The Corine Landcover (2018) for Phase 1 'The Meadows' and Phase 2 'The Farm' is presented below Figure 7. 2

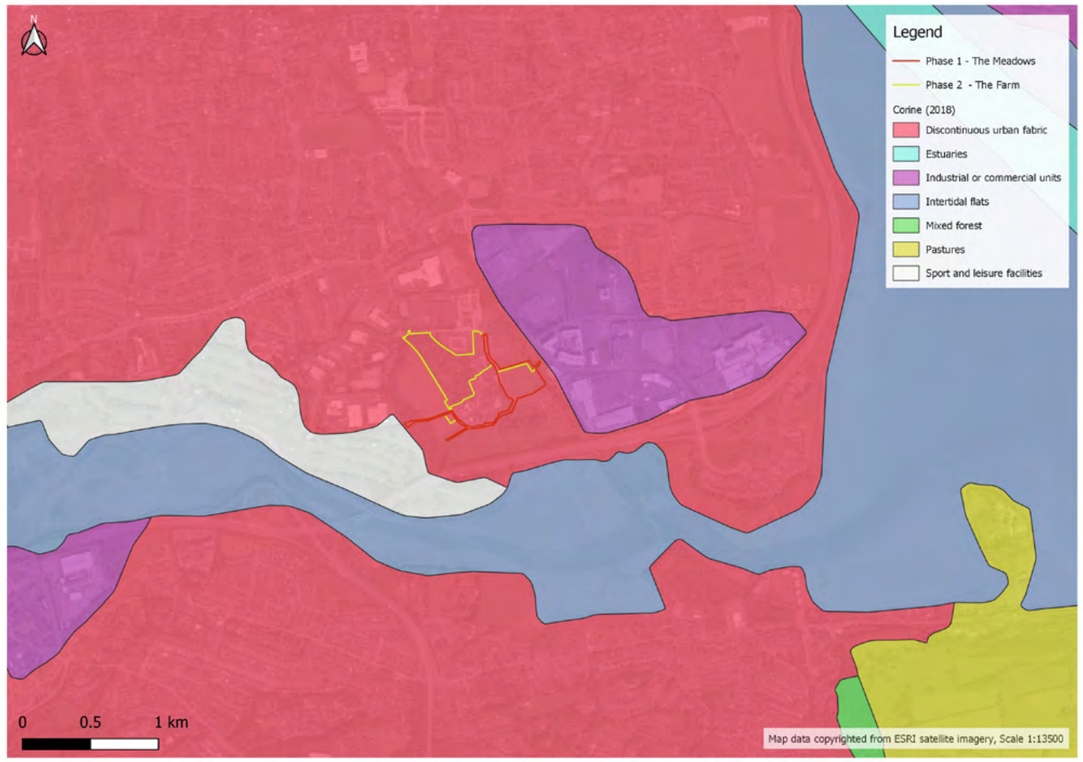


Figure 7. 2: Corine Landcover (2018)

7.2.2 Soils

The “Teagasc Soils” from the GSI Mapping indicates the predominant soil type underlying the Phase 1 ‘The Meadows’ and Phase 2 ‘The Farm’ development area to be ‘made ground’ derived from man-made or artificial materials (Made). The Corine (2018) classifies the area of the site as discontinuous urban fabric. The Soil Cover map for the Phase 1 ‘The Meadows’ and Phase 2 ‘The Farm’ is presented below Figure 7. 3.

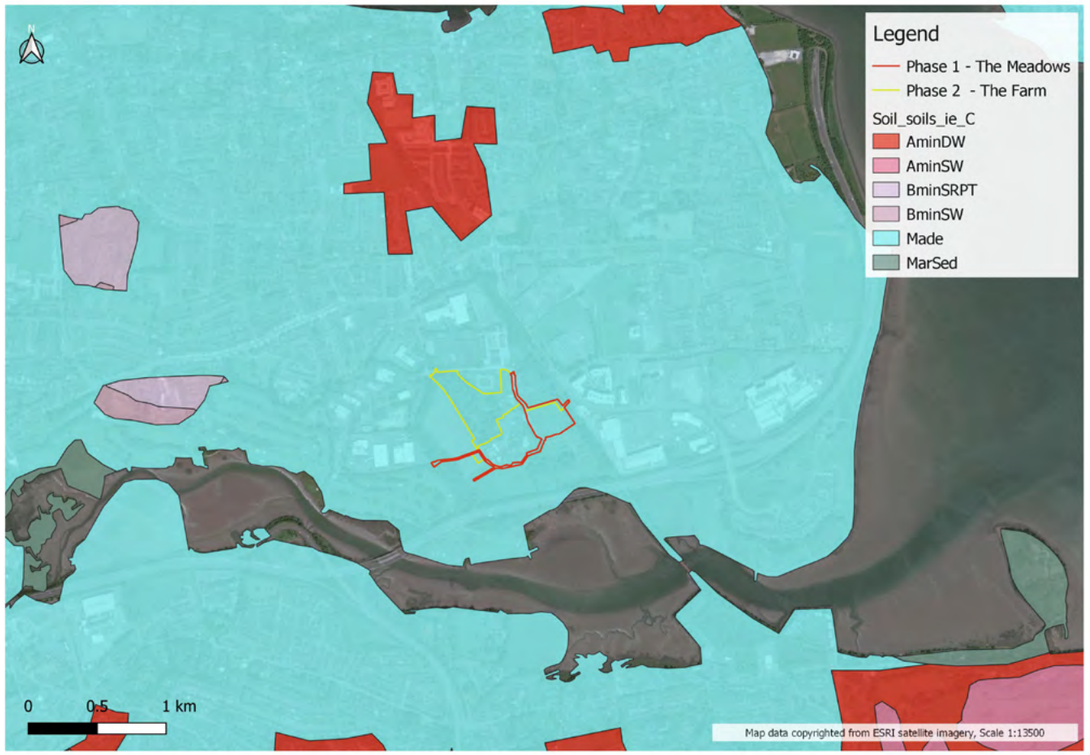


Figure 7.3: Soil Cover

7.2.3 Quaternary Sediments

The quaternary geological period extends from about 1.5 million years ago to the present day and is sub divided into two epochs: the Pleistocene epoch, which covers the Ice Age period, and extends up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day.

Information available on the GSI online Mapping (“Quaternary Sediments”) indicate that the Phase 1 ‘The Meadows’ and Phase 2 ‘The Farm’ development site is underlain predominantly by deposit type ‘made ground’ and the lithology is classified as ‘Urban’ (refer to Figure 7.4).

‘Made Ground’ indicates the deposits associated with anthropogenic action. Generally, where made ground is present it is associated with urban developments within the vicinity of the site.

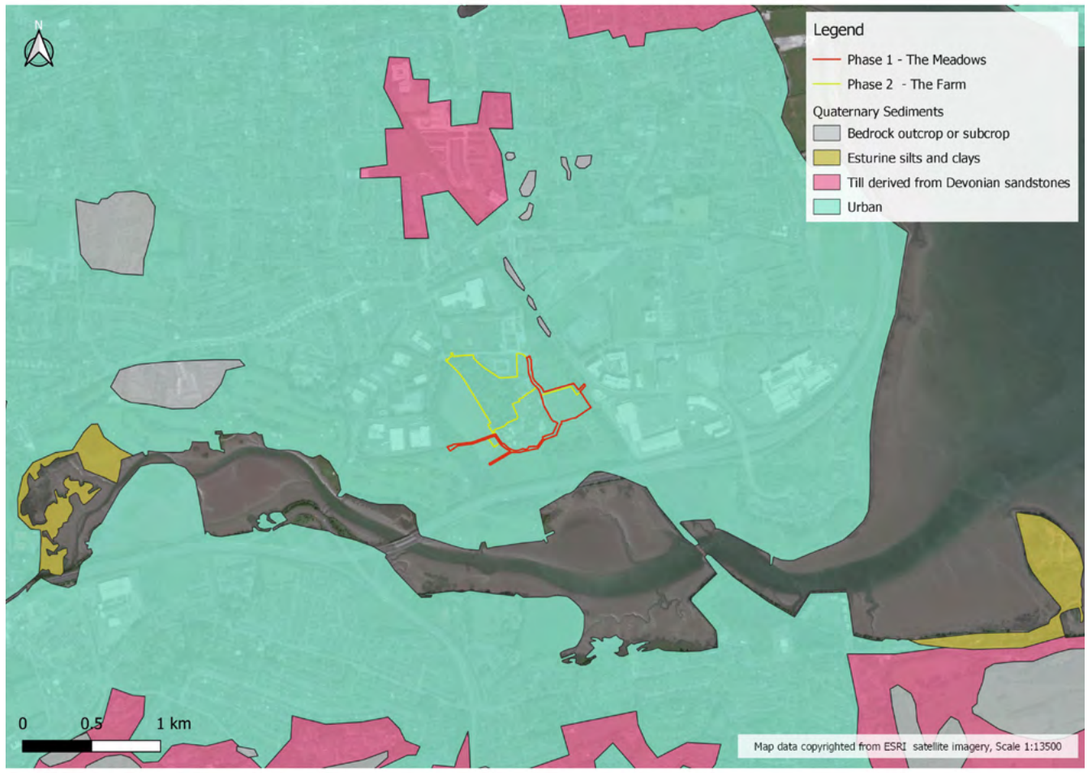


Figure 7.4: Quaternary Sediments

7.2.4 Bedrock Geology

The information obtained from the GSI Map indicates that the Phase 1 ‘The Meadows’ and Phase 2 ‘The Farm’ development site is predominantly underlain by Carboniferous (Tournaisian – lower Visean Stage) Limestone described as “Massive unbedded lime-mudstone”. The geological formation comprises the Waulsortian Limestones. No bedrock outcrop was identified on the site.

In terms of the structural relationship of the area, a fault line is mapped to the north of the Phase 1 ‘The Meadows’ and Phase 2 ‘The Farm’ extending northeast to northwest across the headland running generally horizontally parallel to the development site.

The Bedrock geology for the Phase 1 ‘The Meadows’ and Phase 2 ‘The Farm’ is presented below in Figure 7. 5.

Figure 7.5: Bedrock Geology

7.3 Characteristics of the Proposed Development

7.3.1 Phase 1 – The Meadows

In summary, this proposed development consists of construction of a mixed-use residential development of 280 apartments and ancillary resident uses, with a new pedestrian bridge over the adjacent greenway, set out in 4 blocks ranging in height from 1 to 10 storeys.

A detailed description of the proposed development is contained in Chapter 2 of the EIAR.

The proposed development and future development phases, subject to relevant planning permissions being granted, and in terms of construction phasing, the following timeline have been advised:

- Phase 1: 280 no. apartments Commence 2024;
- Phase 2: 140 no. apartments Commence 2026;

Phase 3 - a proposed future development for construction of 200 no. apartments, subject to zoning.

7.3.1.1 Construction stage

The key construction activities that are associated with the Land and Soil are detailed below:

- Site development works will include stripping of the 50 mm to 150 mm thick topsoil layer. Approximately 4800 m^3 of topsoil will be stripped but only 1,000m^3 is likely to be re-usable on site, with 3,800 m^3 having to be removed from site.
- Excavation of subsoil layers will be required in order to allow road construction, foundation excavation, drainage and utility installation and provision of underground attenuation of surface water along with general excavation to facilitate final layout and level of proposed development. It is estimated that nominally 7,600 m^3 of material will be excavated with approximately 1,200m^3 being reused in the development. Therefore approximately 6,400 m^3 of material having no structural value or reuse possibility will be removed from the site.
- Results of Preliminary Ground Investigation (Section 7.4.1 below) indicate that piling will be required for the substructure of the apartment blocks. The concrete operations associated with the foundations will require concrete batching on site and use of concrete deliveries to the site. Noise and vibration will be generated through the construction phase particularly during pilling and excavation work and these impacts are considered in detail in Chapter 10 – Noise and Vibration.
- Underlying subsoil layers generally comprise of slightly sandy slightly gravelly silt/clay some of which is expected to be suitable for reuse as non-structural fill as described above.
- Bunded fuel storage and use of wet concrete during construction phase.
- Construction of new drainage and service infrastructure to facilitate the development.
- Construction of buildings, boundary walls, fencing, parking areas, and roads
- Construction access to and from the site is via the existing access road off the Bessborough Road.
- Connections to surface water, foul drainage, and water supplies (in accordance with Irish Water's relevant Code of Practice)

The activities required for the construction phase of the Proposed Development represent the greatest risk of potential impact on the geological environment.

7.3.1.2 Operational stage

The day-to-day activities of the completed development would be unlikely to have any direct impact on the land & soils environment. On completion of the construction stage, the site becomes a residential development area. It is not envisaged that there would a further direct impact on the soil or geology structure.

The impacts on land and soils from the development will be limited to the risk of fuel leaks from cars parked within the development leaking into the underlying soil and the risk of leaking of foul sewage from sewer into the underlying soil. Ensuring appropriately designed and constructed site services will protect the soils and geology from future contamination arising from operation of the developments.

The impacts on soil and geology arising from the operational phase will be temporary and imperceptible.

7.3.2 Phase 2 – The Farm

In summary, this proposed development provides for the demolition of 10 no. existing agricultural sheds and structures and the construction of 140 apartments over 2 no. retained and repurposed farmyard buildings and 3 no. new blocks.

A detailed description of the proposed project is contained in Chapter 2 of the EIAR.

The proposed development and future development phases, subject to relevant planning permissions being granted and in terms of construction phasing, following timeline have been advised:

- Phase 1: 280 no. apartments Commence 2024;
- Phase 2: 140 no. apartments Commence 2026;

Phase 3 - a proposed future development for construction of 200 no. apartments, subject to zoning.

7.3.2.1 Construction stage

The key construction activities that are associated with the Land and Soil are detailed below:

- Site development works will include stripping of the 50 mm to 150 mm thick topsoil layer. It is expected that approximately 2,950 m^3 of topsoil will be stripped, with approximately 1,500 m^3 re-usable on site, and the balancing 1,450 m^3 being removed from site.
- Excavation of subsoil layers will be required in order to allow road construction, foundation excavation, drainage and utility installation and provision of underground attenuation of surface water along with general excavation to facilitate final layout and level of proposed development. It is estimated that 6,700 m^3 of material will be excavated with approximately 2,170m^3 being reused in the development. Therefore approximately 4,530m^3 of material having no structural value or reuse possibility will be removed from the site.
- During the demolition phase approximately 350 m^3 of Made Ground, buildings and surface paving will be excavated as part of the site clearance works and removal of existing underground services (foul and storm sewer pipe work, and electrical ducting).
- Underlying subsoil layers generally comprise of slightly sandy slightly gravelly silt/clay some of which is expected to be suitable for reuse as non-structural fill as described above.
- Bunded fuel storage and use of wet concrete during construction phase.
- Construction of new drainage and service infrastructure to facilitate the development.
- Construction of buildings, boundary walls, fencing, parking and roads.
- Construction access to and from the site is via the existing access road off the Bessborough Road.
- Connections to surface water, foul drainage and water supplies (in accordance with Irish Water's relevant Code of Practice).

The activities required for the construction phase of the Proposed Development represents the greatest risk of potential impact on the geological environment.

7.3.2.2 Operational stage

The day-to-day activities of the completed development would be unlikely to have any direct impact on the land & soils environment. On completion of the construction stage, the site becomes a residential development area. It is not envisaged that there would a further direct impact on the soil or geology structure.

The impacts on land and soils from the development will be limited to the risk of fuel leaks from cars parked within the development leaking into the underlying soil and the risk of leaking of foul sewage from sewer into the underlying soil. Ensuring appropriately designed and constructed site services will protect the soils and geology from future contamination arising from operation of the developments.

The impacts on soil and geology arising from the operational phase will be temporary and imperceptible.

7.4 Site Investigations

7.4.1 Phase 1 – The Meadows

7.4.1.1 Ground investigation

A preliminary ground investigation was carried out to establish subsurface conditions at the proposed project site by Priority Geotechnical Ltd in January 2022. A summary of the ground investigation carried out is provided in Table 7. 4 below:

Table 7.4: Summary of Ground Investigation Works Undertaken

Contractor	Description of Investigation	Details of Investigation
Priority Geotechnical Limited	Bessborough SHD, Mahon, Cork Ground Investigation Report No. P21239	Cable Percussion Boreholes (BH04, BH05 and BH06) Trial pits (TP04, TP05 TP06 and TP06A) Dynamic probe (DP04, DP05 and DP06)

Refer to Appendix 7.1 Ground Investigation Report (Priority Geotechnical Ltd, Issue date February 2022)

7.4.1.2 Ground conditions

The summary of encountered ground conditions is given below:

- Topsoil: The topsoil comprising of brown to dark brown slightly sandy slightly gravelly SILT with grass and rootlets was encountered between 0.15 – 0.30m bgl.
- Made Ground: Made ground is soil that has been altered due to anthropogenic activities was encountered in trial pit TP04 from 0.30 – 0.70m bgl and in TP06A from 0.10 to 1.45m bgl. This is described as brown slightly sandy slightly gravelly SILT/CLAY with low cobble content and waste (plastic waste in TP04 and pottery fragments, glass, and plastics in TP06A). No evidence of hazardous waste was recorded during the preliminary ground investigation.
- Cohesive Glacial Till: Cohesive glacial till was encountered beneath the topsoil and was encountered in Trial pit TP04 below 0.7m bgl. It was also found in boreholes BH04 and BH5 from 3.00 – 6.00m and 6.00 – 7.40m bgl respectively. It is generally described as firm to stiff brown to purple brown slightly sandy slightly gravelly SILT/CLAY with medium to low cobble content and low bolder content. Sand is fine to coarse, gravel is fine to coarse, subrounded to rounded. Cobbles are subrounded to rounded.
- Granular Glacial Till: The glacial deposit was encountered was encountered in Trial pit TP04 from 0.70 – 1.50 and Bore hole BH04. It is generally described as soft brown to dark brown slightly sandy slightly gravelly SILT/SAND. Sand is described as fine to coarse; gravel is described as fine to coarse, sub-rounded to rounded of mixed lithologies.

7.4.1.3 Conceptual Site Model

Using the subsurface information from the ground investigation, conceptual site model is summarised in the Table 7. 5 below.

Table 7.5: Summary of Conceptual Site Model

S.no	Description of Investigation	Description	Depth to Top of Unit (m bgl)	Range of Unit Thickness (m bgl)
1	Topsoil	Brown to dark brown slightly sandy slightly gravelly SILT with grass and rootlets	0.0	0.15 – 0.30
2	Made Ground	Brown slightly sandy slightly gravelly SILT/CLAY with low cobble content and waste (plastic waste in TP04 and pottery fragments, glass, and plastics in TP06A)	0.0	0.4 – 1.35
3	Cohesive Glacial Till	firm to stiff brown to purple brown slightly sandy slightly gravelly SILT/CLAY with medium to low cobble content and low bolder content	0.0 to 0.70	1.40 – 3.80
4	Granular Glacial Till	soft brown slightly sandy slightly gravelly SAND/ CLAY	0.0 to 0.07	0.80 – 2.00

Note: The depths and unit thicknesses are based on borehole locations and may not represent the maximum or minimum depths and thicknesses across the site.

7.4.2 Phase 2 – The Farm

7.4.2.1 Ground investigation

A ground investigation was carried out to establish subsurface conditions at the proposed project site by Priority Geotechnical Ltd in January 2022. A summary of the ground investigation carried out is provided in the Table 7. 6 below:

Table 7.6: Summary of Ground Investigation Works Undertaken

Contractor	Description of Investigation	Details of Investigation
Priority Geotechnical Ltd	Bessborough SHD, Mahon, Cork Ground Investigation Report No. P21239	Cable Percussion Boreholes (BH01, BH02 and BH03) Trial pits (TP01, TP02 and TP03) Dynamic probe (DP01, DP02 and DP03)

Refer to Appendix 7.1 Ground Investigation Report (Priority Geotechnical Ltd, Issue date February 2022)

7.4.2.2 Ground conditions

The summary of encountered ground conditions is given below:

- Topsoil: The topsoil comprising of brown slightly sandy slightly gravelly SILT with grass and rootlets was encountered between 0.20 – 0.35m bgl.
- Made Ground: Made ground is soil that has been altered due to anthropogenic activities was encountered in trial pit TP01 from 0.20 – 0.65m bgl, TP02 from 0.30 – 1.20mbgl and TP03 from 0.35 – 1.10m bgl. It is described as brown to purple/brown slightly sandy slightly gravelly SILT/CLAY with pottery fragments, medium cobble content, medium boulder, blocks, timber, plastics, and glass fragments. No evidence of hazardous waste was recorded during the preliminary ground investigation.
- Cohesive Glacial Till: Cohesive glacial till was encountered beneath the topsoil and was encountered in Trial pits and Boreholes TP01, TP02, TP03, BH01, BH02 and BH03 below 0.65m bgl. It is generally described as soft to firm becoming stiffer with increase in depth purple brown to red brown slightly sandy slightly gravelly SILT/CLAY with medium to high cobble content and low bolder content. Sand is fine to coarse, gravel is fine to coarse.
- Granular Glacial Till: The glacial deposit was encountered in Trial pit TP02 from 1.20 – 2.30. It is generally described as soft light purple brown slightly gravelly silty SAND. Sand is described as fine to coarse; gravel is described as fine to coarse of mixed lithologies.

7.4.2.3 Conceptual Site Model

Using the subsurface information from the ground investigation, a conceptual site model is summarised in the Table 7. 7 below.

Table 7.7: Summary of Conceptual Site Model

S.no	Description of Investigation	Description	Depth to Top of Unit (m bgl)	Range of Unit Thickness (m bgl)
1	Topsoil	Brown slightly sandy slightly gravelly SILT with grass and rootlets	0.0	0.2 - 0.35
2	Made Ground	Brown to purple brown slightly sandy slightly gravelly SILT/ CLAY with pottery fragments, medium cobble content, medium boulder, blocks, timber, plastics, and glass fragments.	0.0	0.45 – 0.90
3	Cohesive Glacial Till	soft to firm brown to brown red to purple brown slightly sandy slightly gravelly SILT/CLAY with low to high cobble content and low bolder content	0.00 – 0.65	0.9 – 6.1
4	Granular Glacial Till	soft to firm brown red to purple brown slightly sandy slightly gravelly SILT/CLAY with low or medium cobble content and medium bolder content	0.0 – 1.20	1.1

Note: The depths and unit thicknesses are based on borehole locations and may not represent the maximum or minimum depths and thicknesses across the site.

7.5 Impact Assessment

The predicted geological impacts of the proposed development regarding the land and soil environment during construction and operation are presented below. The mitigation measures included in the design of this project to address these potential impacts are presented in the Section 7.6.1.

7.5.1 Do nothing Scenario

7.5.1.1 Phase 1 – The Meadows

If the proposed development does not proceed there would be no potential for any significant impact on the existing land and soil of the site. The land use would remain unchanged as man-made Urban. There would be no change to the soil environment at the site.

7.5.1.2 Phase 2 – The Farm

If the proposed development does not proceed there would be no potential for any significant impact on the existing land and soil of the site. The land use would remain unchanged as man-made Urban. There would be no change to the soil environment at the site.

7.5.1.3 Combined Phase 1 and Phase 2

Again, if the proposed combined Phase 1 and 2 developments do not proceed there would be no potential for any significant impact on the existing land and soil of the site. The land use would remain unchanged as man-made Urban. There would be no change to the soil environment at the site.

7.5.2 Impacts on Existing Land and Soil

7.5.2.1 Construction Phase

7.5.2.1.1 Phase 1 – The Meadows

Removal/Stripping of Topsoil

The initial development of the site would require extensive removal or stripping of the existing topsoil for enabling works for the pile installation, pile capping and other site services. A portion of the stripped topsoil will be stored and reused on the site for landscaping purposes. It is estimated that a maximum of 4,800 m^3 of material will be excavated with 1,000 m^3 to be reused on-site. The stripped soil can be disturbed and eroded by the site vehicles during the construction. The removal of the existing topsoil on the site comprises removal of made ground. Although it would be permanent impact because the soil type is very common and in extensive abundance, it would be considered as Neutral quality impact. The impact is considered negligible in magnitude and imperceptible in significance.

Excavation of subsoil

The removal of the subsoils would be necessary to accommodate levelling of the site, the construction of the foundations of the buildings, the provisions of drainage and service infrastructure, road construction and levelling of the site. Earthwork and removal of topsoil would result in exposure to effects of weathering of the underlying subsoil layers which will lead to subsoil erosion. The subsoil layer mainly consists of sandy gravels or gravelly sands, some of which can be reused for non-structural fill. Any impact resulting from excavation will be permanent, negligible in magnitude, and imperceptible in significance. Given that foundations are likely to be piled and that other infrastructure will be installed at relatively shallow depths, the development site works, and excavation works in the construction phase will not be at depths which will impact on the underlying bedrock geology.

Noise & Vibration

Results of Preliminary Ground Investigation (Section 7.4.1.1) indicates that piling will be required for the substructure of the apartment blocks. The concrete operations associated with the foundation will require the use of piling equipment, concrete batching on site and concrete deliveries to the site. Noise and vibration will be generated through the construction phase particularly during piling and excavation work and these impacts are considered in detail in Chapter 10 – Noise and Vibration

Storage and Stockpiles

The removal of topsoil, overburden material and the treatment of those materials shall require its temporary storage, handling, and reuse of a portion of this material on site. The impact is classified as having a negative quality, slight significance, and temporary duration.

Export of Material from Site

It is envisioned that the majority of excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. EPA agreement will be obtained before re-using the spoil as a by-product. Where material cannot be reused off site it will be sent for recovery or disposal at an appropriately authorised facility.

Construction traffic

The increased traffic in the development area during the construction effects the existing subsoil layer within the site. The regular movement of heavy machinery, earthwork plants and vehicles delivering construction materials to and from the site results in erosion as well as deposition of mud and dust generation to the surrounding road network. The magnitude of this potential impact is a negative effect, of imperceptible significance and of temporary duration.

Soil Pollution

Risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination is one of the potential impacts during the construction phase. For example, oils, fuels, and lubricant stored at the site, leakage or spillage of oils or fuels from construction machinery and use of concrete during construction. It results in permanent negative impact on the soils. The impact of accidental spillages on soils is negligible in magnitude and imperceptible in significance.

7.5.2.1.2 Phase 2 – The Farm

Removal/Stripping of Topsoil

The initial development of the site will would require extensive removal or stripping of the existing topsoil enabling works for pile installation, pile capping and other site services. A portion of the stripped topsoil will be stored and reused on the site for landscaping purposes. It is estimated that a maximum of 2,950 m^3 of material will be excavated with 1,500 m^3 to be reused on-site. The stripped soil can be disturbed and eroded by the site vehicles during the construction. The removal of the existing topsoil of the site comprises removal of made ground. Although it would be a permanent impact because the soil type is very common and in abundance, it would be considered as a neutral quality impact. The impact is negligible in magnitude and imperceptible in significance.

Excavation of subsoil

The removal of the subsoils will be necessary to accommodate levelling of the site, the construction of the foundations of the buildings, the provision of drainage and service infrastructure, road construction and levelling of the site. Earthwork and removal of topsoil would result in exposure to effects of weathering of the underlying subsoil layers which will lead to subsoil erosion. The subsoil layer mainly consists of sandy gravels or gravelly sands which can be reused for non-structural fill. Any impact resulting from excavation will be permanent, negligible in magnitude and imperceptible in significance. Given the foundations are likely to be piled and that other infrastructure will be installed at relatively shallow depths, the development site works, and excavation works in the construction phase will not be at depths which will impact on the underlying bedrock geology.

Noise & Vibration

Results of Preliminary Ground Investigation (Section 7.4.2.1) indicates that piling will be required for the substructure of the apartment blocks. The concrete operations associated with the foundation will require the use of piling equipment, concrete batching on site and concrete deliveries to the site. Noise and vibration will be generated through the construction phase particularly during piling and excavation work and these impacts are considered in detail in Chapter10 – Noise and Vibration

Storage and Stockpiles

The removal of topsoil, overburden material and the treatment of those materials shall require its temporary storage, handling, and reuse of a portion of this material on site. The impact is classified as having a negative quality, slight significance, and temporary duration.

Export of Material from Site

It is envisioned that the majority of excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. EPA agreement will be obtained before re-using the spoil as a by-product. Where material cannot be reused off site it will be sent for recovery or disposal at an appropriately authorised facility.

Construction traffic

The increased traffic in the development area during the construction effects the existing subsoil layer within the site. The regular movement of heavy machinery, earthwork plants and vehicles delivering construction materials to and from the site results in erosion as well as deposition of mud and dust generation to the surrounding road network. The magnitude of this potential impact is a negative effect, of imperceptible significance and of temporary duration.

Soil Pollution

Risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination is one of the potential impacts during the construction phase. For example, oils, fuels, and lubricant stored at the site, leakage or spillage of oils or fuels from construction machinery and use of concrete during construction. It results in permanent negative impact on the soils. The impact of accidental spillages on soils is negligible in magnitude and imperceptible in significance.

7.5.2.1.3 Combined Phase 1-The Meadows and Phase 2- The Farm

Removal/Stripping of Topsoil

The initial development of each site will would require extensive removal or stripping of the existing topsoil enabling works for pile installation, pile capping and other site services. A portion of the stripped topsoil will be stored and reused on the site for landscaping purposes. For Combined Phase 1 & 2 it is estimated that a maximum of 7,750 m^3 of material will be excavated with 2,500 m^3 to be reused on-site. The stripped soil can be disturbed and eroded by the site vehicles during the construction. The removal of the existing topsoil of the site comprises removal of made ground. Although it would be a permanent impact because the soil type is very common and in abundance, it would be considered as a neutral quality impact. The impact is negligible in magnitude and imperceptible in significance.

Excavation of subsoil

The removal of the subsoils will be necessary to accommodate levelling of the site, the construction of the foundations of the buildings, the provision of drainage and service infrastructure, road construction and levelling of the site. Earthwork and removal of topsoil would result in exposure to effects of weathering of the underlying subsoil layers which will lead to subsoil erosion. The subsoil layer mainly consists of sandy gravels or gravelly sands which can be reused for non-structural fill. Any impact resulting from excavation will be permanent, negligible in magnitude and imperceptible in significance. Given the foundations are likely to be piled and that other infrastructure will be installed at relatively shallow depths, the development site works, and excavation works in the construction phase will not be at depths which will impact on the underlying bedrock geology.

Noise & Vibration

Results of Preliminary Ground Investigation (Section 7.4.2.1) indicates that piling will be required for the substructure of the apartment blocks. The concrete operations associated with the foundation will require the use of piling equipment, concrete batching on site and concrete deliveries to the site. Noise and vibration will be generated through the construction phase particularly during piling and excavation work and these impacts are considered in detail in Chapter10 – Noise and Vibration

Storage and Stockpiles

The removal of topsoil, overburden material and the treatment of those materials shall require its temporary storage, handling, and reuse of a portion of this material on site. The impact is classified as having a negative quality, slight significance, and temporary duration.

Export of Material from Site

It is envisioned that the majority of excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. EPA agreement will be obtained before re-using the spoil as a by-product. Where material cannot be reused off site it will be sent for recovery or disposal at an appropriately authorised facility.

Construction traffic

The increased traffic in the development area during the construction effects the existing subsoil layer within the site. The regular movement of heavy machinery, earthwork plants and vehicles delivering construction materials to and from the site results in erosion as well as deposition of mud and dust generation to the surrounding road network. The magnitude of this potential impact is a negative effect, of imperceptible significance and of temporary duration.

Soil Pollution

Risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination is one of the potential impacts during the construction phase. For example, oils, fuels, and lubricant stored at the site, leakage or spillage of oils or fuels from construction machinery and use of concrete during construction. It results in permanent negative impact on the soils. The impact of accidental spillages on soils is negligible in magnitude and imperceptible in significance.

7.5.2.2 Operational Phase

7.5.2.2.1 Phase 1 – The Meadows

The following risks have been considered in relation to the operational phase of the development: During the operational phase there is only a potential for localized leaks and spillages from storage tanks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental emissions of oil, petrol or diesel or leakage of foul sewage from sewer could cause soil contamination if the emissions are unmitigated.

These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined in Section 7.6.1

7.5.2.2.2 Phase 2 – The Farm

The following risks have been considered in relation to the operational phase of the development: During the operational phase there is only a potential for localized leaks and spillages from storage tanks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental emissions of oil, petrol or diesel or leakage of foul sewage from sewer could cause soil contamination if the emissions are unmitigated.

These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined in Section 7.6.1

Demolition

During the demolition phase approximately 350 m^3 of Made Ground, buildings and surface paving will be excavated as part of the site clearance works and removal of existing underground services (foul and storm sewer pipe work, and electrical ducting). The potential impact pertaining to the proposed development with regard to land and soil involves the removal of the existing structures and services on site and the excavation and disposal of material to allow the development to be constructed. The demolition works will have a neutral, insignificant, temporary effect at the local/ site scale on the soils and geology beneath the site.

7.5.2.2.3 Combined Phase 1-The Meadows and Phase 2- The Farm

Given the nature of the scheme the combined Phase 1 and Phase 2 impacts are the same as outlined individually for Phase 1 and Phase 2.

7.6 Mitigation Measures, Monitoring and Residual Impacts

7.6.1 Mitigation & Monitoring

7.6.1.1 Construction Phase

7.6.1.1.1 Phase 1 – The Meadows

In order to minimize the impact of the construction phase on the Land and soil environment, the following measures will be incorporated to mitigate any potential effects:

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. Keeping the surface area of exposed soils in the construction areas to a minimum is the most effective way of preventing the release of dust in dry weather and suspended sediments in wet conditions. Potential impacts are therefore avoided.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil will be re-used where possible in new landscaped areas. Soft materials and surplus soils that are excavated will be reused, for bunds, landscaping etc.
- Disturbed subsoil layers will be stabilised as soon as practicable. Therefore, backfilling of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping, will all be carried out promptly to minimise the duration that subsoil layers are exposed to weather effects.
- Similar to the storage of the stripped topsoil, stockpiles of excavated subsoil will be protected for the duration of the work. Stockpiles of subsoil material will be located separately from topsoil stockpiles.
- Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site. This will help reduce the surface area of disturbed ground which will limit the potential for soil compaction, sediment runoff or dust generation.
- Refuelling and servicing of construction machinery will take place in a designated hardstanding area. Care and attention will be taken during refuelling and maintenance operations. All potentially harmful substances (e.g., oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds. All oils, fuels, paints, and other chemicals will be stored in bunded tanks with the provision of a retention capacity of 110% of the stored material.
- Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996 (as amended).
- Inspection of fuel / oil storage areas. Petrol interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.
- Monitoring of contractor's stockpile management (e.g., protection of excavated material to be reused as fill, protection of soils for removal from site from contamination)

7.6.1.1.2 Phase 2 – The Farm

In order to minimize the impact of the construction phase on the Land and soil environment, the following measures will be incorporated to mitigate any potential effects:

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. Keeping the surface area of exposed soils in the construction areas to a minimum is the most effective way of preventing the release of dust in dry weather and suspended sediments in wet conditions. Potential impacts are therefore avoided.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas. Limiting activities to work areas and not allowing machinery or construction activity in proposed future green, open space and/or undeveloped areas will ensure that there is no dust or sediment runoff generated. Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil will be re-used where possible in new landscaped areas. Soft materials and surplus soils that are excavated will be reused, for bunds, landscaping etc.
- Disturbed subsoil layers will be stabilised as soon as practicable. Therefore, backfilling of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping, will all be carried out promptly to minimise the duration that subsoil layers are exposed to the weather effects.
- Similar to the storage of the stripped topsoil, stockpiles of excavated subsoil will be protected for the duration of the work. Stockpiles of subsoil material will be located separately from topsoil stockpiles.
- Earthwork plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site. This will help reduce the surface area of disturbed ground which will limit the potential for soil compaction, sediment runoff or dust generation.
- Refuelling and servicing of construction machinery will take place in a designated hardstanding area. Care and attention will be taken during refuelling and maintenance operations. All potentially harmful substances (e.g., oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds. All oils, fuels, paints, and other chemicals will be stored in bunded tanks with the provision of a retention capacity of 110% of the stored material.
- Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996 (as amended).
- Inspection of fuel / oil storage areas. Petrol interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.
- Monitoring of contractor's stockpile management (e.g., protection of excavated material to be reused as fill, protection of soils for removal from site from contamination)

7.6.1.1.3 Combined Phase 1 The Meadows and Phase 2 The Farm

Given the nature of the scheme the combined Phase 1 and Phase 2 construction mitigation measures are the same as outlined individually for Phase 1 and Phase 2 above.

7.6.1.2 Operational Phase

7.6.1.2.1 Phase 1 The Meadows

On completion of the construction phase no further mitigation measures are proposed as there will be no further impact on soils and the geological environment.

Management of hydrocarbon interceptors on stormwater outfalls will continue under Management Company control.

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

7.6.1.2.2 Phase 2 The Farm

On completion of the construction phase no further mitigation measures are proposed as there will be no further impact on soils and the geological environment.

Management of hydrocarbon interceptors on stormwater outfalls will continue under Management Company control.

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

7.6.1.2.3 Combined Phase 1 The Meadows and Phase 2 The Farm

Given the nature of the scheme the combined Phase 1 and Phase 2 operational mitigation measures are the same as outlined individually for Phase 1 and Phase 2 above.

7.6.2 Residual Impacts of the proposed development

7.6.2.1 Phase 1 – The Meadows

Following the implementation of mitigation measures, the predicted residual impacts of the Phase 1 – 'The Meadows' development on land and soils during both construction and operational phases are predicted to be reduced to a neutral effect on quality with imperceptible significance.

7.6.2.2 Phase 2 – The Farm

Following the implementation of mitigation measures, the predicted residual impacts of the Phase 2 – 'The Farm' development on land and soils during both construction and operational phases are predicted to be reduced to a neutral effect on quality with imperceptible significance.

7.6.2.3 Combined Phase 1 The Meadows and Phase 2 The Farm

Following the implementation of mitigation measures, the predicted residual impacts of the Phase 1 and Phase 2 Combined on land and soils during both construction and operational phases are predicted to be reduced to a neutral effect on quality with imperceptible significance.

7.7 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan.

The assessment of the potential impacts on the environment of the Cork City Development Plan 2015was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 3, Soil as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

To protect and enhance the soil and 'Greenfield' resources of the City.

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 3 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in the most positive interaction for most of the soil resources with EPO 3.

The projects in the area which have been assessed in terms of cumulative effects are outlined in chapter 1 of this EIAR.

A number of developments are proposed and permitted in the vicinity of the proposed development and the potential for cumulative impacts with these projects were considered. These include:

Table 7. 8: Potential cumulative Effects (permitted proposed developments)

Application	Applicant(s)	Description	Outcome/Current Status
Cork City Council Ref: 17/37565	Denis O'Brien Developments (Cork) Ltd	Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping drainage and amenity areas	Granted by way of Material Contravention of City Development Plan on 24/04/2018 Crawford Gate Development. Last phase recently completed
Cork City Council Ref: 18/37820	Bessborough Warehouse Holdings Ltd	The demolition and removal of the existing warehouse/ distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three-storey apartment block (comprising 20 no. apartments) and 1 no. creche.	Granted by way of Material Contravention of City Development Plan on 28/02/2019 Construction underway
Cork City Council Ref: 21/40481	The Bessborough Centre Limited	Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works.	Conditional Grant on the 13/12/2021
Cork City Council Ref: 2140503	The Bessborough Centre Limited	Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil	Conditional Grant on the 22/12/2021
Cork City Council Ref: 2140453	First Step Homes Ireland Limited	Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works.	Conditional Grant on 17/1/2022
Cork City Council		Phase – 3 'North Fields' Construction of 200 no. apartments consisting of 5 no. 3-bedroom apartments, 100 no. 2-bedroom apartments, 92 no. 1-bedroom apartments, and 3 no. studio apartments.	Proposed future development

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021:

Table 7. 9: Potential cumulative Effects (Refused proposed development)

Application	Applicant(s)	Description	Outcome/Current Status
An Bord Pleanala Ref: ABP-308790-20	MWB Two Limited	Permission for the construction of a strategic housing development of 179 number residential units. Bessborough, Ballinure, Blackrock, Co Cork	Refused on the 25/05/2021 on basis of prematurity related to resolution of matters concerning a potential burial ground on the site
Cork City Council Ref: 2039705/ABP-309560-1	MWB Two Limited	Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessborough, Ballinure, Blackrock, Co Cork.	Refused on the 15/07/2021 as would result in Haphazard form of Development. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential.

7.7.1 Construction Phase

7.7.1.1 Phase 1 – The Meadows

Cumulatively these other proposals do not affect the land/soil and bedrock criteria ratings used for the Phase 1 – 'The Meadows' development and will not influence the proposed construction works given their scale and distance from the project. The potential for any further impact when considered in combination with other known projects in the immediate area, was found to have no potential for significant cumulative impacts on land, soils, and geology.

Therefore, the significance of the impact of the Phase 1 – 'The Meadows' development for construction activities is imperceptible and is considered not to change in combination with the other projects.

7.7.1.2 Phase 2 – The Farm

Cumulatively these other proposals do not affect the land/soil and bedrock criteria ratings used for the Phase 2 – 'The Farm' development and will not influence the proposed construction works given their scale and distance from the project. The potential for any further impact when considered in combination with other known projects in the immediate area, was found to have no potential for significant cumulative impacts on land, soils, and geology.

Therefore, the significance of the impact of the Phase 2 – 'The Farm' development construction activities is imperceptible and is considered not to change in combination with the other projects.

7.7.1.3 Combined Phase 1 and Phase 2

Based on the combined assessment of impacts on land, soils, and geology of the Phase 1 – 'The Meadows' and Phase 2 – 'The Farm' and other developments (listed in the Table 7. 8 and Table 7. 9), it is concluded that these two phases' developments will not act in combination with those projects to result in likely significant construction phase cumulative impacts on the existing land and soil.

Therefore, no significant combined cumulative impacts were identified during the construction phase of the proposed development.

7.7.1.4 Combined Masterplan Area (including Phases 1-3)

There are no predicted cumulative impacts on land and soil arising from the construction phase of the combined masterplan area including Phase 1 - 'The Meadows', Phase 2 – 'The Farm' and Phase 3 'The North Fields' in combination with other developments (listed in the Table 7. 8 and Table 7. 9) in the vicinity.

7.7.2 Operational Phase

7.7.2.1 Phase 1 – The Meadows

No significant cumulative impacts on the land and soil environment are anticipated during the operational phases of the Phase 1 – 'The Meadows' development as long as mitigation measures outlined are put in place.

All developments will be required to manage sites in compliance with legislative standards for receiving water quality. Therefore, the cumulative impact is concluded to be neutral and imperceptible in relation to water.

7.7.2.2 Phase 2 – The Farm

No significant cumulative impacts on the land and soil environment are anticipated during the operational phases of the Phase 2 – 'The Farm' development as long as mitigation measures outlined are put in place.

All developments will be required to manage sites in compliance with legislative standards for receiving water quality. Therefore, the cumulative impact is concluded to be neutral and imperceptible in relation to water.

7.7.2.3 Combined Phase 1 and Phase 2

Based on the combined assessment of impacts on land, soils, and geology of the Phase 1 – 'The Meadows' and Phase 2 – 'The Farm' and other developments (listed in the Table 7. 8 and Table 7. 9), it is concluded that these two phases' developments will not act in combination with those projects to result in likely significant operational phase cumulative impacts on the existing land and soil.

Therefore, no significant combined cumulative impacts were identified during the operational phase of the proposed development.

7.7.2.4 Combined Masterplan Area (including Phases 1-3)

No impacts from combined masterplan area including Phase 1 - 'The Meadows', Phase 2 – 'The Farm' and Phase 3 'The North Fields' in combination with other developments (listed in the Table 7. 8 and Table 7. 9) on land and soil were identified during the operational phase of the proposed development.

7.8 Interactions

Land and Soils interactions are primarily linked to the environmental factors listed below. These interactions, and the impacts being considered, are identified in the relevant Chapters.

Chapter 8 – Water (Hydrology & Hydrogeology) – Risk of Soil Pollution and associated groundwater pollution during the construction phase.

Chapter 12: Air Quality – The potential for dust generated through the Construction Phase particularly during the pilling and excavation works.

Chapter 10: Noise and Vibration: Noise and vibration will be generated through the Construction Phase particularly during the pilling and excavation works.

Chapter 5: Material Assets: Traffic & Transportation: Traffic will be generated through the Construction Phase particularly the land and soils encountered requiring removal off site during the excavation works.

7.9 Difficulties in Compiling Information

No difficulties were encountered during the preparation of this chapter of the EIAR.

This EIAR Chapter was developed utilising preliminary Ground Investigation which will be supplemented (pending consent) at detailed design. It should be noted that the ground investigations were focused having regard to the legacy issues on the wider Bessborough Estate, with the location agreed with the cultural heritage consultant and works themselves monitored by the forensic archaeologist..

7.10 References

Geological Survey of Ireland (GSI) On-line Geological Datasets

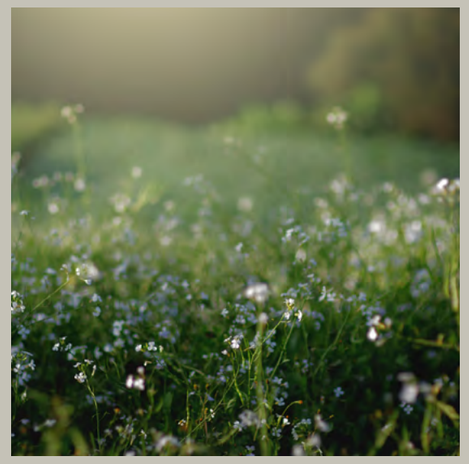
Environmental Protection Agency. “Guidelines on the Information to be Contained in Environmental Impact Assessment Reports” (EPA 2017).

The Institute of Geologists of Ireland, Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013)

Environmental Protection Agency Envision Environmental Maps - Subsoil Data (online).

Ordnance Survey of Ireland On-Line Geohive Web Based Mapping, (online).

Geological Survey of Ireland National Bedrock Aquifer / Vulnerability Maps – (online).



BESSBOROUGH, CORK

CHAPTER 8

Water (Hydrology & Hydrogeology)

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8 Chapter 8: Water (Hydrology and Hydrogeology)

8.1 Introduction

8.1.1 Chapter Context

This section of the EIAR describes the existing water bodies in the vicinity of a proposed Strategic Housing development located at Bessborough, Ballinure, Blackrock, Cork. The proposed development comprises two planning applications to An Board Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in 'Chapter 2 – Project Description'.

This chapter provides an assessment of the likely significant effects on the nearby water bodies (surface water and groundwater) during the construction, and operational phases of the proposed development. In this chapter the potential impacts during the Construction and Operational phase are discussed and assessed. Appropriate mitigation measures to limit any significant impacts to water – hydrology and hydrogeology are recommended, and any residual impacts are also identified.

8.1.2 Methodology

8.1.2.1 Guidance

The Water (Hydrology and Hydrogeology) section of the EIAR is prepared in accordance with the following guidelines:

- 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 Scoping 2017;
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements by the Institute of Geologists of Ireland (IGI, 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018;
- EPA (2017). Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports;
- Water Framework Directive 2000/60/EC;
- S.I. No. 41 of 1999: Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249 of 1989: Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
- S.I. No. 439 of 2000: Quality of Water intended for Human Consumption Regulations and S.I. No. 278 of 2007 European Communities (Drinking Water No. 2) Regulations, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the Drinking Water Directive) and WFD 2000/60/EC (the Water Framework Directive);
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010;

The impacts on the following were assessed:

- Regional water regime: Flow and water quality;
- Local water regime: Flow and water quality;
- Flooding;
- Bedrock aquifer (resource);

Groundwater vulnerability (water quality) and Groundwater supply.

8.1.2.2 Site investigation

The following surveys / investigations were undertaken to inform this Chapter:

- A detailed topographical survey of the area was carried out and this survey, along with a walkover of the site, provided information on drainage patterns.
- A flood risk assessment for the proposed development was completed by J B Barry & Partners.
- Site Investigation (Priority Geotechnical Ltd. January 2022).

A preliminary ground investigation was carried out to establish subsurface conditions at the proposed project site by Priority Geotechnical Ltd in January 2022. Groundwater monitoring standpipes were included as part of this investigation.

Refer to section 8.4 of the chapter for detailed description of the site investigation.

8.1.2.3 Assessment methodology

As detailed in EPA (2017) Draft Guidelines on the information to be contained in Environmental Impact Assessment Report, where more specific definitions exist within a specialised factor or topic these should be used in preference to these generalised definitions. Using this rationale, the methodology follows the information from the Appendix C2 NRA Guidance and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013). An estimation of the Importance of the feature for hydrogeology within the study area is assessed using the criteria set out in Table 8. 1.

Table 8.1: Criteria for Rating Site Importance of Hydrogeological Features (NRA, 2008)

Importance	Criteria	Typical example
Extremely High	Attribute has a high quality or value on an international scale.	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – e.g. NHA status. Regionally important potable water source supplying >2500 homes. Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer. Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale.	Poor Bedrock Aquifer. Potable water source supplying <50 homes.

Estimation of the Magnitude of the impact on the feature (Hydrogeology attribute) from the proposed development is given in Table 8. 2.

Table 8.2: Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeology Attribute (NRA, 2008)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and/or quality and integrity of attribute.	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute.	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute.	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity.	Calculated risk of serious pollution incident <0.5% annually.

Determining the Significance of the impact on the feature (hydrogeology attribute) based on the Importance of the feature and the Magnitude of the impact is given in Table 8. 3.

Table 8.3: Rating of Significant Environmental Impacts at EIS Stage (NRA, 2008)

Importance of Attribute	Magnitude of Impact			
	Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Profound/ Significant

Importance of Attribute	Magnitude of Impact			
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/ Moderate

8.1.3 Sources of information

The information on hydrology and hydrogeology underlying the proposed development site was obtained through assessing databases and archives available. The following are the sources of datasets for this chapter:

- Environmental Protection Agency (EPA) – database information and website mapping
- EPA/Water Framework Directive Map Viewer (www.catchments.ie)
- National Flood Hazard Mapping (www.floodinfo.ie) – past flood event data
- Geological Survey of Ireland (GSI) On-line Geological datasets (www.gsi.ie)
- National Parks & Wildlife Services (NPWS) - Public Map Viewer (www.npws.ie)

8.2 Description of Existing Baseline Environment

8.2.1 Regional Hydrology & Water Quality

On a regional scale, the study area is located within the Hydrometric Area No.19 which is the EPA classification for the catchments. The proposed site is within Glasheen(Corkcity)_SC_010 sub-catchment, which is within the River Lee, Cork Harbour and Youghal Bay catchment under Water Framework Directive (WFD). Togher and Douglas are included in this hydrometric area. This Hydrometric Area falls within the South Western River Basin District which is the Water Framework Directive (WFD) designated catchment for the local area that also includes Togher and Douglas.

The largest urban centre in hydrometric area 19 is Cork City. Other suburbs areas within the hydrometric area includes Blarney, Midleton and Macroom. Hydrometric Area 19 is 1,732km^2 in area with ground elevations ranging from sea level to over 500mOD.

The European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy, commonly known as the Water Framework Directive (WFD). The WFD is an important piece of environmental legislation which aims to improve the water quality. The WFD classification scheme for water quality includes five status classes: high, good, moderate, poor, and bad.

'High status' is defined as the biological, chemical and morphological conditions associated with no or very low human pressure. This is also called the 'reference condition' as it is the best status achievable - the benchmark. Assessment of quality is based on the extent of deviation from these reference conditions. 'Good status' means a 'slight' deviation from this condition, 'moderate status' means 'moderate' deviation, and so on.

The Lough Mahon water body in the vicinity of the site is categorised on the EPA Water Quality Map as a transitional waterbody. EPA sampling of watercourses dating from 2013 – 2018 WFD assessment indicates that it had a 'moderate' status. The Lough Mahon transitional water body and Douglas River estuaries are identified as being 'at risk' of not meeting the WFD objectives.

The water quality within the designated water courses will be particularly affected by the quantity and quality of surface water run-off from the adjacent lands. Poor construction and water management practices during the construction phase have the potential to impact on local surface water quality. Mitigation measures (refer to Section 8.8) will ensure that surface runoff from the developed areas of the site will be of a high quality and will therefore not impact on the status of downstream surface water bodies.

The Lough Mahon surface water body in the vicinity of the site is categorised on the EPA Water Quality Map as a transitional waterbody. EPA sampling of watercourses dating from 2013 – 2018 WFD assessment indicates that it had a 'moderate' status. The Lough Mahon transitional water body and Douglas River estuaries are identified as being 'at risk' of not meeting the WFD objectives.

The water quality within the designated water courses will be particularly affected by the quantity and quality of surface water run-off from the adjacent lands. Poor construction and water management practices during the construction phase have the potential to impact on local surface water quality. Mitigation measures (refer to Section 8.8) will ensure that surface runoff from the developed areas of the site will be of a high quality and will therefore not impact on the status of downstream surface water bodies.

The site is underlain by the Ballincollig groundwater body (IE_SW_G_002). EPA sampling from the 2013 – 2018 WFD assessment indicates that it had a 'good' status (refer Table 8. 4). The risk of not meeting the WFD objectives is presently under review.

Table 8. 4: Ballincollig GWB WFD Status

Overall Groundwater Status	Good
Quantitative Groundwater Status	Good
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Quantitative Status Test	Good
Groundwater Dependent Ecosystems (GWDTE) - Quantitative Assessment Test	Good
Water Balance Test	Good
Chemical Groundwater Status	Good
Saline (or Other) Intrusions Test	Good
Impact of Groundwater on Surface Water Ecological/Chemical Status Test	Good
Groundwater Dependent Ecosystems (GWDTE) - Chemical Assessment Test	Good
Drinking Water Protected Area Test	Good
General Chemical Assessment Test	Good

Mitigation measures (refer to Section 8.6.1) will ensure that surface runoff from the developed areas of the site will be of a high quality and will therefore not impact on the status of underlying groundwater bodies.

8.2.2 Local Hydrology & Water Quality

The proposed development site does not contain any mapped watercourse. The nearest watercourse to the proposed development site is River Douglas estuary which is located approximately 180m to the south of the Phase 1 'The Meadows' and 220m to the south of the Phase 2 'The Farm'. River Douglas estuary flows in an easterly direction and discharges to transitional water body Lough Mahon to the south of the site. Most of the site appears to be well

drained from observation during the site visits. The main hydrological features associated with the development site are presented in Figure 8. 1.

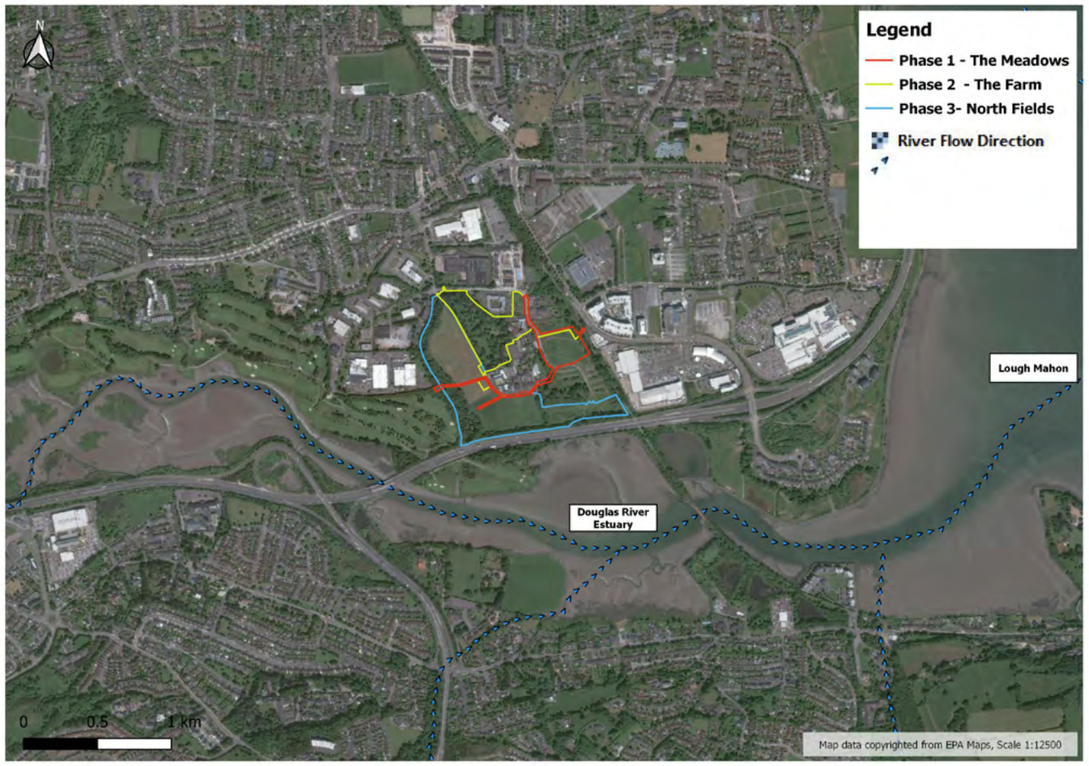

Figure 8. 1: Hydrological Features

8.2.3 Flood risk

The National Flood Hazard Mapping website operated by the OPW (www.floodinfo.ie) has collated records of historic flooding events throughout Ireland. According to the National Flood Hazard Mapping there was no record of historic flooding at the site of the proposed development. The nearest floods to have occurred to the proposed development site occurred in Douglas in 2002 and 2012 and in Rochestown in 2014.

The development site is not identified as an area susceptible to flooding and no history of flooding at the site by the Cork City Development Plan and CFRAM mapping. The CFRAMS Map and Cork City Council Flood Map both indicate that the site lies outside of Flood Zones A and B and can therefore be considered to be located within Flood Zone C.

A site-specific Flood Risk Assessment has been carried out by J B Barry and Partners for the proposed development site and this FRA confirms that the site is located in Flood Zone C, the lowest flood risk designation.

Therefore, the proposed development is deemed 'Appropriate' in accordance with the Office of Public Work (OPW) Flood Risk Management Guidelines.

Refer to Appendix 8.1 and Appendix 8.2 Flood Risk Assessment (FRA) reports.

8.2.4 Bedrock Aquifer

The Geological Survey of Ireland has classified the aquifer based on the groundwater resources and hydrological characteristic (such as the area extent, well yield, specific capacity and groundwater throughput). There are three main types of aquifers namely, Regionally Important Aquifer, Locally Important Aquifer and Poor Aquifer. Each of these three main categories is further subclassified (refer Table 8. 5)

Table 8. 5: Main categories of Bedrock Aquifer

Aquifer Type	Description	Code
Regionally Important (R)	Karstified (diffuse)	(Rkd)
	Karstified (conduit)	(Rkc)
	Fissured	(Rf)
	Extensive sand & gravel	(Rg)
Locally Important (L)	Sand and gravel	(Lg)
	Bedrock which is Generally Moderately Productive	(Lm)
	Bedrock which is Moderately Productive only in Local Zones	(Ll)
	Locally important karstified bedrock	(Lk)
Poor (P)	Bedrock which is Generally Unproductive except for Local Zones	(PL)
	Bedrock which is Generally Unproductive	(Pu)

According to the GSI Mapping, the Phase 1 'The Meadows' and Phase 2 'The Farm' development site is underlain by 'Regionally Important Aquifer' which is Karstified bedrock dominated by diffuse flow (Rkd). In this type of aquifer groundwater flows mainly diffusely through solutional-enlarged fissures. The Bedrock Aquifer map for the Phase 1 'The Meadows' and Phase 2 'The Farm' is presented below (refer Figure 8. 2). An east west trending Bedrock fault is noted crossing the northern extents of both proposed Phase 1 'The Meadows' and Phase 2 'The Farm' development sites.

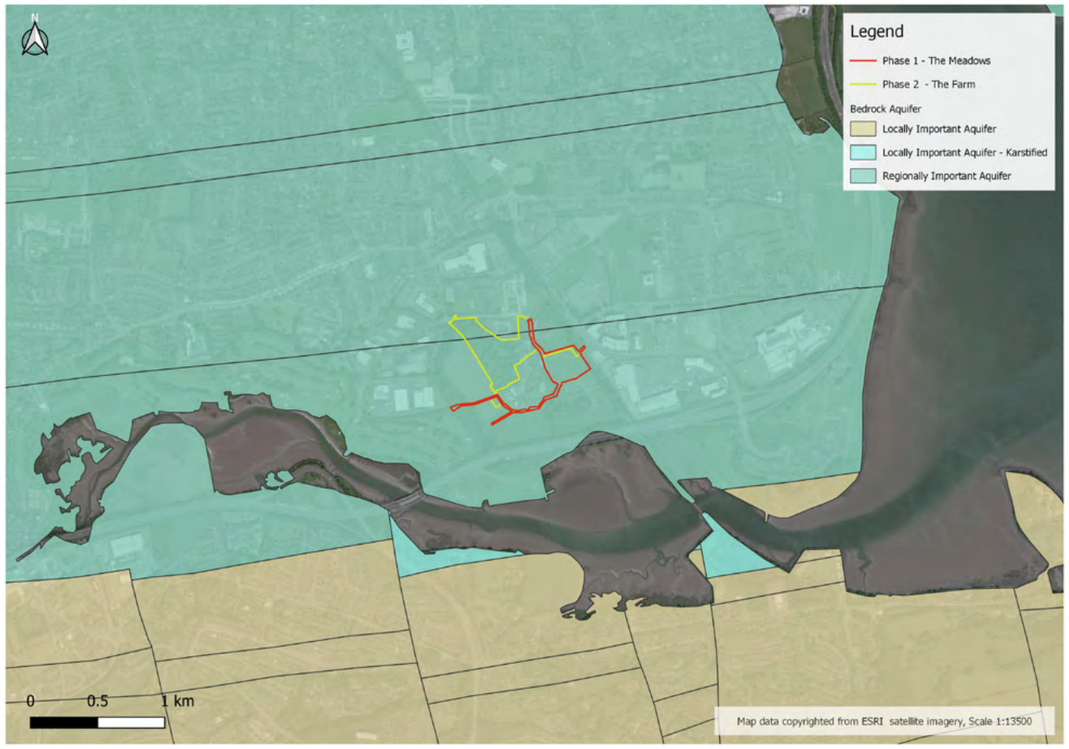

Figure 8. 2: Bedrock aquifer

8.2.5 Groundwater Vulnerability

According to GSI, the Groundwater Vulnerability represents the intrinsic geological and hydrogeological characteristics that determine the ease at which groundwater may be contaminated by human activities. The vulnerability of the groundwater depends on the time travel of infiltrating water, the quantity of contaminants that reach the groundwater and the contaminant attenuation capacity of the geological materials through which the water and contaminants infiltrate. The final vulnerability rating of an area is determined by the permeability and thickness of the subsoils underlying the groundwater, and the type of recharge sources (diffuse or point source). Therefore, areas where the infiltrating water and contaminants move faster from land to groundwater with high permeability are more vulnerable.

Based on the geological and hydrogeological characteristics, groundwater vulnerability is divided into four main categories: Extreme (E), High (H), Moderate (M) and Low (L) as shown in Table 8. 6.

Table 8. 6: Main categories of groundwater vulnerability

Vulnerability Rating 2312	Hydrological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High Permeability (sand/gravel)	Medium Permeability (Sandy subsoil)	Low Permeability (Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30m radius)
Extreme (E)	0 – 3.0m	0 - 3.0m	0 – 3.0m	0 – 3.0m	n/a
High (H)	>3.0m	3.0-10.0m	3.0 – 5.0m	>3.0m	n/a
Moderate (M)	n/a	>10.0m	5.0 – 10.0m	n/a	n/a
Low (L)	n/a	n/a	>10.0m	n/a	n/a

n/a = not applicable

Precise permeability values cannot be given at present

Release point of contaminants is assumed to be 1-2m below ground surface

According to the GSI the vulnerability classification for the proposed development site is 'High (H)' likely based on the presence of high permeability sand and gravel subsoils. There were no karst features identified adjacent to the site. The groundwater vulnerability map for the Phase 1 'The Meadows' and Phase 2 'The Farm' is presented below in Figure 8. 3.

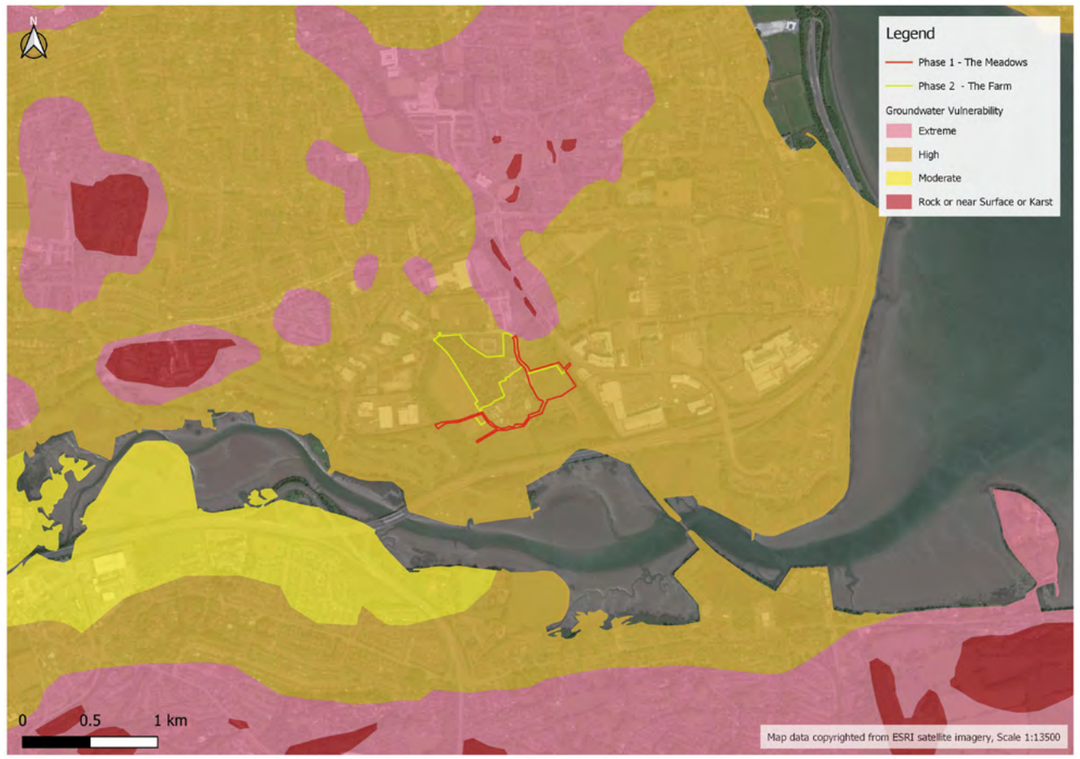

Figure 8. 3: Groundwater vulnerability

8.2.6 Groundwater Supply

The Water Framework Directive (WFD) provides for the protection, improvement, and sustainable use of waters, including rivers, lakes, coastal waters, estuaries, and groundwater within the EU Member States. It aims to prevent deterioration of these water bodies and enhance the status of aquatic ecosystems; promote sustainable water use; reduce pollution; and contribute to the mitigation of floods and droughts.

A search of private well locations (wells with location accuracy of 1km, 100m and 50m were sought) was undertaken using the GSI well database (www.gsi.ie). The well 10-50B (50km mapped accuracy) located 1.6 km to the southwest and well 100-50B (100km mapped accuracy) located 1.5km to the northwest of the construction site. A cluster of 3 no. wells (1km mapped accuracy) within 2km from the site. No wells were mapped in the area of the proposed development site. Based on the GSI well database, there are no mapped source zones (Group Scheme and Public Supply Source Protection Areas) mapped within ~3km of the development site.

GSI mapping of 'Groundwater Wells and Springs' indicates that there are five no. wells recoded within the 2 km study area as shown on Figure 8. 4 and detailed below in Table 8. 7.

Table 8.7: Groundwater wells

GSI Name	Townland	Well type	Depth	Use	Yield (m3d)
1705NWW085	KNOCKREA	Borehole	17.4	Other	Poor
1707SWW085	BALLYPHILIP	Borehole	nil	Public supply (Co Co)	Poor
1705NWW001	DOUGLAS	Borehole	47.9	DTB Unknown	Good
1705NWW002	DOUGLAS	Borehole	117.3	DTB Unknown	Poor
1705NWW003	DOUGLAS	Borehole	45.7	Bedrock Met	Good

Groundwater flow is a subdued reflection of the regional topography. The groundwater flow beneath the site will be in a south-easterly direction.

Figure 8. 4: Groundwater supply

8.3 Characteristics of the Proposed Development

8.3.1 Phase 1 – The Meadows

In summary, this proposed development consists of construction of a mixed-use residential development of 280 apartments set out in 4 blocks ranging in height from 1 to 10 storeys.

- A detailed description of the proposed project is contained in Chapter 2 of the EIAR.

Consideration of the Characteristics of the Proposed Development allows for a projection of the 'level of impact' on any particular aspect of the proposed environment that could arise. For this chapter the potential impact on Water is assessed and therefore characteristics of the proposed development that may impact on water bodies.

8.3.1.1 Surface water

The extent, density, and character of the proposed developments within the application site including the density, location of open spaces etc. will affect run-off rates, water quality in adjacent watercourses, groundwater recharge ability and impact existing smaller surface water channels. To facilitate development, it will be necessary to service the proposed development with physical infrastructure which will have the characteristics described below.

The proposed surface water network will include a drainage pipe network, attenuation storage and SuDS features. The restricted discharge from the site will be conveyed in a new surface water pipe laid from the western boundary of 'The Meadows' in a westerly direction across the Bessborough site to connect to an existing 750mm diameter surface water sewer upstream of its connection to the 1350mm diameter surface water pipe which discharges to the Douglas Estuary south of the N40 (refer to Figure 6.1). A legal wayleave is in place across the Bessborough lands immediately to the west of 'The Meadows' development to facilitate this connection.

In order to fully control the surface water runoff from the development interception and attenuation storage will be provided. This will be by a combination of source control interception - Sustainable Urban Drainage System along with attenuation storage.

The proposed interception storage will be provided by SuDS features such as:

- Green roof - this allows the roof areas of the proposed apartments to use a Sedum type covering to absorb the first 'flush' from rainfall events.
- Permeable paving - this system allows rainwater to be directed into carparking bays whereby the rainwater can filter through gaps in the paving blocks and percolate into the subsoil.
- Swales – are broad and shallow channels covered by grass or vegetation that allows the water runoff to store or infiltrate the water through ground
- Tree pits - to allow storm water to be directed locally into tree pits for prevent this storm water from entering the main drainage network.

The surface water strategy for the development will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Within the development site, the surface water runoff will be collected to a range of source control SuDS before discharging to a storm sewer which will convey the flows towards the natural low point at the south of the site into StormTech attenuation tanks before ultimate discharge via existing stormwater outfall.

Surface water runoff directed to the SuDS features will therefore benefit from their pollutant removal qualities. However, to ensure water quality standards are met, dedicated attenuation facilities that are sized on the basis of a design storm with 100-year return period will be installed. The proposed rate of surface water discharge from the development will be limited to that of the greenfield runoff for a 100-year storm event.

Grit-sump manholes will also be installed upstream of the two attenuation areas to remove grit from flows to the interceptor and attenuation areas.

8.3.1.2 Potable water supply

Irish Water have a number of ductile Iron watermains running through the vicinity of the proposed development area. A 150mm diameter ductile iron watermain is located in the existing road that forms the eastern boundary of 'The Meadows' development. IW have advised that the connection to serve the development is to be made to this existing main.

The proposed water supply system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Water Infrastructure' (Irish Water);
- 'Water Infrastructure Standard Details' (Irish Water); and
- Building Regulations, Technical Guidance Document Part B 'Fire Safety';

The new site watermain network has been designed to adequately serve the firefighting requirements of the development. Fire hydrants will be provided such that each building will be within 46m of a hydrant and these hydrants will be fully accessible to the fire service.

A bulk water meter will be provided at connections to the various buildings and commercial units and the final supply arrangements will be agreed by way of detailed Connection Applications to Irish Water.

Refer to Chapter 6 Material Assets Infrastructure & Utilities (and associated appendices).

8.3.1.3 Foul water drainage

Wastewater collection within the proposed development will be via a network of 150mm and 225mm diameter gravity sewers, which will direct the flows to the southwest corner of the site. A new gravity sewer will then convey the flows in a westerly direction and will connect directly to the Bessborough wastewater pumping station (refer to Figure 6.3). A legal wayleave is in place across the Bessborough lands immediately to the west of 'The Meadows' development to facilitate this connection.

The proposed foul water drainage system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Wastewater Infrastructure' (Irish Water);
- 'Wastewater Infrastructure Standard Details' (Irish Water);
- Building Regulations, Technical Guidance Document Part H 'Drainage and Waste Water Disposal'; and
- IS EN752, "Drain and Sewer Systems Outside Buildings";

Odours will be generated within the foul drainage system and will require venting in accordance with Irish Water standard details which will ensure the odour issue is imperceptible impact at the connection point to the existing foul sewer network, or at the location of the proposed pumping station.

Refer to Chapter 6 Material Assets Infrastructure & Utilities (and associated appendices).

The overall foul sewer installation will be subject to detailed agreement with Irish Water by way of a Statement of Design Acceptance when final development layouts and infrastructure design is being completed.

8.3.2 Phase 2 – The Farm

In summary, this proposed development provides for the demolition of 10 no. existing agricultural sheds and structures and the construction of 140 apartments over 2 no. retained and repurposed farmyard buildings and 3 no. new blocks.

A detailed description of the proposed project is contained in Chapter 2 of the EIAR.

Consideration of the Characteristics of the Proposed Development allows for a projection of the 'level of impact' on any particular aspect of the proposed environment that could arise. For this chapter the potential impact on Water is assessed and therefore characteristics of the proposed development that may impact on water bodies.

8.3.2.1 Surface water drainage

The extent, density, and character of the proposed developments within the application site including the density, location of open spaces etc. will affect run-off rates, water quality in adjacent watercourses, groundwater recharge ability and impact existing smaller surface water channels. To facilitate development, it will be necessary to service the proposed development with physical infrastructure which will have the characteristics described below.

The proposed surface water network will include a drainage pipe network, attenuation storage and SuDS features. The restricted discharge from the site will be conveyed in a new gravity sewer will convey flows in a southerly direction, from the western boundary of The Farm, joining the proposed surface water sewer from 'The Meadows'. From this point it will continue in a westerly direction connecting to the existing 750mmØ surface water sewer upstream of its connection to the 1350mmØ surface water pipe which in turn discharges to the Douglas Estuary further to the south of the N40 (refer to Figure 6.1).

In order to fully control the surface water runoff from the development interception and attenuation storage will be provided. This will be by a combination of source control interception - Sustainable Urban Drainage System along with attenuation storage.

The proposed interception storage will be provided by SuDS features such as:

- Green roof - this allows the roof areas of the proposed apartments to use a Sedum type covering to absorb the first 'flush' from rainfall events.
- Permeable paving - this system allows rainwater to be directed into carparking bays whereby the rainwater can filter through gaps in the paving blocks and percolate into the subsoil.
- Swales – are broad and shallow channels covered by grass or vegetation that allows the water runoff to store or infiltrate the water through ground.
- Tree pits - to allow storm water to be directed locally into tree pits for prevent this storm water from entering the main drainage network.

The surface water strategy for the development will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Within the development site, the surface water runoff will be collected to a range of source control SuDS before slowly discharging to a storm sewer which will convey the flows towards the natural low point at the south of the site (final storage - StormTech attenuation tanks).

Surface water runoff directed to the SuDS features will therefore benefit from their pollutant removal qualities. However, to ensure water quality standards are met, dedicated attenuation facilities that are sized on the basis of a design storm with 100-year return period will be installed. The proposed rate of surface water discharge from the development will be limited to that of the greenfield runoff for a 100-year storm event.

Grit-sump manholes will also be installed upstream of the attenuation area to remove grit from flows to the interceptor and attenuation area.

8.3.2.2 Potable water supply

Irish Water have a number of ductile Iron watermains running through the vicinity of the proposed development area. Water supply within the development will be served by a network of 150mm, 100mm and 80mmØ watermains. IW have advised that the connection is to be made to the existing 300mmØ ductile iron watermain in Bessborough Road to the north of the site.

The proposed water supply system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Water Infrastructure' (Irish Water);
- 'Water Infrastructure Standard Details' (Irish Water); and
- Building Regulations, Technical Guidance Document Part B 'Fire Safety';

The new site watermain network has been designed to adequately serve the firefighting requirements of the development. Fire hydrants will be provided such that each building will be within 46m of a hydrant and these hydrants will be fully accessible to the fire service.

A bulk water meter will be provided at connections to the various buildings and commercial units and the final supply arrangements will be agreed by way of detailed Connection Applications to Irish Water.

Refer to Chapter 6 Material Assets Infrastructure & Utilities (and associated appendices).

8.3.2.3 Foul water drainage

Wastewater collection within the proposed development will be via a network of 150mm and 225mm diameter gravity sewers, which will direct the flows to the southwest corner of the site. A new gravity sewer will then convey the flows in a westerly direction and will connect directly to the Bessborough wastewater pumping station (refer to Figure 6.3).

The proposed foul water drainage system has been designed and will be constructed in accordance with the requirements of Irish Water and will comply with the following:

- 'Code of Practice for Wastewater Infrastructure' (Irish Water);
- 'Wastewater Infrastructure Standard Details' (Irish Water);
- Building Regulations, Technical Guidance Document Part H 'Drainage and Waste Water Disposal'; and
- IS EN752, "Drain and Sewer Systems Outside Buildings";

Odours will be generated within the foul drainage system and will require venting in accordance with Irish Water standard details which will ensure the odour issue is imperceptible impact at the connection point to the existing foul sewer network, or at the location of the proposed pumping station.

Refer to Chapter 6 Material Assets Infrastructure & Utilities (and associated appendices).

The overall foul sewer installation will be subject to detailed agreement with Irish Water by way of a Statement of Design Acceptance when final development layouts and infrastructure design is being completed.

8.4 Site Investigation

8.4.1 Phase 1 – The Meadows

Ground investigation

A ground investigation was carried out to establish subsurface conditions at the proposed project site by Priority Geotechnical Ltd in January 2022. A summary of ground investigation carried out is provided in the Table 8. 8 below:

Table 8.8: Summary of Ground Investigation Works Undertaken

Contractor	Description of Investigation	Details of Investigation
Priority Geotechnical Ltd	Bessborough SHD, Mahon, Cork Ground Investigation Report No. P21239	Cable Percussion Boreholes (BH04, BH05 and BH06) Trial pits (TP04, TP05 TP06 and TP06A) Dynamic probe (DP04, DP05 and DP06) Falling head Test (BH05)

Refer to Appendix 7.1 Ground Investigation Report (Priority Geotechnical Ltd, Issue date February 2022)

Groundwater

Groundwater was encountered in the trial pits at depths ranging from 3.10m to 3.90m below ground level as detailed in Table 8. 9 below. A falling head permeability test was undertaken in BH05

Table 8.9: Table for Groundwater Depths encountered during Ground Investigation

Location	Ground level (m OD)	Groundwater Depth Strike (m bgl)	Reduced Levels (m OD)
TP04	12.35	3.90	8.45
TP05	12.21	3.90	8.31
TP06A	13.61	3.10	10.51

8.4.2 Phase 2 – The Farm

Ground investigation

A ground investigation was carried out to establish subsurface conditions at the proposed project site by Priority Geotechnical Ltd in January 2022. A summary of ground investigation carried out is provided in the Table 8. 10below:

Table 8. 10: Summary of Ground Investigation Works Undertaken

Contractor	Description of Investigation	Details of Investigation
Priority Geotechnical Ltd	Bessborough SHD, Mahon, Cork Ground Investigation Report No. P21239	Cable Percussion Boreholes (BH01, BH02 and BH03) Trial pits (TP01, TP02 and TP03) Dynamic probe (DP01, DP02 and DP03) Falling Head Test (BH03)

Refer to Appendix 7.1 Ground Investigation Report (Priority Geotechnical Ltd, Issue date February 2022)

Groundwater

A falling head permeability test was undertaken in Borehole BH03 and the falling head permeability test showed results that permeability (K) of the groundwater influence at 2.20m bgl was 1.12E-03 ms^{-1}.

8.5 Potential Impact of the Proposed Development

This sub section addresses the predicted impacts for the proposed development on the existing environment and looks at the possible affects the proposed development may have during the construction and operational phase.

8.5.1 Do-Nothing Scenario

8.5.1.1 Phase 1 – The Meadows

If the proposed development did not proceed, there would be no impact on the underlying aquifer or the current surface water regime at the site.

8.5.1.2 Phase 2 – The Farm

If the proposed development did not proceed, there would be no impact on the underlying aquifer or the current surface water regime at the site.

8.5.1.3 Combined Phase 1 and Phase 2

If the combined Phase 1 and Phase 2 developments did not proceed, there would be no impact on the underlying aquifer or the current surface water regime at the site.

8.5.2 Impacts on Existing Water – Hydrology and Hydrogeology

8.5.2.1 Construction phase

The principal risks associated with the Construction Phase are:

8.5.2.1.1 Phase 1 – The Meadows

Excavation activities

There is potential for surface water or groundwater to be contaminated with pollutants associated with construction activity. Contaminants such as Suspended solids (muddy water with increase turbidity) which arises from the excavation and ground disturbance during the construction phase contribute to contamination of the local groundwater. The removal of topsoil and localised excavations across the site will potentially increase the vulnerability of the underlying groundwater aquifer. However, although the vulnerability rating for the site is high, as mapped by the GSI, it is likely that this is conservative based on the depth of cohesive material encountered during the site investigation works. It is therefore anticipated that the vulnerability status of the site is not considered likely to increase to a higher vulnerability status.

The impact is considered to be is negligible on the groundwater contained within the bedrock aquifer. The impact on the regional groundwater quality is is predicted to be negligible in magnitude and imperceptible in significance, temporary in duration and unlikely.

The risk to the Douglas River is considered to be imperceptible given the distance from the site i.e., 180m south of the site.

Accidental spillage

Accidental oil or fuel spillage during the refuelling of construction plant with petroleum hydrocarbons or leaks from constructive materials have the potential to contaminate the soils and groundwater underlying the site. Accidental spillages could contaminate the aquifer by direct percolation or via the superficial water network. Accidental spillage or leaks may result in localised contamination and as well as adjacent water courses, therefore posing risk of reducing water quality of the waterbodies. The potential impact of construction spillage and leaks have a permanent negative impact on the groundwater. The impact of accidental spillages on soils is negligible in magnitude and imperceptible in significance. It may cause short to long-term impacts on groundwater. Since there's no excavation anticipated to take place into the bedrock, the impact is Negligible on the groundwater contained within the bedrock aquifer. As a result, its significance is imperceptible.

Given lack of an existing surface water network (pathway) and the distance from the site i.e., 180m south of the site. The risk to the Douglas River is considered to be moderate without mitigation measures being put in place.

Concrete wash water

Inappropriate disposal or uncontrolled water runoff of concrete or other cement-based products from construction materials which are highly alkaline, and corrosive have the potential to impact the quality of the underlying aquifer. The magnitude of impact is assessed to be temporary, negligible and imperceptible in significance.

Waste

Solid (municipal) wastes being disposed or blown into watercourses or drainage systems and wastewater arising from poor on-site toilets and washroom have potential to cause pollution effecting the water quality. The magnitude of impact is assessed to be temporary, negligible and imperceptible in significance.

8.5.2.1.2 Phase 2 – The Farm

The principal risks associated with the Construction Phase are:

Excavation activities

There is potential of the water or groundwater to be contaminated with pollutants associated with construction activity. Contaminants such as Suspended solids (muddy water with increase turbidity) which arises from the excavation and ground disturbance during the construction phase contribute to contamination of the local groundwater. The removal of topsoil and localised excavations across the site will potentially increase the vulnerability of the underlying groundwater aquifer. However, although the vulnerability rating for the site is high, as mapped by the GSI, it is likely that this is conservative based on the depth of cohesive material encountered during the site investigation works. It is therefore anticipated that the vulnerability status of the site is not considered likely to increase to a higher vulnerability status.

The impact is considered to be is negligible on the groundwater contained within the bedrock aquifer. The impact on the regional groundwater quality is is predicted to be negligible in magnitude and imperceptible in significance, temporary in duration and unlikely.

The risk to the Douglas River is considered to be imperceptible given the distance from the site i.e., 220m south of the site

Accidental spillage

Accidental oil or fuel spillage during the refuelling of construction plant with petroleum hydrocarbons or leaks from constructive materials have the potential to contaminate the soils and groundwater underlying the site. Accidental spillages could contaminate the aquifer by direct percolation or via the superficial water network.

Accidental spillage or leaks may result in localised contamination and as well as adjacent water courses, therefore posing risk of reducing water quality of the waterbodies.

The potential impact of construction spillage and leaks have a permanent negative impact on the groundwater. The impact of accidental spillages on soils is negligible in magnitude and imperceptible in significance. It may cause short to long-term impacts on groundwater. Since there's no excavation anticipated to take place into the bedrock, the impact is Negligible on the groundwater contained within the bedrock aquifer. As a result, its significance is imperceptible.

Given lack of an existing surface water network (pathway) and the distance from the site i.e., 220m south of the site. The risk to the Douglas River is considered to be moderate without mitigation measures being put in place.

Concrete wash water

Inappropriate disposal or uncontrolled water runoff of concrete or other cement-based products from construction materials which are highly alkaline, and corrosive have the potential to impact the quality of the underlying aquifer. The magnitude of impact is assessed to be temporary, negligible and imperceptible in significance.

Waste

Solid (municipal) wastes being disposed or blown into watercourses or drainage systems and wastewater arising from poor on-site toilets and washroom have potential to cause pollution and effecting the water quality. The magnitude of impact is assessed to be temporary, negligible and imperceptible in significance.

8.5.2.1.3 Combined Phase 1 and Phase 2

The Phase 1 and 2 developments are planned to be constructed sequentially so the individual impacts noted above will take effect over a period of time, with many of the Phase 1 impacts repeated again when the Phase 2 development is taking place.

However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

8.5.2.2 Operational phase

8.5.2.2.1 Phase 1 – The Meadows

There will be little or no potential impact on surface water or groundwater during the operational phase of the development.

Reduction in recharge area

The proposed development will result in a reduction of recharge area due to the introduction of impermeable surfaces such as roofs, roads, and hardstanding areas (having low permeability) which severely restrict recharge. However, the reduction in recharge area is insignificant when compared to the overall total recharge area of the aquifer. Since the aquifer underlying the site is considered to be regionally important aquifer (karstified diffuse), the overall impact on the groundwater resource due to reduction in recharge area will be imperceptible.

Flooding

Surface water run-off discharge rates from the development sites may be increased due to the increase in the area of impermeable surfaces, shorter flow paths through pipes and reduced roughness co-efficient, however the implementation of SuDs features will maintain runoff rates at, or below, existing greenfield runoff rates. Greater run-off volumes generated by the impermeable surfaces will require stormwater storage within the site to provide protection against pluvial flooding events. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development.

To prevent any increased flooding at the proposed development, it is proposed to implement SuDS in order to limit the discharge from the site to the current greenfield discharge rates. The implementation of these SuDS measures will mitigate the risk of flooding outside of the development site. Therefore, any potential impacts arising from this activity may be characterised as imperceptible and neutral.

8.5.2.2.2 Phase 2 – The Farm

There will be little or no potential impact on surface water or groundwater during the operational phase of the development.

Reduction in recharge area

The proposed development will result in a reduction of recharge area due to the introduction of impermeable surfaces such as roofs, roads, and hardstanding areas (having low permeability) which severely restrict recharge. However, the reduction in recharge area is insignificant when compared to the overall total recharge area of the aquifer. Since the aquifer underlying the site is considered to be regionally important aquifer (karstified diffuse), the overall impact on the groundwater resource due to reduction in recharge area will be permanent and imperceptible.

Flooding

Surface water run-off discharge rates from the development sites may be increased due to the increase in the area of impermeable surfaces, shorter flow paths through pipes and reduced roughness co-efficient, however the implementation of SuDs features will maintain runoff rates at, or below, existing greenfield runoff rates. Greater run-off volumes generated by the impermeable surfaces will require stormwater storage within the site to provide protection against pluvial flooding events. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development.

To prevent any increased flooding at the proposed development, it is proposed to implement SuDS in order to limit the discharge from the site to the current greenfield discharge rates. The implementation of these SuDS measures will mitigate the risk of flooding outside of the development site. Therefore, any potential impacts arising from this activity may be characterised as permanent, imperceptible and neutral.

8.5.2.2.3 Combined Phase 1 The Meadows and Phase 2 The Farm

The Phase 1 and Phase 2 developments are to be constructed sequentially (and not in parallel) and also will be become operational sequentially, with Phase 1 being occupied first and the Phase 2 development being occupied later.

In this context the construction impacts of each development as described above will not be additive but will take place over an extended period of time given that the construction work will take place sequentially.

Given that the construction impacts on water and groundwater are considered to be temporary and imperceptible without mitigation for each of the two developments then it is considered that the impact of the two developments combined will also be temporary and imperceptible without mitigation.

Given that the operational impacts on water and groundwater are considered to be imperceptible and neutral for each of the two developments then it is considered that the impact of the two developments combined will also be imperceptible and neutral without mitigation.

8.6 Mitigation Measures, Monitoring and Residual Impacts

8.6.1 Mitigation & Monitoring

8.6.1.1 Construction Phase

8.6.1.1.1 Phase 1 – The Meadows

The main potential impacts are associated with the Construction Phase of the proposed development.

The mitigation measures in relation to maintaining a high quality of surface water runoff from the development and groundwater protection will ensure that the status of both surface water and groundwater bodies in the vicinity of the site will be at least maintained (see WFD water body status and objectives) regardless of their existing status. The following Best Practice Guidance relating to water control will be adhered to at all stages of construction. CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006) and CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

The following mitigation measures will be put in place to minimise and mitigate the potential impacts to the ground and surface water at the site:

- The excavated soil will be temporarily stockpiled and stored away from the any ditch or surface water drainage network to prevent any suspended solids from entering it.
- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored, and disposed of in accordance with recognized standards and manufacturer's guidance. Hazardous construction materials shall be stored appropriately to prevent contamination of watercourses or groundwater.
- All batching and mixing activities will be located in areas away from watercourses and drains. Designated impermeable fuelling areas will be constructed. Fuels, oils, solvents, and other chemicals used during construction will be stored within temporary bunded storage in designated areas of the site. Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996-2011.
- Refuelling of construction vehicles and hydraulic oils or lubricants to vehicles will take place off-site or in designated hardstanding areas away from surface water drainage in order to minimise the potential contamination of the water environment. Spill kits and drip trays will be kept in the designated areas in the events of spillage during refuelling of the construction vehicles and machineries. All relevant personnel will be fully trained in the use of this equipment. Attention and care to be taken during the refuelling and maintenance operation.
- Concrete batching and concrete wash down or wash out of concrete trucks will take place off site or in a designated area with an impermeable surface and appropriate drainage/interception/collection measures in place. Spills of concrete, cement, grout, or similar materials will not be hosed into drains.
- Discharge from any vehicle wheel wash areas is to be directed to onsite settlement areas, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility.
- Regular inspection of surface water run-off and any sediment control measures e.g. silt traps will be carried out during the Construction Phase.
- Regular auditing of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc.

8.6.1.1.2 Phase 2 – The Farm

The main potential impacts are associated with the Construction Phase of the proposed development.

The mitigation measures in relation to maintaining a high quality of surface water runoff from the development and groundwater protection will ensure that the status of both surface water and groundwater bodies in the vicinity of the site will be at least maintained (see WFD water body status and objectives) regardless of their existing status. The following Best Practice Guidance relating to water control will be adhered to at all stages of construction. CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006) and CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

The following mitigation measures will be put in place to minimise and mitigate the potential impacts to the ground and surface water at the site:

- The excavated soil will be temporarily stockpiled and stored away from the any ditch or surface water drainage network to prevent any suspended solids from entering it.
- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored, and disposed of in accordance with recognized standards and manufacturer's guidance. Hazardous construction materials shall be stored appropriately to prevent contamination of watercourses or groundwater.
- All batching and mixing activities will be located in areas away from watercourses and drains. Designated impermeable fuelling areas will be constructed. Fuels, oils, solvents, and other chemicals used during construction will be stored within temporary bunded storage in designated areas of the site. Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996-2011.
- Refuelling of construction vehicles and hydraulic oils or lubricants to vehicles will take place off-site or in designated hardstanding areas away from surface water drainage in order to minimise the potential contamination of the water environment. Spill kits and drip trays will be kept in the designated areas in the events of spillage during refuelling of the construction vehicles and machineries. All relevant personnel will be fully trained in the use of this equipment. Attention and care to be taken during the refuelling and maintenance operation.
- Concrete batching and concrete wash down or wash out of concrete trucks will take place off site or in a designated area with an impermeable surface and appropriate drainage/interception/collection measures in place. Spills of concrete, cement, grout, or similar materials will not be hosed into drains.
- Discharge from any vehicle wheel wash areas is to be directed to onsite settlement areas, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility.
- Regular inspection of surface water run-off and any sediment control measures e.g. silt traps will be carried out during the Construction Phase.
- Regular auditing of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc.

8.6.1.1.3 Combined Phase 1 The Meadows and Phase 2 The Farm

Given the nature of the scheme the combined Phase 1 and Phase 2 construction mitigation measures are the same as outlined individually for Phase 1 and Phase 2 above.

8.6.1.2 Operational Phase

8.6.1.2.1 Phase 1 – The Meadows

With the introduction of these mitigation measures, the significance of the potential operational impacts identified earlier are considered to reduce since they either remove or significantly minimise the source of potential impact and/or place barriers to the pathways for such impact events.

- The Site will be predominantly covered in hardstanding. The impermeable surface will minimise the potential influx of any contaminants into soils and underlying groundwater.
- Surface water runoff arising on site during the operational phase will be directed to the surface drainage system via an appropriate designed system such as petrol or hydrocarbon interceptor and silt traps that removes the contaminants prior to discharge to the soakaways.
- Any accidental leak drainage from car parks or road areas will be discharged will be discharged through appropriate oil interceptor to the drainage system.

- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies and petrol interceptor will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.
- Attenuation will be provided by underground tanks to ensure that the discharge rate is maintained at greenfield runoff rate. The attenuation facility will accommodate rainfall events up to, and including, the 1-in-100-year storm event. 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 Hydro brake flow control devices, with underground attenuation tanks, provided to store runoff from a 1 in 100-year return period event.
- The area of hardstanding on the proposed development site will be increased as a result of the proposed development and will incorporate SuDs requirements. Due to a variety of measures such as the design of the attenuation system with hydrocarbon interception and the design of the wider drainage system in line with SuDS the likelihood of any spills entering the water environment is negligible.
- No future surface water monitoring is proposed as part of the proposed Project due to the low hazard potential at the development.
- Oil interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions.
- Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.
- The performance of all Suds features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed Hydro brake and gullies will be required to prevent contamination and increased runoff from the site.

8.6.1.2.2 Phase 2 – The Farm

With the introduction of these mitigation measures, the significance of the potential operational impacts identified earlier are considered to reduce since they either remove or significantly minimise the source of potential impact and/or place barriers to the pathways for such impact events.

- The Site will be predominantly covered in hardstanding. The impermeable surface will minimise the potential influx of any contaminants into soils and underlying groundwater.
- Surface water runoff arising on site during the operational phase will be directed to the surface drainage system via an appropriate designed system such as petrol or hydrocarbon interceptor and silt traps that removes the contaminants prior to discharge to the soakaways.
- Any accidental leak drainage from car parks or road areas will be discharged will be discharged through appropriate oil interceptor to the drainage system.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies and petrol interceptor will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.
- Attenuation will be provided by underground tanks to ensure that the discharge rate is maintained at greenfield runoff rate. The attenuation facility will accommodate rainfall events up to, and including, the 1-in-100-year storm event. 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 Hydro brake flow control devices, with underground attenuation tanks, provided to store runoff from a 1 in 100-year return period event.
- The area of hardstanding on the proposed development site will be increased as a result of the proposed development and will incorporate SuDs requirements. Due to a variety of measures such as the design of the attenuation system with hydrocarbon interception and the design of the wider drainage system in line with SuDS the likelihood of any spills entering the water environment is negligible.
- No future surface water monitoring is proposed as part of the proposed Project due to the low hazard potential at the development.
- Oil interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions.
- Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.
- The performance of all Suds features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed Hydro brake and gullies will be required to prevent contamination and increased runoff from the site.

8.6.1.2.3 Combined Phase 1 The Meadows and Phase 2 The Farm

Given the nature of the scheme the combined Phase 1 and Phase 2 operational mitigation measures are the same as outlined individually for Phase 1 and Phase 2 above.

8.6.2 Residual Impacts of the proposed development

8.6.2.1 Phase 1 – The Meadows

An overall analysis of the impacts considering the proposed mitigation measures concludes that all of the potential impacts (both construction and operational impacts) are predicted to be reduced to a neutral quality, imperceptible significance.

8.6.2.2 Phase 2 – The Farm

An overall analysis of the impacts considering the proposed mitigation measures concludes that all of the potential impacts (both construction and operational impacts) are predicted to be reduced to a neutral quality, imperceptible significance.

8.6.2.3 Combined Phase 1 The Meadows and Phase 2 The Farm

An overall analysis of the impacts considering the proposed mitigation measures concludes that all of the potential impacts (both construction and operational impacts) of both phases of development are predicted to be reduced to a neutral quality, imperceptible significance.

8.7 Cumulative Impacts of the proposed development

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 4, Water as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *To protect and where necessary improve the quality and management of watercourses and groundwater, in compliance with the requirements of the Water Framework Directive*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a neutral interaction with the status of EPO 4 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in a neutral interaction for most of the water resources with EPO 4.

The projects in the area which have been assessed in terms of cumulative effects are outlined in chapter 1 of this EIAR.

A number of developments are proposed and permitted in the vicinity of the proposed development and the potential for cumulative impacts with these projects were considered. These include:

Table 8. 11: Potential cumulative Effects (permitted proposed developments)

Application	Applicant(s)	Description	Outcome/Current Status
Cork City Council Ref: 17/37565	Denis O'Brien Developments (Cork) Ltd	Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping drainage and amenity areas	Granted by way of Material Contravention of City Development Plan on 24/04/2018 Crawford Gate Development. Last phase recently completed
Cork City Council Ref: 18/37820	Bessborough Warehouse Holdings Ltd	The demolition and removal of the existing warehouse/ distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three-storey apartment block (comprising 20 no. apartments) and 1 no. creche.	Granted by way of Material Contravention of City Development Plan on 28/02/2019 Construction underway
Cork City Council Ref: 21/40481	The Bessborough Centre Limited	Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works.	Conditional Grant on the 13/12/2021
Cork City Council Ref: 2140503	The Bessborough Centre Limited	Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil	Conditional Grant on the 22/12/2021
Cork City Council Ref: 2140453	First Step Homes Ireland Limited	Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works.	Conditional Grant on 17/1/2022
Cork City Council		Phase – 3 'North Fields' Construction of 200 no. apartments consisting of 5 no. 3-bedroom apartments, 100 no. 2-bedroom apartments, 92 no. 1-bedroom apartments, and 3 no. studio apartments.	Proposed future development

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021:

Table 8. 12: Potential cumulative Effects (Refused proposed development)

Application	Applicant(s)	Description	Outcome/Current Status
An Bord Pleanala Ref: ABP-308790-20	MWB Two Limited	Permission for the construction of a strategic housing development of 179 number residential units. Bessborough, Ballinure, Blackrock, Co Cork.	Refused on the 25/05/2021 on basis of prematurity related to resolution of matters concerning a potential burial ground on the site.
Cork City Council Ref: 2039705/ABP-309560-1	MWB Two Limited	Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessborough, Ballinure, Blackrock, Co Cork.	Refused on the 15/07/2021 as would result in Haphazard form of Development. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential.

8.7.1 Construction Phase

8.7.1.1 Phase 1 – The Meadows

No significant cumulative impacts on the water environment are anticipated during the construction phase of the Phase 1 – 'The Meadows' development as long as mitigation measures outlined are put in place.

Therefore, the significance of the impact of the Phase 1 – 'The Meadows' development construction activities is imperceptible and is considered not to change in combination with the other projects.

8.7.1.2 Phase 2 – The Farm

The cumulative residual construction impacts of the Phase 2 – 'The Farm' development and the following projects and plans have been assessed:

No significant cumulative impacts on the water environment are anticipated during the construction phase of the Phase 2 – 'The Farm' development as long as mitigation measures outlined are put in place.

Therefore, the significance of the impact of the Phase 2 – 'The Farm' development construction activities is imperceptible and is considered not to change in combination with the other projects.

8.7.1.3 Combined Phase 1 and Phase 2

Based on the combined assessment of impacts on water- hydrology and hydrogeology of the Phase 1 – 'The Meadows' and Phase 2 – 'The Farm' and other developments (listed in the Table 8. 11 and Table 8. 12), it is concluded that these two phases' developments will not act in combination with those projects to result in likely significant construction phase cumulative impacts on the existing water environment.

Therefore, no significant combined cumulative impacts were identified during the construction phase of the proposed development.

8.7.1.4 Combined Masterplan Area (including Phases 1-3)

There are no predicted cumulative impacts on water quality arising from the construction phase of the combined masterplan area including Phase 1 - 'The Meadows', Phase 2 – 'The Farm' and Phase 3 'The North Fields' in combination with other developments (listed in the Table 8. 11 and Table 8. 12) in the vicinity.

8.7.2 Operational Phase

8.7.2.1 Phase 1 – The Meadows

Based on the overall size of the underlying aquifer and measures to protect soil and water quality there will be no overall change on the groundwater body status. No potential for significant cumulative impacts on water – hydrology and hydrogeology in combination with other projects anticipated during the operational phase of Phase 1 - 'The Meadows'

All developments will be required to manage sites in compliance with legislative standards for receiving water quality. Therefore, the cumulative impact is concluded to be neutral and imperceptible in relation to water.

8.7.2.2 Phase 2 – The Farm

Based on the overall size of the underlying aquifer and measures to protect soil and water quality there will be no overall change on the groundwater body status. No potential for significant cumulative impacts on water – hydrology and hydrogeology in combination with other projects anticipated during the operational phase of Phase 2 – 'The Farm'.

All developments will be required to manage sites in compliance with legislative standards for receiving water quality. Therefore, the cumulative impact is concluded to be neutral and imperceptible in relation to water.

8.7.2.3 Combined Phase 1 and Phase 2

Based on the combined assessment of impacts on water- hydrology and hydrogeology of the Phase 1 – 'The Meadows' and Phase 2 – 'The Farm' and other developments (listed in the Table 8.11and Table 8.12), it is concluded that these two phases' developments will not act in combination with those projects to result in likely significant operational phase cumulative impacts on the existing water environment.

Therefore, no significant combined cumulative impacts were identified during the operational phase of the proposed development.

8.7.2.4 Combined Masterplan Area (including Phases 1-3)

No impacts from combined masterplan area including Phase 1 - 'The Meadows', Phase 2 – 'The Farm' and Phase 3 'The North Fields' in combination with other developments (listed in the Table 8.11 and Table 8.12) on water quality were identified during the operational phase of the proposed development.

8.8 Interactions

Water (Hydrology and Hydrogeology) interactions are primarily linked to the environmental factors listed below. These interactions, and the impacts being considered, are identified in the relevant Chapters.

Chapter 7 – Land, Soils & Geology: Risk of Soil Pollution and associated groundwater pollution during the construction phase.

Chapter 9 - Biodiversity - a key environmental interaction with Water is Biodiversity. A series of mitigation measures are proposed in this Chapter 8 – Water of this EIAR document to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard.

Chapter 6 - Material Assets – Services, Infrastructure & Utilities: - a key environmental interaction with Water is Material Assets – Services, Infrastructure & Utilities which outlines the existing wastewater and surface water networks capacity to facilitate scheme discharges.

8.9 Difficulties in Compiling Information

No difficulties were encountered during the preparation of this chapter of the EIAR.

8.10 References

- Environmental Protection Agency. “Guidelines on the Information to be Contained in Environmental Impact Assessment Reports” (EPA 2017).
- Geological Survey of Ireland National Bedrock Aquifer / Vulnerability Maps – (online).
- Office of Public Works (OPW) Guidelines for Planning Authorities – The Planning System and Flood Risk Management, (OPW 2009).
- Department of the Environment Flooding Guidelines
- Office of Public Works Flood Maps

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CHAPTER 9

Biodiversity

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CHAPTER 9

Biodiversity

CHAPTER 9

9 Biodiversity

9.1 Introduction

This chapter describes the likely significant effects of the proposed development (Phase 1 'The Meadows' and Phase 2 'The Farm') on biodiversity, including flora (plants), fauna (animals), and habitats in both the terrestrial and aquatic environment. Mitigation measures are also described, where applicable or appropriate, that avoid or minimise adverse biodiversity effects.

Chapter 2 provides a full description of the proposed development. Appropriate Assessment (AA) Screenings and Natura Impact Statements (NIS) has also been prepared for the project, and this will be submitted to An Bord Pleanála as part of the planning application documentation.

The potential effects on biodiversity in this chapter should be considered in conjunction with the other chapters of the EIAR including Chapter 2- Project Description, Chapter 4- Landscape and Visual Impact, Chapter 5 - Material Assets – Traffic and Transportation, Chapter 6 – Material Assets Infrastructure and Utilities, Chapter 7 – Land and Soils, Chapter 8 – Water (Hydrology and Hydrogeology), Chapter 11 – Noise and Vibration and Chapter 12 – Air Quality and Climate. A Construction and Environmental Management Plan (CEMP) has also been prepared for Phase 1 'The Meadows' and Phase 2 'The Farm' of the proposed development and have been included **Appendix 2-1 and Appendix 2-2** of the EIAR.

Chapter Context

9.1.1 Relevant Legislation

Flora and fauna in Ireland are protected at a national level by the Wildlife Act 1976, as amended, and the European Communities (Birds and Natural Habitats) Regulations 2011. They are also protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC).

Under this legislation, sites of nature conservation importance are then designated in order to legally protect faunal and floral species and important/vulnerable habitats. The relevant categories of designation are as follows:

- Special Areas of Conservation (SAC) are designated under the European Communities (Birds and Natural Habitats) Regulations 2011 to meet the EU Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) are designated under the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC; and
- Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHA) are listed under the Wildlife (Amendment) Act 2000. A NHA is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated.

9.1.1.1 Relevant European Legislation

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

9.1.1.2 Relevant Irish Legislation

- The Wildlife Act 1976, as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000, the Wildlife (Amendment) Act 2010, Wildlife (Amendment) Act 2012, European Communities (Wildlife Act, 1976) (Amendment) Regulations 2017. (The Wildlife Act);
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- Fisheries (Consolidation) Act, 1959 (as amended), hereafter referred to as the Fisheries Act;
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011);
- The Flora (Protection) Order, 2015 (S.I. No. 356/2015).

9.1.2 Guidance

This chapter of the EIAR follows the Environmental Protection Agency's *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017). It also takes account of the draft *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Environment, Community and Local Government, August 2018), *Guidelines on Ecological Impact Assessment in the UK and Ireland, 2nd edition* (Chartered Institute of Ecology and Environmental Management CIEEM 2016) and *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.1* (CIEEM, 2018). Reference was also made to the following documents where relevant:

- *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)* (European Union (EU), 2017);

- *Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC* (EC Environment Directorate-General, 2018);
- *Guidance on integrating climate changes and biodiversity into environmental impact assessment* (EU Commission 2013);
- *Assessment of plans & projects in relation to N2K sites – Methodological Guidance* (EC 2021);
- *Guidance document on the strict protection of animal species of Community interest under the Habitats Directive* (EC 2021);
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority 2009);
- *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011);
- *A Guide to Habitats in Ireland* (Fossitt, 2000);
- *Guidelines for the treatment of Badgers prior to the construction of National Road Schemes. National Roads Authority, Dublin* (National Roads Authority (NRA) 2005a);
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (National Roads Authority (NRA) 2005b).
- *Guidelines for the treatment of bats during the construction of national road schemes* (National Roads Authority (NRA) 2005c);
- *Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes*. (National Roads Authority (NRA) 2006).
- *Guidelines for the treatment of Otters prior to the construction of National Road Schemes* (National Roads Authority (NRA) 2008);
- *Bird Census Techniques Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H.* (2000) and
- *Bird Monitoring Methods - a Manual of Techniques for Key UK Species.* Gilbert, G., Gibbons, D.W. & Evans, J. (1998).

9.1.3 Consultation

The consultation process which informed the scope of this EIAR is described in **Appendix 1-2 - Scoping Responses from Statutory Bodies**. Comments and guidance which were received from the Development Applications Unit (DAU) regarding tree removal, bat roosts, and bat surveys have been addressed in this chapter.

9.2 Methodology

9.2.1 General Assessment Methodology

The biodiversity assessment addresses the potential likely significant direct, indirect and cumulative effects of the proposed development on terrestrial and aquatic biodiversity, including flora, fauna, and habitats in proximity to the site.

The assessment has been carried out in three stages:

1. Desktop assessment to determine existing information and records in relation to:

- Sites, species, and habitats protected under Council Directive 92/43/EEC (Habitats Directive), and sites and species protected under Council Directive 2009/147/EC (Birds Directive), within the zone of influence of the proposed development and more distant hydrologically linked sites.
- The Zone of Influence (ZoI) comprises the area within which the proposed development which may potentially affect the conservation objectives (or qualifying interests) of Natura 2000 sites
- Biodiversity, habitats, and species present near the proposed development.

2. Site visits and field surveys by the ecologists to establish the existing ecological conditions within the footprint of the proposed development and within the vicinity of all the proposed development elements.

3. Evaluation of the proposed development and determination of the scale and extent of potential likely direct and indirect significant effects on biodiversity (i.e., flora, fauna, and habitats) and the identification of appropriate mitigation and monitoring which may be required.

9.2.2 Desktop Study

A desktop study was carried out to collate the available information on the local ecological environment. The purpose of the desktop study was to identify features of ecological value occurring within the study area and those occurring in close proximity to it which have the potential to be affected by the proposed development. A desktop review also allows the key ecological issues to be identified early in the assessment process and facilitates the planning of surveys. Sources of information utilised for this report include the following:

- National Parks and Wildlife Service (NPWS) - www.npws.ie;
- Environmental Protection Agency (EPA) – www.epa.ie;
- National Biodiversity Data Centre (NDBC) – www.biodiversityireland.ie;
- Bat Conservation Ireland - www.batconservationireland.org;
- Birdwatch Ireland - www.birdwatchireland.ie;
- National Biodiversity Action Plan 2017-2021 (NPWS 2017);
- Cork City Development Plan 2015-2021 and
- Draft Cork City Development Plan 2022-2028.

9.2.3 Site Surveys

The proposed development comprises two planning applications to An Bord Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' 'The Meadows and Phase 2 'The Farm' 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in Chapter 2 - Project Description'. This chapter of the EIAR considers the overall masterplan for the purposes of completing a robust assessment of the entire project and having regard to the outline level of design detail that presently exists for the North Fields. With this in mind, the study area focused on all lands within the EIAR boundary, as shown in Figure 1.1 of this EIAR.

Surveys were carried out between November 2019 and February 2022. Site visits and surveys were carried out in accordance with best practice and in the expert opinion of the authors, are considered sufficient to assess potential significant ecological effects associated with the project.

The standard literature was checked for reference to the site and locality, as were the listings of sites of conservation importance in Cork held by the NPWS of the Department of the Environment, Heritage and Local Government (www.npws.ie).

The following surveys were carried out:

9.2.3.1 Habitat surveys

Habitats were surveyed and mapped on the 3 June, 21 June and 22 June 2021 as well as 3 February, 4 February, 7 February 2022, 16 February 2022 and 5 March 2022 according to the classification scheme outlined in the Heritage Council Publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). Habitats were cross referenced with Habitats Directive Annex I habitats where relevant. During these surveys the site was also surveyed for invasive species and rare floral species (Wyse *et al*., 2016; Stace 2019).

9.2.3.2 Bird Surveys

Breeding bird surveys were carried out on the 28 April 2021 and 22 June 2021 based on the BTO Common Breeding Bird Survey (BBS) (Gilbert *et al.* 1998 and Bibby *et al.* 2000) which aims to capture a snapshot of breeding bird activity within the survey area. Any birds observed during other survey e.g. habitat surveys/bat surveys were also recorded.

Winter bird surveys were carried out during winter of 2020/2021. Winter bird surveys were carried out on the 20 November 2020, 9 December 2020, 8 January 2021, 15 February 2021, 25 February 2021 and 26 February 2021. This survey was loosely based on Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert *et al.* (1998). In place of the "look see" method, counts were carried out for 1 hour per visit. The focus of winter bird surveys was wintering waterfowl and waders, however all birds were recorded during the site survey.

9.2.3.3 Bat Surveys

A range of bat surveys were carried out within the study area. Bat surveys were carried out utilising guidelines set out in '*Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed)*' (Collins, 2016).

- Bat activity surveys were carried out on the 13 May 2021, 18 May 2021, 3 June 2021, 21 June 2021, 22 June 2021, 9 of July 2021, 13 of July 2021 and 9 September 2021 using a Batbox Duet and Echo Meter Touch Bat Detector under suitable weather conditions. Dusk activity surveys commenced 15 minutes before sunset and ended a minimum of two hours after sunset. The primary purpose of bat surveys was to assess usage of structures and habitats, located within the study area.
- A detailed preliminary roost assessment was carried at ground level on all trees earmarked for removal within the study area, with binoculars used where required. Site visits and desktop studies were carried out in consultation with the Arboriculture baseline reports for Phase 1 'The Meadows' and Phase 2 'The Farm'. The tree assessment involved a detailed inspection of the exterior of each tree to identify any signs of bats and/or features that could be used as Potential Roost Features (PRF). Tree assessments were carried out on the 21 January 2022, 3 February 2022, 4 February 2022, 16 February 2022 and 5 March 2022. Potential roost features associated with trees include cracks, crevices, loose bark, and splits. Evidence indicating bat presence, includes dark stains running below holes or cracks, bat droppings, odours, or scratch marks. Following the initial preliminary ground level roost assessment, a climbing survey was carried out to inspect trees considered of moderate potential value for bats or to inspect particular structural elements within low value trees such as cracks and crevices.
- Interior and exterior assessment of buildings earmarked for demolition (or repurpose) was carried out during daylight hours. Building surveys were carried out on the 13 May 2021, 3 June 2021 and 21 June 2021. Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures.

9.2.3.4 Other Mammal Surveys

General mammal surveys were conducted in conjunction with habitat surveys on the 3 June 2021, 21 June 2021, 22 June 2021 and 3 February 2022. These surveys focused in particular on Badger *Meles meles* and Otter *Lutra lutra* and identifying potential foraging habitat for bats (NRA 2005a, NRA 2005b, NRA 2005c, NRA 2008).

Field signs of Badger are characteristic and sometimes quite obvious and include tufts of hair caught on barbed wire fences, conspicuous Badger paths, footprints, small excavated pits or latrines in which droppings are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where Badgers have searched for insects and plant tubers.

The study area was assessed for signs of Otter. Otter survey methodology followed guidance outlined in NRA (2008) and included searches for breeding or resting sites within 150m of the study area boundary. Evidence of Otter, including spraints, footprints, or feeding remains, was recorded where present. A general mammal survey was also carried out in conjunction with the habitat surveys.

9.2.3.5 Other surveys

During site visits, any other species observed were also recorded. It is noted that no aquatic habitats are located within the Phase 1 'The Meadows' and Phase 2 'The Farm' site boundaries. A eutrophic pond the Phase 3 site boundary is of low ecological value and therefore no specialised surveys of this habitat were considered necessary,

9.2.4 Difficulties in Compiling Information

Extensive survey work was carried out within the study area using a range of standard methodologies. However, there were difficulties in mapping faunal territory and other species in third party lands outside the control of the Applicant. It can be difficult to determine territory size of wildlife populations particularly where they may include multiple landholdings. Therefore, in this case a conservative approach was adopted in determining impact.

9.3 Characterisation of Existing Baseline Environment

9.3.1 General Landscape

The study area is located in Blackrock, a suburban area approximately 4.5km southwest of Cork City. The National route N40 runs along the southern boundary of the site and the noise from this road is clearly audible throughout the southern sections of the study area. Further south is the Douglas Estuary, which forms part of the Cork Harbour Special Protection Area (SPA), a large, enclosed tidal channel which is dominated by estuarine habitats at low tide. Urbanised business parks surround the site to the west, north and east. Access to and from the site is via an existing access road, Bessborough Road. To the north and west of the study area there is a mixture of industrial development and residential development. Mahon Golf course, located to east of the site, is a prominent feature in the local landscape. The Bessborough site is characterised by a mix old and new buildings and large numbers of mature trees in a parkland setting. Two large fields are used for grazing horses and the band of woodland along the eastern boundary and the formal gardens are important local features in a landscape that is generally devoid of mature trees. Unused sections of the site are being colonised by scrub.

9.3.2 Designated Sites/Conservation Areas

9.3.2.1 European Sites

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

In accordance with the European Commission Methodological Guidance (EC 2018), a list of Natura 2000 Sites that can be potentially affected by the proposed project has been complied. All candidate SACs (cSAC) and SPAs sites which could potentially be impacted by the proposed development have been identified. Table 9.1 lists the relevant Natura 2000 sites, the location of which are shown in **Figure 9.1**.

The proposed development is not located within a Natura 2000 site. The proposed development is potentially hydrologically connected to two Natura 2000 sites, which are listed in **Table 9.1,** i.e. Cork Harbour SPA and Great Island Channel SAC. Surface water runoff during the construction and/or operational phases of the proposed development could potentially discharge into Cork Harbour via the Douglas Estuary. Wastewater discharges from the Carrigrennan Wastewater Treatment Plant (WWTP) could potential impact on these Natura 2000 sites during operation. The site is separated from the main estuarine habitats of the Cork Harbour SPA, which provide valuable foraging habitat for winter birds, by the busy N40 route. In this context, noise and visual disturbance impacts on the estuary will be insignificant. There are invasive species, including multiple stands of Japanese Knotweed within the study area and in the absence of mitigation, invasive could be inadvertently spread to habitats outside the site boundary. Therefore, qualifying species and habitats within these Natura sites could potentially be impacted via potential reductions in water quality and the spread of invasive species during the construction and/or operational phases. Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

Cork Harbour SPA is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poulnabibe inlets. Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive.

Table 9.1. Designated sites and their location relative to study area

Natura 2000 Site name	Site code	Distance from study area at closest point
Special Areas of Conservation (SAC)		
Great Island Channel SAC	001058	6.4km east
Special Protection Areas (SPA)		
Cork Harbour SPA	004030	70m south
Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHA)		
Douglas River Estuary pNHA	001046	70m south
Dunkettle Shore pNHA	001082	2.07km northeast
Glanmire Wood pNHA	001054	2.89km north
Rockfarm Quarry pNHA	001074	3.8km east
Great Island Channel pNHA	001058	4.6km northeast
Monkstown Creek pNHA	001979	6.3km southeast

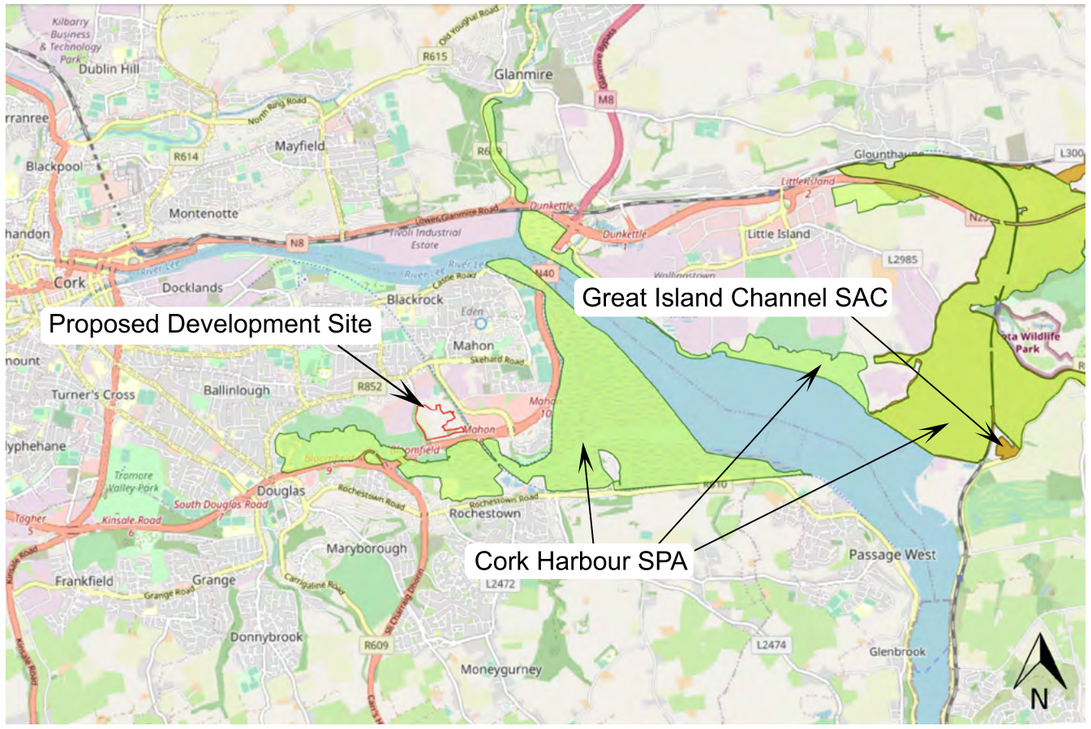


Figure 9.1. Location of the proposed development boundary and Natura 2000 sites located within zone of influence of study area | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | Not to scale

9.3.2.2 Nationally Protected Sites

Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated.

The study area is not located within any NHA or pNHA. There are a number of pNHAs in the vicinity of the study area (**Table 9.1**).

The study area is potentially hydrologically connected to Cork Harbour, via surface water and wastewater discharges. A number of pNHAs in the vicinity form part of the Cork Harbour complex i.e., Douglas River Estuary pNHA, Monkstown Creek pNHA, Dunkettle Shores pNHA, Great Island Channel pNHA. Surface water discharges during construction and operational could potentially impact on these pNHAs. The Rockfarm Quarry pNHA and Glanmire Woods pNHA are designated for terrestrial habitats and therefore there is no pathway for the proposed development to impact on these sites.

The NHAs (pNHAs) located in the vicinity of the study area are shown in **Figure 9.2**.

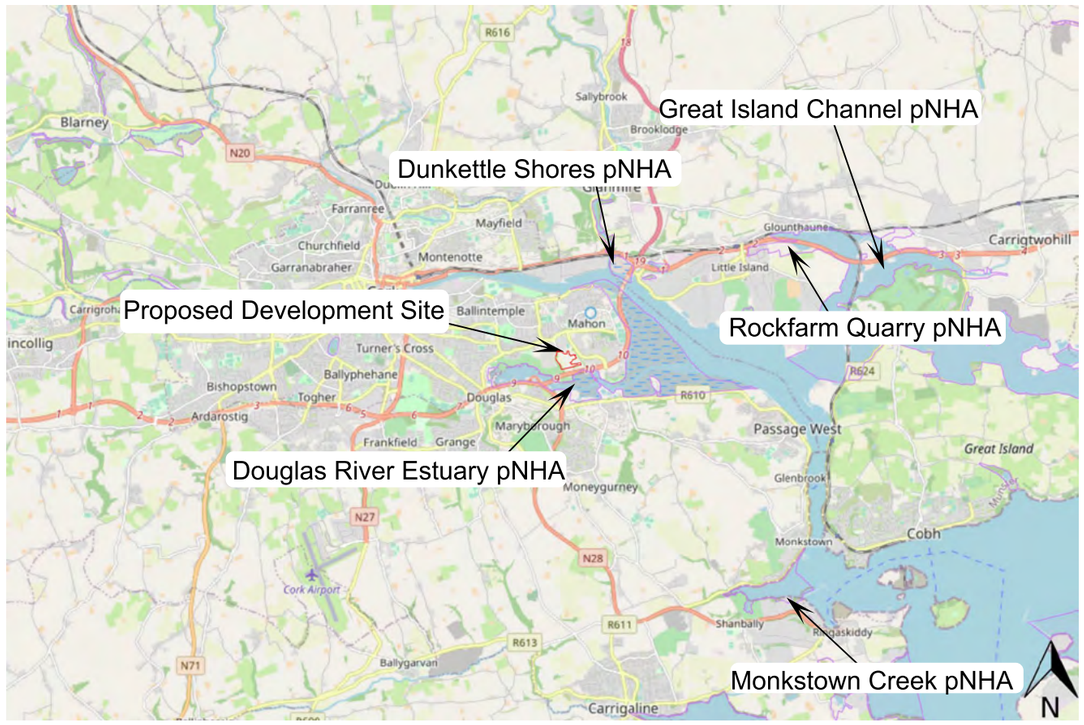


Figure 9.2. Proposed Natural Heritage Areas (pNHAs) in the vicinity of the study area | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | Not to scale

9.3.3 Ramsar Sites

The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance. Cork Harbour, located approximately 230m south of the study area, is listed as a Ramsar site, which is a non-statutory designation.

9.3.4 Important Bird Areas

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor, and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes.

Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the Important Bird Area (IBA) Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate. The development site lies adjacent to the Cork Harbour IBA (Site Code: IE088).

The Cork Harbour IBA site qualifies for designation under the following IBA Criteria (2000) as detailed in **Table 9.2.**:

- A4iii - The site is known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabird of one or more species.
- B1i - The site is known or thought to hold ≥ 1% of a flyway or other distinct population of a waterbird species.
- B2 - The site is one of the most important in the country for a species with an unfavourable conservation status in Europe and for which the site-protection approach is thought to be appropriate.
- C3 - The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (not listed on Annex 1 of The Birds Directive).
- C4 - The site is known to regularly hold at least 20,000 migratory waterbirds and/or 10,000 pairs of migratory species of one or more species.
- C6 - The site is one of the five most important in the European region in question for a species or subspecies considered threatened in the European Union.

Table 9.2 Provides a summary of the Cork Harbour IBA trigger species

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Eurasian Curlew (*Numenius arquata*)	NT	winter	1995	1,669 individuals	B2
Bar-tailed Godwit (*Limosa lapponica*)	NT	winter	1996	456 individuals	B2
Black-tailed Godwit (*Limosa limosa*)	NT	winter	1996	1,399 individuals	B1i, C3
Dunlin (*Calidris alpine*)	LC	winter	1995	12,050 individuals	B1i, B2, C3
Common Redshank (*Tringa tetanus*)	LC	winter	1996	1,344 individuals	B1i, C3
Common Tern (*Sterna hirundo*)	LC	breeding	1995	102 breeding pairs	C6
A4iii Species group - waterbirds	n/a	winter	-	20,000 individuals	A4iii, C4

9.4 Description of Existing Baseline Environment

9.4.1 Habitats

Habitat surveys were carried out on the 3 June, 21 June and 22 June 2021 as well as the 3 February, 4 February, 7 February 2022 and 16 February 2022 . Habitat mapping was carried out in line with the methodology outlined in the Heritage Council Publication, *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). The terrestrial and aquatic habitats within the study area were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required.

The ecological value of habitats has been defined using the classification scheme outlined in the Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009) which is included in **Appendix 9-1**. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Habitats that are considered to be good examples of Annex I and Priority habitats are classed as being of International or National Importance. Semi-natural habitats with high biodiversity in a county context and that are vulnerable, are considered to be of County Importance. Habitats that are semi-natural, or locally important for wildlife, are considered to be of Local Importance (higher value) and sites containing small areas of semi-natural habitat or maintain connectivity between habitats are considered to be of Local Importance (lower value).

The habitats recorded within Phase 1 'The Meadows' and Phase 2 'The Farm' site boundaries and their ecological value, are discussed in **Table 9.3** and **Table 9.4**. Habitats recorded in the third follow-on phase of development to the west and south of Bessborough House (Phase 3), are also described in **Table 9.5**. The location of these habitats within Phase 1 'The Meadows', Phase 2 'The Farm' and Phase 3 'North Fields' follow up phase are illustrated in **Figure 9.3, Figure 9.4 and Figure 9.5 respectively**. Site photographs are included in **Appendix 9-2**. It is noted that there is overlap between small sections of the different phases of the project and therefore some of the habitat descriptions are included in more than one of the Tables and Figures.

Figure 9.3. Habitats recorded within Phase 1 'The Meadows' site boundary

Figure 9.4. Habitats recorded within Phase 2 'The Farm' site boundary

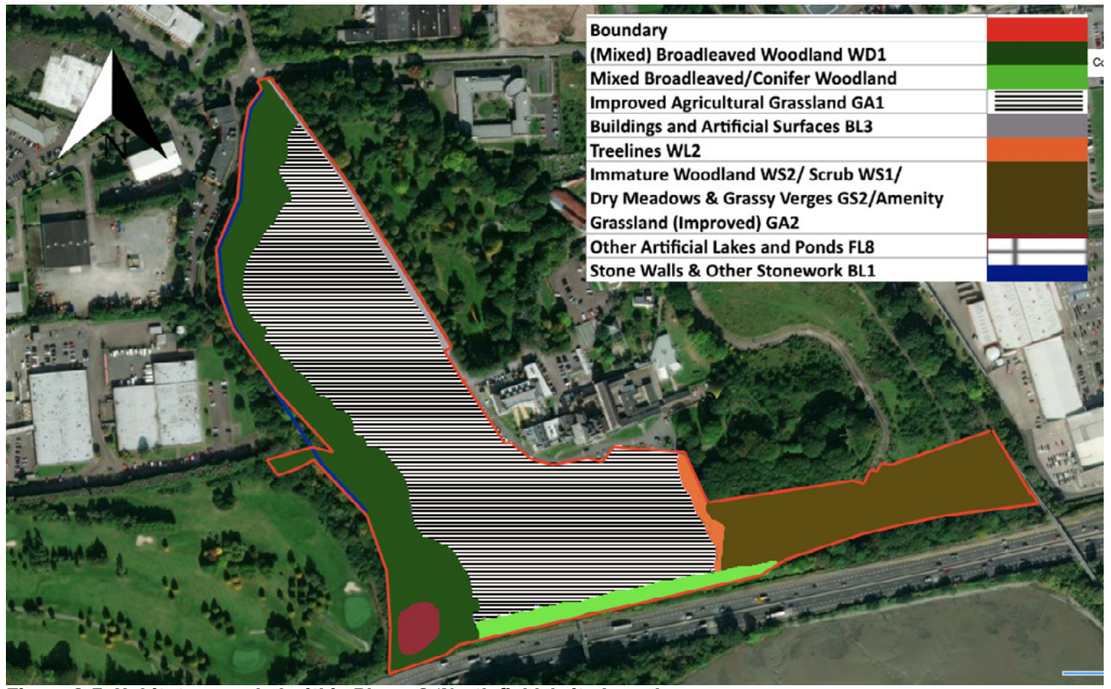


Figure 9.5. Habitats recorded within Phase 3 'North fields' site boundary

Table 9.3. Habitats within Phase 1 'The Meadows' development site boundary and their ecological value

Habitat	Comments	Habitat Value (NRA Guidelines)
Buildings and artificial surfaces BL3	This habitat type includes the road at the eastern edge of Phase 1 'The Meadows'. The road is not used and is being recolonized by vegetation, including Fescue *Festuca sp.,* Bramble *Rubus fruticosus*, Rosebay Willowherb *Chamaenerion angustifolium*, and immature Willow *Salix spp.* Other species noted include Groundsel *Senecio Vulgaris,* Bramble *Rubus fruticosus* and Teasel *Dipsacus fullonum*. These species are common within this area and this habitat is of limited ecological value. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites.	Local value (lower importance)
Treelines WL2/ Broadleaved woodland WD1	There is a mature treeline along the western boundary of the study area on the boundary of Phase 1 'The Meadows' which has developed on an earth bank. The trees are mature and a treeline is detailed at this location on the 6" First Edition maps (1829-1842). (See **Appendix 3-4 *Historical Landscape Assessment*** for further detail). Although the treeline is prominent, in places it is sufficiently wide to be classified as a narrow strip of broadleaved woodland. A mix of native and non-native species are present. Species noted include Sessile Oak *Quercus petraea* Hawthorn *Crataegus monogyna,*, Sycamore *Acer pseudoplatanus*, Ash *Fraxinus excelsior,* Wych Elm *Ulmus glabra,* Elderberry *Sambucus nigra* and Silver Birch *Betula pendula*. The understory is dominated by Bracken *Pteridium aquilimum* and Bramble, with patches of Hogweed *Heracleum sphondylium*, Germander Speedwell *Veronica chamaedrys*. Buddleia *Buddleja davidii* also common. The proposed footbridge location extends on the eastern side of the Blackrock-Passage greenway which runs parallel with this eastern boundary of the Phase 1 'The Meadows' site. *Rhododendron ponticum* was recorded in this area. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local value (higher importance)
Scrub WS1/Dry meadow and grassy verge GS2/Recolonising bare ground ED3	The Phase 1 'The Meadows' development site is dominated by a complex mosaic of common habitats which typically develop on land which is not actively used. Interspersed with areas of scrub there are isolated patches of Dry meadow and grassy verge habitat with Yorkshire Fog *Holcus lanatus* and Cocksfoot *Dactylis glomerata*. There are dense thickets of scrub, and this habitat will continue to encroach on grassland areas and areas of recolonizing bare ground in the absence of active management. Bramble and *Willow Salix sp.* are the dominant scrub species with Gorse also noted. Sycamore is also becoming established. Other species noted within the habitat include Teasel *Dipsacus fullonum*, Rosebay Willowherb *Epilobium angustifolium*, Common Figwort *Scrophularia nodosa*, , Soft Rush *Juncus effusus*, Dogwood *Cornus sanguinea*, Curled Dock *Rumex crispus, Greater Bird's-Foot Trefoil Lotus pedunculatus* and Spear Thistle *Cirsium vulgare.* Bee Orchid (*Ophrys apifera)* which has widespread but local distribution was also recorded within this area. As scrub will continue to develop in the absence of development, this species is unlikely to persist in the absence of active management as it requires open conditions. Early successional species and scrub provide local resources for invertebrates, birds and mammals. Dry meadow and grassy verge habitat loosely corresponds to the annexed habitat, 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510)'. The dry meadow and grassy verge habitat within the study area is not a valuable example of this habitat type.	Local value (higher importance)
Scrub WS1	A more pronounced and uneven line of scrub adjoins the treeline along the western boundary. It is dominated by Bramble with Bracken also noted. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local value (lower importance)
Scattered trees and parkland WD5/Recolonising bare ground ED3	A small area of this habitat is located within the centre of the site. It consists of maintained grassland with a mix of mature and immature trees. Notable trees include a large mature ash and a mature Monteray Cypress. A small area of disturbed ground is being recolonised by common ruderal species and the non-native species Montbretia is common,	Local importance (Higher value)
Improved agricultural grassland GA1	Part of the Phase 1 'The Meadows' development site boundary runs west through a large field dominated by low value improved grassland. Grassland in the more southerly field has died back. Species including Perennial Rye Grass *Lolium perenne*, Nettle *Urtica diocia* and Broad Leaved Dock *Rumex obtusifolius.* Only a small area of this habitat will be affected. This habitat is common and supports a limited flora. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)

Broadleaved woodland WD1	The small area of broadleaved woodland is located on the western edge of the Phase 1 'The Meadows' site. It supports a mixture of native and non-native species, however non-native species predominate. Species noted include Beech, Sycamore, and Ash. The understory is poorly developed with Holly Ilex europeas and occasional Hazel Corylus avellana and Willow Salix sp. noted. The ground layer is heavily shaded and includes Soft Shield Fern Polystichum setiferum, Hogweed Heracleum sphondylium, Primrose Primula vulgaris, Woodrush Luzula spp., Bluebell Hyacinthoides non-scripta, Ivy Hedera hibernica, Bramble Rubus fruiticosus and Hartstongue Fern Asplenium scolopendrium. A notable feature is a large eutrophic pond in the southern corner of this woodland. On wetter ground on the periphery of the pond Willow Salix sp. is common with, Pendulous Sedge Carex pendula and Soft Rush Juncus effuses also noted. Cherry Laurel Prunus laurocerasus and Winter Heliotrope Petasites fragrans are common with a scattered distribution and Wild Clematis Clematis vitalba was also recorded. A large stand of mature Japanese Knotweed Fallopia japonica was recorded in the northern section of the woodland. Rhododendron Rhododendron ponticum was also recorded in proximity to the pond. A review of historical mapping (www.osi.ie) shows that this area of woodland was present on the 6" First Edition maps. Notwithstanding the preponderance of non-native tree species, older woodlands are generally of higher ecological value as mature trees can support bat roosts and a more diverse flora, including woodland indicator species. A small area of this habitat will be affected. Woodland (See **Appendix 3-4 Historical Landscape Assessment** for further detail). Woodland within the study area is dominated by non-native species. Relatively poor habitat structure but of local value in the context of a urbanised landscape. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (higher value)

Table 9.4. Habitats within Phase 2 'The Farm' development site boundary and their ecological value

Habitat	Description	Habitat value
Scattered trees and parkland WD5	A large formal garden covers most of the Phase 2 'The Farm' development site. It is delineated by existing stonewalls along its northern, eastern and southern boundaries and is separated from the main access road by a mature treeline. Grassland within this area is regularly mowed and species diversity is generally low. It is dominated by common grass and herbaceous species including Red Fescue *Festuca rubra,* Creeping Buttercup *Ranunculus acris,* Daisy *Bellis perenne*, Meadow Grass *Poa annua* and Dandelion *Taraxacum vulgaria.* Trees are generally mature and non-native including Beech *Fagus sylvatica*, Sycamore *Acer pseudoplatanus*, Lime *Tilia sp.,* Turkey Oak *Quercus cerris* and Cherry *Prunus sp*. Eucalyptus *Eucalyptus Globulus* is prominent. Small numbers of native species are also present including Silver Birch *Betula pendula*, Yew *Taxus baccata*, Ash *Fraxinus excelsior* and Hawthorn *Crataegus monogyna*. There is no significant understorey or ground layer. Some of this habitat will be removed as part of the proposed development but the majority of the trees will be retained. Further detail on trees including trees to be removed is included in the Arboriculture report (**Appendix 3-3b of this EIAR**) Mature stands of Japanese Knotweed *Fallopia japonica* were recorded within the garden and Winter Heliotrope *Petasites fragrans* and Buddleia *Buddleia davidii* have a scattered distribution. The trees within the garden are predominantly non-native. This area does not have a coherent woodland structure and lacks cover for fauna. However mature trees within the garden may provide roosting sites for bats. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (higher value)
Treelines WL2	The most prominent treeline is located along the eastern boundary of the main access road. Although dominated by non-native species including Lime *Tilia sp.*, Holm Oak *Quercus ilex* and Sycamore Many7 of the trees are mature and could be of value for roosting bats however these trees will not be removed. Notwithstanding the preponderance of non-native species, mature treelines provide foraging, nesting and roosting opportunities and form connective elements within the wider landscape[SS1] .	Local importance (higher value)

Broadleaved woodland WD1	The largest area of broadleaved woodland in Phase 2 'The Farm' is located along the western boundary of the study area. It supports a mixture of native and non-native species, however non-native species predominate. Species noted include Beech, Sycamore, and Ash. The understory is poorly developed with Holly *Ilex europeas* and occasional Hazel *Corylus avellana* and Willow *Salix sp.* noted. The ground layer is heavily shaded and includes Soft Shield Fern *Polystichum setiferum*, Hogweed *Heracleum sphondylium*, Primrose *Primula vulgaris*, Woodrush *Luzula spp*., Bluebell *Hyacinthoides non-scripta*, Ivy *Hedera hibernica,* Bramble *Rubus fruiticosus* and Hartstongue Fern *Asplenium scolopendrium*. A notable feature is a large eutrophic pond in the southern corner of this woodland. On wetter ground on the periphery of the pond Willow *Salix sp.* is common with, Pendulous Sedge *Carex pendula* and Soft Rush *Juncus effuses* also noted. Cherry Laurel *Prunus laurocerasus* and Winter Heliotrope *Petasites fragrans* are common with a scattered distribution and Wild Clematis *Clematis vitalba* was also recorded. A large stand of mature Japanese Knotweed *Fallopia japonica* was recorded in the northern section of the woodland. Rhododendron *Rhododendron ponticum* was also recorded in proximity to the pond. A review of historical mapping (www.osi.ie) shows that this area of woodland was present on the 6" First Edition maps. Notwithstanding the preponderance of non-native tree species, older woodlands are generally of higher ecological value as mature trees can support bat roosts and a more diverse flora, including woodland indicator species. A small area of this habitat will be affected. The northern section of the formal garden has more closely spaced trees and has characteristics of broadleaved woodland. There is no significant understorey and the ground layer is heavily shaded with Lord and Ladies *Arum maculatum*, Goosegrass *Galium aparine,* Sun Spurge *Euphorbia helioscopia* Primrose, Tutsan *Hypericum androsaemumand* Woodrush *Luzula sylvatica*. Trees within this area include Beech, *Ash Fraxinus excelsior*, Lime *Tilia sp*., Sycamore, *Poplar Populus sp.* and Holm Oak *Quercus ilex*, many of which are mature. Further detail on trees including trees to be removed is included in the Arboriculture report (**Appendix 3-3b of this EIAR**). A review of historical mapping (**www.osi.ie**) shows that this area of woodland was extant on the 6" First Edition maps as woodland (See **Appendix 3-4 Historical *Landscape Assessment*** for further detail) Woodland within the study area is dominated by non-native species. Relatively poor habitat structure but of local value in the context of a urbanised landscape. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (higher value)
Stonewalls and other stonework BL1	Stonewalls within Phase 2 'The Farm' site boundary vary in composition and age but limestone is the predominant building material. Walls form the southern, eastern and northern boundaries of the formal garden and there are other small and similar sections elsewhere. The walls are generally in good condition but lack suitable roosting habitat for bats. The walls are generally devoid of vegetation but older walls support some specialist species including Ivy, Maidenhair Spleenwort *Asplenium trichomanes*, Herb Robert, Harstongue Fern *Asplenium scolopendrum*, Polypody *Polypodium interjectum*, Pennywort *Umbilicus rupestris* and Daisy. Introduced species include Ivy Leaved Toadflax *Cymbalaria muralis* and Mexican Fleabane *Erigeron karvinskianus*. Buddleia *Buddleia davidii* have become established at multiple locations. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)
Scrub WS1	A linear band of scrub has developed along the western boundary of the formal garden at the Phase 2 'The Farm' development site between the garden and treeline along the approach road. It supports a mixture of native and non-native species including Bramble which is dominant and non-native species such Fuchsia *Fuchsia magellanica,* Bay *Laurus Nobilis*, Monbretia *Crocosmia x crocosmiiflora,* Bamboo and Pampas grass. Willow is occasional. Elsewhere within the site there are pockets of scrub which generally occur in a mosaic with other habitats. A small area will also be affected adjacent to the treeline along the western boundary. This habitat provides some potential feeding and nesting habitat. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)
Treelines WL2/ Broadleaved woodland WD1	There is a mature treeline along the western boundary of the study area on the boundary of Phase 1 'The Meadows' which has developed on an earth bank. The trees are mature and a treeline is detailed at this location on the 6" First Edition maps (1829-1842). Although the treeline is prominent, in places it is sufficiently wide to be classified as a narrow strip of broadleaved woodland. A mix of native and non-native species are present. Species noted include Sessile Oak *Quercus petraea* Hawthorn *Crataegus monogyna,*, Sycamore Acer pseudoplatanus, Ash *Fraxinus excelsior*, Wych Elm *Ulmus glabra,* Elderberry Sambucus nigra and Silver Birch *Betula pendula*. The understory is dominated by Bracken *Pteridium aquilimum* and Bramble, with patches of Hogweed *Heracleum sphondylium*, Germander Speedwell Veronica chamaedrys. Buddleia *Buddleja davidii* also common.. *Rhododendron ponticum* was recorded in this area. Notwithstanding the preponderance of non-native species, mature treelines provide foraging, nesting and roosting opportunities and form connective elements within the wider landscape. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (higher value)
Dry Meadow and grassy verges GS2	This habitat has developed on an unused field in the northern section of the Phase 2 'The Farm' site. It supports a range of common species including tussocky grass species such as Bramble, Cocksfoot and Yorkshire Fog. Willow saplings were also noted. In the absence of management, it is likely to be further colonised by scrub species. Dry meadow and grassy verge loosely corresponds to the annexed habitat, 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510)'. The dry meadow and grassy verge habitat within the study area is not a valuable example of this habitat type. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)
Scrub WS1/ Recolonising Bare ground/ Spoil and bare ground ED2	An area within a small courtyard to the east of the formal garden in Phase 2 'The Farm' has a mixture of spoil heaps, old wood, pallets etc. There are small patches of scrub with Bramble and Sycamore and some early successional species such as Rosebay Willowherb *Chamaenerion angustifolium* are becoming established. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)

Scrub WS1/ Dry meadow and grassy verge GS2/ Recolonising bare ground ED3	The small area of this habitat that will be affected by Phase 2 'The Farm' is part of a much larger mosaic of habitats. It is dominated by a complex mosaic of common habitats which typically develop on land which is not actively used. Interspersed with areas of scrub there is isolated patches of Dry meadow and grassy verge with Yorkshire Fog *Holcus lanatus* and Cocksfoot *Dactylis glomerata*. There are dense thickets of scrub and this habitat will continue to encroach on grassland areas and areas of recolonizing bare ground in the absence of active management. Bramble and *Willow Salix sp.* are the dominant scrub species with Gorse also noted. Sycamore is also becoming established. Other species noted within the habitat include Teasel *Dipsacus fullonum*, Rosebay Willowherb Epilobium angustifolium, Common Figwort *Scrophularia nodosa*, , Soft Rush *Juncus effusus*, Dogwood *Cornus sanguinea*, Curled Dock *Rumex crispus, Greater Bird's-Foot Trefoil Lotus pedunculatus* and Spear Thistle *Cirsium vulgare.* Bee Orchid (*Ophrys apifera)* whichhas widespread but local distribution was also recorded within this area. As scrub will continue to develop in the absence of development this species is unlikely to persist as it requires open conditions. Early successional species and scrub provides local resources for invertebrates, birds and mammals. Dry meadow and grassy verge loosely corresponds to the annexed habitat, 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510)'. The dry meadow and grassy verge habitat within the study area is not a valuable example of this habitat type.	
Buildings and artificial surfaces BL3	This habitat includes the various built structures around the formal garden and courtyard at Phase 2 'The Farm', including several stone farmhouse-style buildings and a barn. The structures within the courtyard are of potential value as summer roosts for bats, in particular the low stone buildings at the north end of the courtyard. Bat emergence surveys and building surveys were conducted in this area and no evidence of bats was recorded (See **Section 9.4.3.1** for further detail) This habitat also includes a courtyard which is being recolonized by vegetation around its margins, including Fescue Festuca sp., Bramble *Rubus fruticosus,* Rosebay Willowherb *Chamaenerion angustifolium,* and immature Willow *Salix* spp. This habitat type also includes a small section of disused road at the eastern edge of Phase 2 'The Farm' site. The road is not used and is being recolonized by vegetation, including Fescue *Festuca sp*., Bramble *Rubus fruticosus*, Rosebay Willowherb *Chamaenerion angustifolium*, and immature Willow *Salix spp*. Other species noted include Groundsel *Senecio vulgaris,* Bramble *Rubus fruticosus* and Teasel *Dipsacus fullonum*. These species are common within this area and this habitat is of limited ecological value. These species are common within this area and this habitat is of negligible value. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	
Improved agricultural grassland GA1	Part of the Phase 2 'The Farm' site runs to the west through an area of improved agricultural grassland. This includes two large fields that are used for grazing horses and are dominated by low value improved grassland. Grassland in the more southerly field has died back. The northerly field is lightly grazed and supports common grass and herbaceous species including Perennial Rye Grass *Lolium perenne*, Nettle *Urtica diocia* and Broad Leaved Dock *Rumex obtusifolius.* This habitat is common and supports a limited flora. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)
Horticultural BC2	A disused garden, located just north of the courtyard in Phase 2 'The Farm' has become overgrown with grass and herbaceous species including Cocksfoot, Yorkshire Fog and Ribwort Plantain *Plantago lanceolata.* This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)

Table 9.5. Habitats within Phase 3 "North Fields' development site boundary and their ecological value

Habitat	Description	Habitat value
Broadleaved Woodland WD1	The largest area of broadleaved woodland is located along the eastern boundary of the Phase 3 'North Fields' site. It supports a mixture of native and non-native species, however non-native species predominate. Species noted include Beech, Sycamore, Horse Chestnut *Aesculus hippocastanum* and Ash. The understory is poorly developed with Holly *Ilex europeas* and occasional Hazel *Corylus avellana* and Willow *Salix sp.* noted. The ground layer is heavily shaded and includes Soft Shield Fern *Polystichum setiferum*, Hogweed *Heracleum sphondylium*, Primrose *Primula vulgaris*, Woodrush *Luzula spp*., Bluebell *Hyacinthoides non-scripta*, Ivy *Hedera hibernica,* Bramble *Rubus fruiticosus* and Hartstongue Fern *Asplenium scolopendrium*. A notable feature is a large eutrophic pond in the southern corner of this woodland. On wetter ground on the periphery of the pond Willow *Salix sp.* is common with, Pendulous Sedge *Carex pendula* and Soft Rush *Juncus effuses* also noted. Cherry Laurel *Prunus laurocerasus* and Winter Heliotrope *Petasites fragrans* are common with a scattered distribution and Wild Clematis *Clematis vitalba* was also recorded. A large stand of mature Japanese Knotweed *Fallopia japonica* was recorded in the northern section of the woodland. Rhododendron *Rhododendron ponticum* was also recorded in proximity to the pond and on a small island within it. A review of historical mapping (www.osi.ie) shows that this area of woodland was present on the 6" First Edition maps. Notwithstanding the preponderance of non-native tree species, older woodlands are generally of higher ecological value as mature trees can support bat roosts and a more diverse flora, including woodland indicator species. Woodland within the study area is dominated by non-native species. Relatively poor habitat structure but of local value in the context of a urbanised landscape. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (higher value)

Mixed broadleaved/ conifer woodland WD2	Running in a band along the southern boundary of the Phase 3 'North Fields' site there is band of planted woodland. Most of the trees are non-native and include Cedar *Thuja sp*, and Sycamore. This woodland lacks an understorey and the ground layer is depauperate and dominated by Ivy and Bramble. A review of arial mapping (www.osi.ie) shows that this more uniform area of woodland is of more recent origin. Overall this woodland is of recent origin and lacking diversity. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)
Other artificial lakes and ponds FL8	Located in the southwest corner of the Phase 3 'North Fields' site, there is a large pond with five small islands which are a heavily vegetated. A review of historical mapping (www.osi.ie) shows that this feature, which is artificial in origin, is present on the 6" First Edition maps (1829-1842). Originally one of the islands would have connected to the mainland via a footbridge. The pond is currently in poor ecological conditions with a heavy accumulation of rotting leaves and deep silt, discoloured water and a strong odour. It discharges via a short open section of channel. No birds were noted during site surveys and in its current condition this pond is of limited ecological value and is not of value for breeding Common Frog *Rana temporaria* or Smooth Newt *Lissotriton vulgaris*. One of the islands is dominated by Cherry Laurel and the remaining island support a mixture of native and non-native species. On wetter ground on the periphery of the pond Willow is common with Pendulous Sedge *Carex pendula* and Remote sedge *Carex remota* also noted. As water quality is poor, this feature is unlikely to support Otter, specialised bird species, fish or amphibians and in its current condition it is of limited ecological value. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	. Local importance (lower value)
Improved agricultural grassland GA1	Two large fields are used for grazing horses and are dominated by low value improved grassland. Grassland in the more southerly field has died back. The northerly field is lightly grazed and supports common grass and herbaceous species including Perennial Rye Grass *Lolium perenne*, Nettle *Urtica diocia* and Broad Leaved Dock *Rumex obtusifolius.* This habitat is common and supports a limited flora. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)
Immature woodland WS2/ Scrub WS1/Dry meadow and grassy verge GS2/Amenity grassland GA2/	This mosaic of habitats occurs in a band in the southern section of the Phase 3 'North Fields' site. Scrub is most prominent at the western and eastern extremities of this area and has developed on areas that are not regularly maintained. In the western section of the site scrub is dominated by Willow and Bramble with early successional species common. In the eastern section Bramble dominates. Small sections of dry meadow and grassy verge with Yorkshire Fog, Creeping Buttercup and Cocksfoot occur, however in the absence of active management scrub will continue to encroach. There is also a band of maintained amenity grassland of limited value and there is also a section of planted woodland which is dominated by non-native Turkey Oak *Quercus laevis.* Amenity grassland and plantations of non-native trees are of limited ecological value. Scrub and dry meadow and grassy verge provide local resources for invertebrates, birds and mammals Dry meadow and grassy verge loosely corresponds to the annexed habitat, 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510)'. The dry meadow and grassy verge habitat within the study area is not a valuable example of this habitat type. This is not an Annex I habitat and is not a qualifying habitat for Natura 2000 sites	Local importance (lower value)
Treelines WL2	A small section of treeline runs north to south within the Phase 3 area. Species noted include Oak, Ash, Hawthorn, Holly. Understory species include Bramble, Cleavers, Bedstraw, Ivy, Lords and Ladies *Arum maculatum* and Nettle.	Local importance (higher value)
Buildings and artificial surfaces	Part of the main entrance road to the Bessborough site runs through Phase 3 ' North Fields' site boundary	Local importance (lower value)

9.4.2 Flora

The study area lies within Ordnance Survey National Grid 10km square (hectad) W77. The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within the 10km grid squares. Some 391 flowering plants are listed by the NBDC as present in hectad W77.

The NBDC database lists two protected plant species within W77 i.e. Meadow Barley (*Hordeum secalinum*) and Chives (*Allium schoenoprasum*). These species are protected by the Flora Protection Order 2015 (S.I. No. 356 of 2015). Little Robin, an endangered plant species has also been recorded within W77.

No species listed on the Flora Protection Order 2015 was recorded within the study area. Bee Orchid (*Ophrys apifera*) which has widespread but local distribution was recorded within the Phase 1 'The Meadows' and Phase 2 'The Farm' site boundaries (**Figure 9.6** and **Figure 9.7**). As scrub will continue to develop in the absence of maintenance this species is unlikely to persist as it requires open conditions. **Table 9.6** lists threatened species, designations and 10km grid square.

Figure 9.6. Bee Orchid location in Phase 1 'The Meadows' site boundary (not to scale)

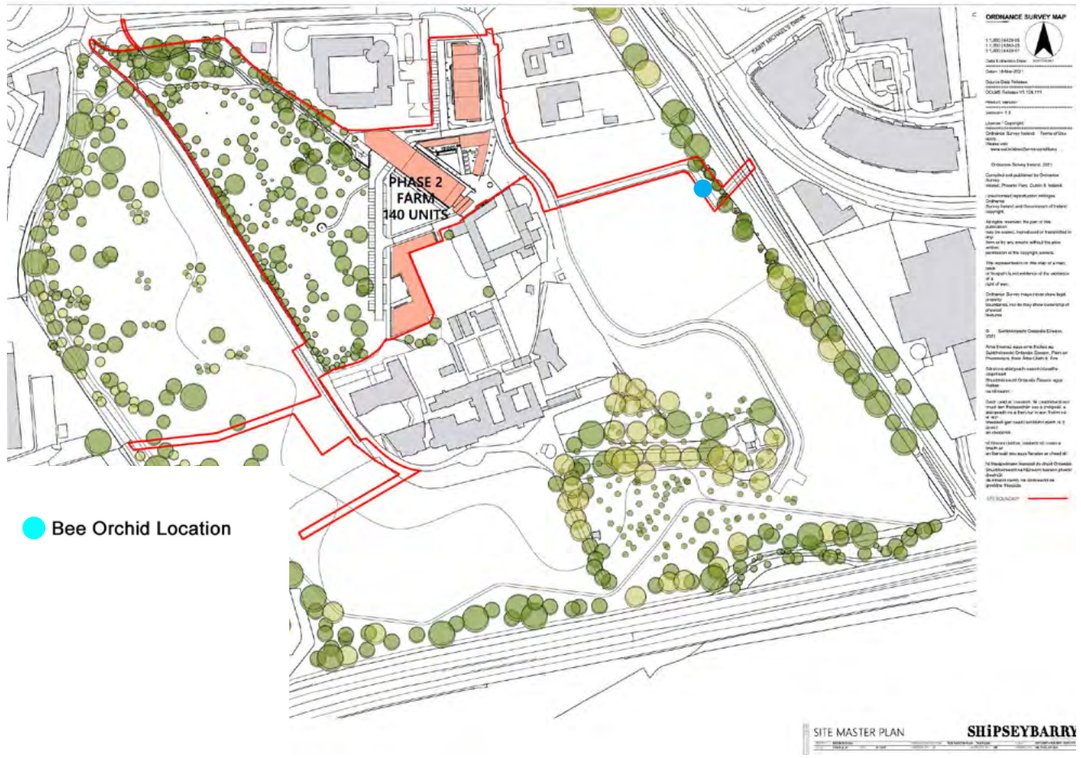


Figure 9.7. Bee Orchid location in Phase 2 'The Farm' site boundary (not to scale)

Table 9.6. NBDC listed flowering and endangered flowering plants for hectad W77

Hectad	Flowering plant Species	Latin Name	Designations/Threatened Status
W77	Chives	*Allium schoenoprasum*	Flora Protection Order & Vulnerable
W77	Little-robin	*Geranium purpureum*	Endangered
W77	Meadow Barley	*Hordeum secalinum*	Flora Protection Order & Endangered

Source NBDC database 25/01/21

9.4.2.1 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists a number of both aquatic and terrestrial high impact invasive species which have been recorded within hectad W77 (**Table 9.7**).

Table 9.7. High impact invasive species recorded in W77

Common Name	Latin Name
Canada Goose	*Branta canadensis*
Ruddy Duck	*Oxyura jamaicensis*
Cherry Laurel	*Prunus laurocerasus*
Common Cord-grass	*Spartina anglica*
Knotweed	*Fallopia japonica x sachalinensis = F. x bohemica*
Giant Hogweed	*Heracleum mantegazzianum*
Giant Knotweed	*Fallopia sachalinensis*
Giant-rhubarb	*Gunnera tinctoria*
Indian Balsam	*Impatiens glandulifera*
Japanese Knotweed	*Fallopia japonica*
Parrot's-feather	*Myriophyllum aquaticum*
Rhododendron	*Rhododendron ponticum*
Harlequin Ladybird	*Harmonia axyridis*
American Mink	*Mustela vison*
Brown Rat	*Rattus norvegicus*
Fallow Deer	*Dama dama*
Feral Ferret	*Mustela furo*
House Mouse	*Mus musculus*
Sika Deer	*Cervus nippon*

Source NBDC database 28/01/22

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that

'Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, ['refers only to exotic species thereof'][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.'

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed *Fallopia japonica*, as follows: *"any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [....] shall be guilty of an offence."*

The Third Schedule species, Japanese Knotweed and Himalayan Knotweed Persicaria wallichii were recorded at several locations within the study area. Rhododendron Rhododendron ponitcum, also a third schedule species, was recorded in the Phase 3 'North Fields' site. The location of these third schedule invasive species within the Phase 1 'The Meadows', Phase 2 'The Farm' and Phase 3 'North Fields' site boundaries are shown in **Figure 9.8**, **Figure 9.9** and **Figure 9.10** respectively. The third schedule invasive species Himalayan Balsam *Impatiens glandulifera* was recorded immediately south of the Phase 1 'The Meadows' site boundary. Although not within the proposed development area, it is recommended that this plant be eradicated.

Japanese Knotweed is a member of the Polygonaceae (docks and rhubarb family), native to Japan and northern China. It has however, become widely distributed throughout Europe, North America, Canada, New Zealand and Australia. Himalayan Knotweed which is a closely related species rarely exceeds 1.5m in height while Japanese Knotweed can reach 3m in height. Dispersal typically occurs through rhizome fragments being transported in soil by humans or to a lesser extent, through passive mechanical means such as in floodwaters. Dispersal is also achieved through vegetative reproduction from plant fragments. The plant typically occurs along roadsides, riverbanks and waste ground in Ireland where it forms dense, monotypic stands. Japanese and Himalayan Knotweed cause a range of problems due to prolific and dense growth habit including blocking sight- lines on roads, damage to paving and structures, erosion of riverbanks and flood defence structures, damage to archaeological sites, loss and displacement of native habitats and species.

Rhododendron is an evergreen, acid loving shrub introduced to Ireland in the 18th Century. It can withstand considerable shade and thrives as an understorey species in woodland, though it also tolerates open conditions in suitable acid soils. Its dense tangle of stems can block pathways, smother watercourses and encroach on roadways thereby impinging on sight-lines and reducing the capacity of the road to drying out. The foliage of Rhododendron contains various compounds that appear to have an allelopathic action on other species (inhibiting their growth) which may further inhibit plants from growing within close proximity.

Himalayan balsam (Impatiens glandulifera) is an invasive terrestrial plant species that was first introduced in the UK in 1839 as an ornamental garden plant. Since it was introduced, it has spread to most parts of Ireland. Due to the nutrient poor soil and cold temperatures in its home range, the Himalayas, it has adapted to develop thousands of seeds, which are dispersed widely as the ripe seedpods shoot their seeds up to 7m (22ft) away. Due to our warmer climate and nutrient rich soils it has thrived here and became highly invasive. Once established in the catchment of a river the seeds, which can remain viable for two years, are transported further afield by water.

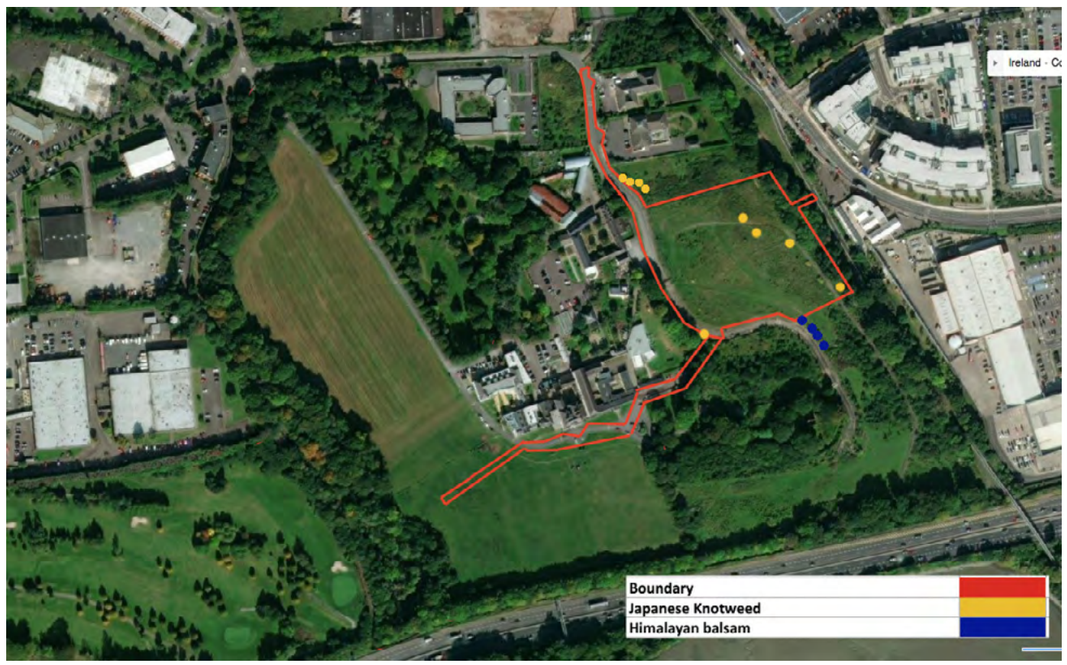


Figure 9.8. Third schedule invasive species recorded within the Phase 1 'The Meadows' site boundary

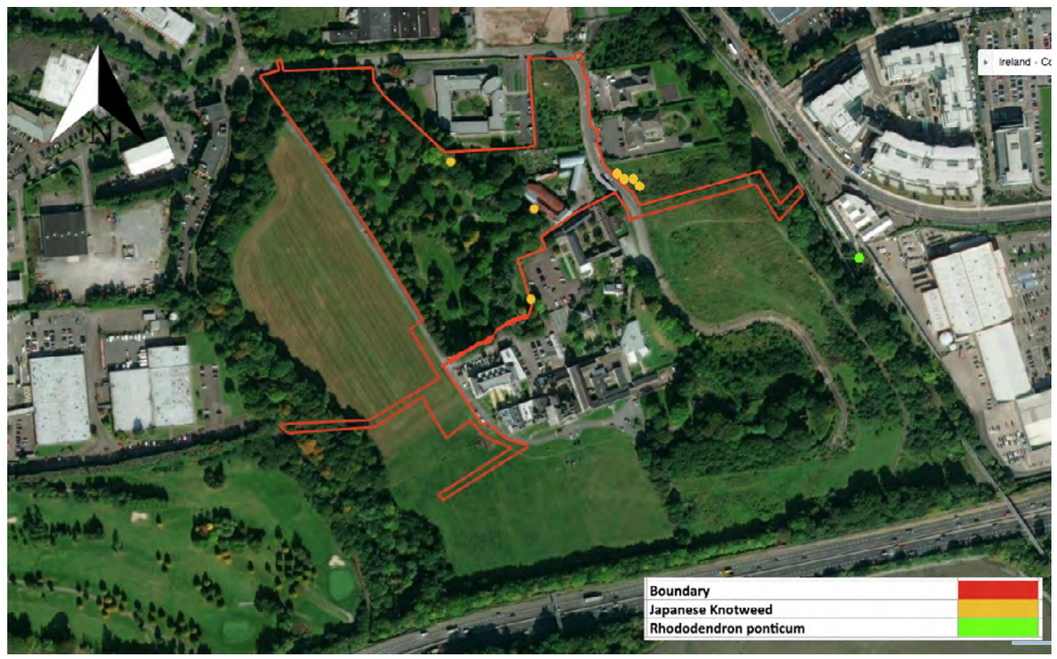


Figure 9.9. Third schedule invasive species recorded within the Phase 2 'The Farm' site boundary

Figure 9.10. Third schedule invasive species recorded within the Phase 3 'North Fields' site boundary

Four other invasive species Cherry Laurel *Prunus laurocerasus,* Buddleia *Buddleja davidii*, Wild Clematis *Clematis vitalba* and Winter Heliotrope *Arctostaphylos luciana* were recorded with a scattered distribution throughout the study area. These species are not included in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). Therefore, their presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (S.I. 477 of 2011).

Cherry Laurel (*Prunus laurocerasus*) is listed by the NBDC as a high impact invasive species. Cherry Laurel was recorded within the area of woodland along the western boundary of the Phase 3 'North Fields' site and also occurs within the walled garden in Phase 2 'The Farm' site. The species was recorded on both sides of the road directly across from each other. Cherry Laurel is a dense thicket forming invasive ever-green shrub of gardens, parks and woodlands from South West Asia. The leaves are thick and laurel-like and are poisonous with cyanide. Its rapid growth and the way it casts an all–year–round dense shade means that it shades out plants from the woodland floor, and generally out–competes less vigorous shrubs and young trees. Like *Rhododendron ponticum* with which it often grows, if unmanaged, it will form almost impenetrable shrubberies or understories in woodland and effectively kill off all other vegetation except the mature trees.

Buddleia and Wild Clematis are listed as a medium impact listed species by the NBDC. The NBDC notes that under the right ecological conditions these species may have an impact on the conservation goals of a European site or impact on a water body achieving good/high ecological status under the Water Framework Directive (Directive 2000/60/EC). Buddleia and Wild Clematis is also included in the NRA *Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads* (NRA 2010) as these species have been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and is likely to be encountered during road schemes.

Winter Heliotrope is classified as a low imact invasive species by the NBDC. Winter Heliotrope is included in the NRA *Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads* (NRA, 2010) as these species have been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and are likely to be encountered during road schemes

9.4.3 Fauna

9.4.3.1 Bats

In Ireland, nine species of bat are currently known to be resident. These are classified into two Families: the *Rhinolophidae* (Horseshoe bats) and the *Vespertilionidae* (Common bats). The lesser horseshoe bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: common *Pipistrellus pipistrellus*, soprano *Pipistrellus pygmaeus* and Nathusius' *Pipistrellus nathusii*, four *Myotids*: Natterer's *Myotis nattereri*, Daubenton's *Myotis daubentonii*, whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii*, the brown long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Whiskered and Natterer's bats are listed as '*Threatened in Ireland*', while the other species are listed as 'Internationally Important' in the Irish Red Data Book 2: Vertebrates (Whilde, 1993). The population status of both Whiskered and Natterer's bats was considered '*indeterminate*' because of the small numbers known of each, a few hundred and approximately a thousand respectively. Ireland is considered to be an international stronghold for Leisler's bat, whose global status is described as being at '*low risk, near threatened*' (LR; nt) by the IUCN (Hutson, *et al*., 2001).

Near threatened status is applied to those taxa that are close to being listed as vulnerable (facing a high risk of extinction in the wild in the medium-term future on the basis of a range of criteria defined by the IUCN). The Irish population of the Lesser Horseshoe Bat is estimated at 14,000 individuals and is considered of International Importance because it has declined dramatically and become extinct in many other parts of Europe. Data collected shows that the species increased significantly between from the early 1990's to present.

A review of existing bat records within hectad W77 (NBDC 28/01/22) showed that seven bat have been recorded (**Table 9.8**).

Table 9.8. Presence of Irish bat species within hectad W77

Common name	Scientific name	Presence
Lesser Noctule	*Nyctalus leisleri*	Present
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Present
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Present
Daubenton's Bat	*Myotis daubentonii*	Present
Natterer's Bat	*Myotis nattereri*	Present
Brown Long-eared Bat	*Plecotus auritus*	Present
Whiskered Bat	*Myotis mystacinus*	Present
Lesser Horseshoe	*Rhinolophus hipposideros*	Absent
Nathusius's Pipistrelle	*Pipistrellus nathusii*	Absent

NBDC 28/01/22

It is noted that other species which have not been included within this database are also likely to occur. Lesser Horseshoe Bat *Rhinolophus hipposideros* is the only species of bat listed on Annex II of the Habitats Directive (Directive 92/43/EEC). The closest recorded records for Lesser Horseshoe Bat is approximately 18km west of the study area (NBDC records). Brandt's *Myotis brandtii* bats have not been recorded in the local area to date. This is a rarer Irish species, which is less likely to occur.

All bat species are protected under the Wildlife Acts (1976 & 2000) which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat;
- Possess or control any live or dead specimen or anything derived from a bat;
- Wilfully interfere with any structure or place used for breeding or resting by a bat; or
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

All bats are listed on Annex IV of the EU Habitats Directive. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by NPWS. Furthermore, on 21st September 2011, the Irish Government published the European Communities (Birds and Natural Habitats) Regulations 2011 which include the protection of the Irish bat fauna and further outline derogation licensing requirements. **Table 9.9** summarises the protection given to bats by national and international legislation and conventions.

Table 9.9. Legislative protection for bats in Ireland

Legislation/Convention	Relevance to Irish bats
Irish Wildlife Act (1976) & Irish Wildlife (Amendment) Act 2000.	It is an offence to wilfully interfere with or destroy the breeding or resting place of bats, (with some exemptions for certain kinds of construction development). Provides for the creation of NHAs.
EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC), commonly known as the 'Habitats Directive	Lists all the vesper bats in Annex IV as in need of strict protection and also encourages Member States to conserve landscape features such as river corridors, field boundaries, ponds and woodlands. It also requests that Member States establish a system to monitor the incidental capture and killing of the animals listed in Annex IV. The lesser horseshoe bat is further listed in Annex II of the EU Habitats Directive The level of protection offered to lesser horseshoe bats effectively means that areas important for this species are designated as Special Areas of Conservation.
The Convention on the Conservation of European Wildlife and Natural Habitats, commonly known as the 'Berne Convention'.	It obliges states to protect and conserve animals and their habitats, especially those listed as endangered or vulnerable. Also obliges parties to promote national policies for the conservation of wild fauna and natural habitats
The Convention on the Conservation of Migratory Species of Wild Animals, commonly known as the 'Bonn Convention'.	This led to the European Bats Agreement (EUROBATS), which lists a wide range of objectives, including promoting research programmes relating to the conservation and management of bats, promoting bat conservation and public awareness of bats, and identifying and protecting important feeding areas of bats from damage and disturbance.

A study by Lundy *et al.* (2011) examined the relative importance of landscape and habitat associations across Ireland. Maximum Entropy Models (MEM) were constructed for each bat species using records from the National Bat Database from 2000-2009. This method allows species' records that have not been collected in a systematic survey to be analysed. The results help explain patterns of species' occurrence and predict where species might occur. Landcover (CORINE), topography, climate, soil pH, riparian habitat and human bias factors were incorporated into the models. The analyses provide a picture of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species. This also provides a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. The habitat indices for all Irish bats for the landscape within the vicinity of the proposed development sit is shown in **Table 9.10**.

Table 9.10. Model Predicted Habitat suitability indices for All Irish bat species at the study area

Latin Name	Common Name	Habitat indices
All Bats		35.56
Pipistrellus pygmaeus	Soprano pipistrelle	50
Plecotus auratus	Brown long-eared bat	51
Pipistrellus pipistrellus	Common pipistrelle	48
Rhinolophus hipposideros	Lesser horseshoe	0
Nyctalus leisleri	Leisler's bat	49
Myotis mystacinus	Whiskered bat	43
Myotis daubentoniid	Daubenton's bat	30
Pipistrellus nathusii	Nathusius' pipistrelle	10
Myotis nattereri	Natterer's bat	39

Source: NBDC 28/01/22

Bat Building Survey

All buildings earmarked for demolition and/or repurpose in the Phase 2 'The Farm' development site were surveyed to determine their value as bat roosts. There are no buildings located in the Phase 1 'The Meadows' or Phase 3 'North Fields' sites with the exception on an icehouse in Phase 3 'North Fields'. The icehouse is easily accessible and used recreationally, including lighting fires and is considered of negligible value for bats. It will not be affected by the Phase 1 'The Meadows' and Phase 2 'The Farm' developments. The value of buildings as potential bat roosts was classified using the criteria specified in Collins (2016) to assess the potential value of structures as bat roosts.

Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures. Full details of this survey are included in **Appendix 9.4**.

In total there are 10 buildings earmarked for demolition and 2 for refurbishment. These buildings include small stand-alone buildings within the formal garden which are of modern construction and several buildings, including older buildings, which form part of a complex around the courtyard.

The playhouse and wooden lodge are modern single storey structures within the formal gardens and are of negligible value as bat roosts (**Buildings 8, 9, 10 and 11 in Appendix 9.4**).

Building 7 Appendix 9.4, is an open barn which is in an advanced state of disrepair and is considered of negligible value for bats. Similarly **Building 12 Appendix 9.4** open structures in an advanced state of disrepair. Many of the remaining buildings have open or broken windows and doors which makes them drafty and lowers their value as potential bat roosts (**Appendix 9.4 Building 1 and Building 2**

Older buildings, including those constructed of limestone, are roofed in corrugated iron which can lead to temperature fluctuations and they lack obvious access points (**Appendix 9.4, Building 3, Building 4, Building 5**). Where these buildings have an open interior, such as **Building 3 of Appendix 9.4**, which is used as a sports hall, there is an absence of structures that would provide high value roosting habitat. **Building 6** with its metal roof has limited bat potential and has no suitable cracks of crevices were recorded within external walls that are of significant value for roosting bats No suitable cracks of crevices were recorded within external walls or linear stone walls that are of significant value for roosting bats.

Overall, the buildings on site are not considered of high potential value for roosting bats and no signs of bats or of bat emergence was recorded during bat surveys (See below).

Bat Tree Surveys

It is noted that while the arboriculture assessment was used in support of the Preliminary Roost Assessment (PRF), the conclusions on the value of each tree for bats was determined by the ecologist and not the arboriculture assessment. Evidence indicating bat presence, includes dark stains running below holes or cracks, bat droppings, odours, or scratch marks. The project has been designed to minimise tree removal and only a small proportion of the mature trees within the study area will be affected. Where possible, crown reduction or removal of branches will be utilised. Full details of the preliminary ground level roost assessment of trees earmarked for removal is included in **Appendix 9-4**. Following the initial preliminary ground level roost assessment, a climbing survey was carried out to inspect trees considered of moderate potential value for bats or to inspect particular structural elements within low value trees such as cracks and crevices. The tree climbing survey did not record any evidence of bats and further detail is provided in **Appendix 9-4**. It is noted that trees that were considered of negligible value for bats (generally young trees, trees without dense ivy and trees with smooth bark without PRFs such as cracks and crevices) are not included in

Appendix 9-4 as these trees were excluded as potential habitat for bats based on an initial preliminary ground level assessment.PRFs that can occur in trees as detailed in Collins (2016) include the following:

- rot holes
- hazard beams
- other vertical or horizontal cracks and splits (such as frost cracks) in stems or branches
- partially detached platey bark
- knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar
- man-made holes (e.g cavities that have developed from flush cuts) otr cavities created by branches tearing from the parent stems
- cankers (caused by localised bark death) in which cavities have developed
- other hollows or cavities including butt rot
- double-leaders forming compression forks which included bark and potential cavities
- gaps between over lapping stems or branches
- partially detached ivy with stem diameters in excess of 50mm
- bat or bird boxes.

It is noted that although some mature trees will be removed, the vast majority of the trees within the study area will be retained. The trees to be removed lack significant potential roost features (PRFs). Although a small number of trees were checked to determine usage via a climbing survey, no signs of bat usage was recorded. Some of the trees support ivy, which varied from immature growth at ground level to occasionally dense growth. Partially detached ivy with stem diameters in excess of 50mm was not common and most ivy was either not detached and/or of insufficient diameter. One bat box is *in situ* on a semi-mature Oak that is located within the Phase 1 'The Meadows' boundary adjacent to the greenway. This tree will be retained with the removal of a small number of side branches which are not of value for bats.

As detailed below four bat species were recorded during bat activity surveys, namely Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat and Brown Long-eared. Kelleher and Marnell (2006), uses the following classification scheme to classify usage of trees and buildings and maternity and hibernation roosts by these species (**Table 9.11**)

Table 9.11. Bat Species Roost Classification Scheme (Kelleher and Marnell (2006)

Species	Trees		Buildings	
	Maternity	Hibernation	Maternity	Hibernation
Common pipistrelle *Pipistrellus pipistrellus*	M	M	H	H
Soprano pipistrelle *Pipistrellus pygmaeus*	M	M	H	H
Leisler's bat *Nyctalus leisleri*	M	M	H	L
Brown long-eared bat *Plecotus auritus*	H	H	H	H

N – not recorded in recent times, L – low dependence; unusual, but has been recorded, M – some usage recorded, though perhaps not the most important type of site, H – the most frequently recorded type of site for this species/activity

As detailed above Soprano Pipistrelle and Common Pipistrelle show preferential use of buildings for maternity and hibernation roosts. Leislers Bat show preferential use of buildings for maternity roosts. For Brown Long Eared buildings and trees are classed as equally utilised for maternity and hibernation roosts.

Therefore although it is noted that bat roosts in trees may be under-recorded, Leislers Bat, Soprano Pipistrelle and Common Pipistrelle are more likely to used buildings than low suitability trees. Radio-tracking has shown that bats are very variable in the distances that they travel from their roosts to forage. For example, at some roost sites for Daubenton's, bats activity took place within 2km of the roost whereas at other roosts some individuals travelled up to 19km to forage. Brown Long-eared Bats appear to be a relatively sedentary species, with few individuals travelling more than 2km whereas other species such as Leisler's Bat will frequently travel more than 5km from their roost sites (Kelleher and Marnell 2006). It is noted that the study area is located within an urban environment where there are numerous structures within a 2km radius and beyond. These structures are likely to provide potential roosting habitat which would be expected to be of higher value than trees within the study area which are of limited value as potential roosts.

For Brown Long-eared Bat, no preference is recorded for trees or buildings for maternity and hibernation roosts. This species is strongly associated with tree cover, prefers woodland with cluttered understorey including native species, particularly deciduous and also forages in mixed woodland edge and among conifers (Collins, 2016). Brown Long-eared Bat was recorded using the woodland on the western boundary of the study area (within Phase 3 'North Fields' boundary) and tree removal here will be minimised. Two dead trees and one live Yew tree will be removed and loss of these trees is considered of negligible significance in the context of the number of other trees retained in the vicinity.

None of the trees to be removed are considered of significant value for bats, although taking a worst case scenario approach, the presence of occasional roosting bats cannot be altogether ruled out. Collins (2016) notes that surveying for bat roosts can be more challenging than surveying buildings because many species that use trees for roosts exhibit switching behaviour, including Daubentons Bat, Natterers Bat, Leislers Bat and Common Pipistrelle. Roost switching has been observed in Natterers Bat on average every three days and Leislers Bat between every two and ten days.

As noted in Kelleher and Marnell (2006), confirmation of the presence of bats may be attempted by using bat detectors for an emergence survey at an appropriate time of the year. If inspection suggests that the tree has suitable cavities or roost sites, a bat detector survey at dusk or dawn during the summer may produce evidence of bats. However the nomadic nature of tree-dwelling bats means that the success rate is likely to be very low. It can also be difficult to pinpoint exactly which tree a bat emerged from. Climbing trees to look for roosts, using appropriate equipment and safety precautions, is a possible approach for small numbers of trees with a high probability of bats, but the results of radiotracking studies of some species suggest that bats may use cracks or crevices that are far from obvious.

In respect of the study area, it is noted that no trees which are considered of high value as potential bat roosts were recorded. Ivy was recorded on a number of trees but climbing surveys to search ivy is problematic and it is extremely difficult to locate bats in these circumstance without an intrusive survey which would remove vegetation and damage any potential roosts. Following the initial preliminary ground level roost assessment, a climbing survey was carried out to inspect trees considered of moderate potential value for bats or to inspect particular structural elements within low value trees such as cracks and crevices. No signs of bat usage was recorded.

Based on the above, removal of trees, which will incorporate specific mitigation measures, will not have a significant impact on local bat populations in the context of a landscape where there are a large number of mature trees of comparable or higher value and numerous buildings in the wider landscape that provide potential roosting habitat. It is also noted that bat boxes will be provided which will provide bat roosting habitat which is likely to be of higher value for bats than that provided by the trees to be removed. Detailed mitigation will be put in place prior to and during construction to prevent any potential impacts on bats.

Bat activity/emergence surveys

Night-time bat emergence surveys were carried out on several dates within the study area and covered habitats in Phase 1 'The Meadows', Phase 2 'The Farm' and Phase 3 'North Fields'. The survey followed the guidelines set out in '*Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed*)' (Collins, 2016). Surveys focused on linear features within the study area as well as trees and buildings earmarked for removal.

Habitats within the study area which are of most potential value for bats include broadleaved woodland, parkland and treelines. Relatively large blocks of woodland are not common in this general suburban area and as such it provides a high value resource for local bats.

Moderate levels of bat activity were recorded within the study area during the bat surveys carried out in 2021. Four species were recorded namely Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat and Brown Long-eared.

Within the Phase 1 'The Meadows' development site, small numbers of Common Pipistrelle and Leisler's Bat were recorded. These bats were recorded predominantly commuting/foraging along the treeline/woodland on the western boundary of the site. With the exception of the treeline/woodland on the western boundary, the mixture of habitats within this area is of limited value for foraging bats.

Within the Phase 2 'The Farm' development site the primary foraging habitat is the formal walled garden. Leisler's Bat, Common Pipistrelle and Soprano Bat were recorded foraging and commuting within this area. Most of the activity was recorded along the treeline which borders the entrance road along the western boundary. Only small numbers of bats were recorded. No bat emergence was recorded from any of the buildings earmarked for demolition and/or repurpose. Surveys of the buildings did not record any signs of bats including dropping, staining and prey remains (See above).

The large area of woodland within the Phase 3 'North Fields' site is of high potential value for bats. Leisler's Bat, Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared Bat were recorded foraging/commuting along the eastern edge of the woodland. There are a large number of mature trees within the woodland which have the potential to support bat roosts. However only minor tree removal is proposed for removal within the Phase 3 North Field's area.

9.4.3.2 Otter

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Direct which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for Otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting placing or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called "couches" are formed (NRA, 2008). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and Otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Cork and Limerick City. Thus, Otters are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

A review of existing NBDC records showed that Otter or signs of Otter have been recorded on 31 occasions within grid square W77, the most recent being in September 2018. Otters are known to occur throughout Cork Harbour and within Cork City itself (Sleeman, 2005).

There are no watercourses within the study area. Otter have been recorded regularly along the Douglas Estuary which is located approximately 70m south of the study area (NBDC). However the study area is separated from the Douglas Estuary by the busy National Route N40 and is unlikely to provide significant habitat for Otter. The pond within the

Phase 3 'North Fields' site is currently in poor ecological condition with a heavy accumulation of rotting leaves, deep silt, discoloured water and a strong odour. It discharges to the Douglas Estuary via a short open section of channel. It is unlikely to support fish or amphibians and is not therefore of significant value as a feeding resource for Otter. The study area is of Local importance (Lower value) for Otter.

9.4.3.3 Other terrestrial mammals

Eighteen other species of terrestrial mammal have been recorded within grid square W77. Eight of which are protected under the Irish Wildlife Act 1976 as amended, namely Badger (*Meles meles*), Pygmy Shrew (*Sorex minutus*), Red Squirrel (*Sciurus vulgaris*), Fallow Deer (*Dama dama*), Irish Hare (*Lepus timidus subsp. hibernicus*), Sika Deer (*Cervus nippon*), Irish Stoat (*Mustela erminea subsp. hibernica*) and Hedgehog (*Erinaceus europaeus*).

Rabbits (*Oryctolagus cuniculus)* were regularly recorded within the Phase 2 'The Farm' site boundary. Rabbits are not protected under the Wildlife Act 1976, as amended.

Badger

Badger setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage to a protected species. Badgers are also protected under Appendix III of the Berne. Badger have been recorded on 33 occasions in W77.

No signs of Badger were recorded within the study area. Although one entrance hole has been excavated in the margins of the woodland within the Phase 3 'North Fields' site boundary, rabbits are common in this area and it is considered probable that an existing rabbit burrow was widened by dogs. No latrines were located. Although Badger do utilise woodland, the high levels of disturbance and the isolated nature of the site may have prevented this species from becoming established. The study area is of Local importance (Lower value) for Badger.

Fallow Deer

Ireland's second largest deer species and are the most widespread of the deer, found in nearly every county of the island. In Ireland the fallow deer mainly resides in mature deciduous or mixed woodlands which are close to open grassland. Fallow deer is not likely to occur within or in the vicinity of the proposed site. From the NBDC records, there is one record of Fallow deer within hectad W77, in December 2008.

No evidence of Fallow Deer was observed within the study area. and the study area is of negligible value for this species.

Hedgehog

Listed on Appendix III of the Berne Convention and can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. Due to the habitats recorded within the study area and surrounding landscape, hedgehog is unlikely to occur. From the NBDC records, there are 18 records of Hedgehogs within hectad W77, the latest being in October 2015.

No evidence of Hedgehogs was observed within the study area. However Hedgehog are likely to use the study area. Given the habitats onsite, the study area is of Local importance (Higher value) for Hedgehog.

Irish Stoat

Irish stoats occur in most habitats with sufficient cover, including urban areas. From the NBDC records, there are 10 records of Stoat within hectad W77, the latest being in October 2015.

No evidence of Stoat was observed within the study area. However, given the widespread distribution and range of habitats used, Stoats could potentially use habitats within the study area. Given the habitats onsite the study area is of Local importance (Lower value) for Irish Stoat.

Red Squirrel

Listed on Appendix III of the Berne Convention can be found throughout Ireland. Red squirrel is known to occur in the wider area (NBDC records), however there is no suitable habitat for Red Squirrel within the study area. From the NBDC records, there are 62 records of Red Squirrel within hectad W77, the latest being in October 2018. Given the habitats onsite the study area is of Local importance (Higher value) for Red Squirrel.

Irish hare

Listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book.

The Irish hare is adaptable and lives in a wide variety of habitats. It typically reaches its highest densities on farmland, particularly where there is a mix of grassland and arable fields along with hedgerows and other cover. There is no suitable habitat for this species within the study area. From the NBDC records, there are 4 records of Irish Hare within hectad W77, the latest being in May 2017. No evidence of Irish Hare was observed during within the study area. and the study area is of negligible value for this species.

Pygmy Shrew

Common throughout mainland Ireland and has a preference for habitats such as hedgerows and grasslands; they have also been found utilizing stone walls. Pygmy Shrew could potentially occur within the study area. From the NBDC records, there are 5 records of Pygmy Shrew within hectad W77, the latest being in January 2016.

No evidence of Pygmy Shrew was observed within the study area. However Pygmy Shrew are likely to use the study area. Given the habitats onsite the study area is of Local importance (Higher value) for Pygmy Shrew.

Sika Deer

Sika Deer is the smallest of the three deer species now resident in Ireland. They are non-native species with the first Irish population introduced to the Powerscourt estate in county Wicklow in 1860 then to Killarney four years later. They are protected under the Wildlife Act in the republic and under the 1985 Wildlife Order in Ulster although they are listed as a quarry species and can be hunted under license. Sika deer are mainly associated with woodland areas which have open grasslands nearby. There is no suitable habitat for this species within the study area. From the NBDC records, there are two records of Sika Deer within hectad W77, the latest being in July 2015.

No evidence of Sika Deer was observed during within the study area. and the study area is of negligible value for this species.

9.4.3.4 Reptiles and Amphibians

According to records held by the NBDC, Common Frog (*Rana temporaria*) and Smooth Newt (*Lissotriton vulgaris*) are the only amphibians recorded within grid square W77 (NDBC 22/01/21). The reptile species Common Lizard (*Zootoca vivipara*) and Red-eared Terrapin (*Trachemys scripta*) have also been recorded.

Common Frog is listed in Annex V of the EU Habitats Directive and is protected under the Wildlife Acts. No evidence of Common Frog was observed during within the study area.

Smooth Newt is the only member of the Urodela (the tailed amphibians) found in Ireland. While commonly encountered near water bodies, adult newts are actually terrestrial, only returning to water bodies to breed.

The pond within the Phase 3 'North Fields' site boundary has poor water quality and is not of value for amphibian species in its current condition. There are no wetland habitats within the Phase 1 'The Meadows' or Phase 2 'The Farm' site boundaries. The study area is of neglible value for amphibian species.

Common Lizard is Ireland's only native terrestrial reptile and is so protected under the Wildlife Act.. The species has not been recorded the vicinity of the study area (NBDC) and it is unlikely that the species occurs within or in proximity to the study area.

9.4.3.5 Birds

Birds species listed in Annex I of the Birds Directive are considered a conservation priority. During the survey, all birds seen or heard within the development site were recorded. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size (Gilbert *et al*. 2021). BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable.

The National Biodiversity Centre online data base lists 162 species of bird recorded within grid square W77. Of these species, a number are listed under Annex I of the Birds Directive and are Red Listed Birds of Conservation Concern in Ireland (Gilbert *et al*. 2021) (**Table 9.12**).

Table 9.12. Bird species listed under Annex I of the Birds Directive and/or classified as Red Listed Birds of Conservation Concern in Ireland recorded within grid square W77

Species	Birds Directive Annex	BOCCI
	I	Red List
Whooper Swan	X	
Great Northern Diver	X	
Little Egret	X	
Little Gull	X	
Peregrine Falcon	X	
Golden Plover	X	X
Bar-tailed Godwit	X	X
Kingfisher	X	
Common Tern	X	
Corncrake	X	X
Dunlin	X	X
Hen Harrier	X	
Mediterranean Gull	X	
Merlin	X	
Short-eared Owl	X	
Wigeon		
Shoveler		X
Tufted Duck		
Long-tailed Duck		X
Goldeneye		X
Lapwing		X
Woodcock		X
Curlew		X
Redshank		X
Black-headed Gull		
Herring Gull		
Barn Owl		X
Meadow Pipit		X
Grey Wagtail		X
Yellowhammer		X

Source NDBC 28/01/22

Winter Birds

Winter bird surveys were carried out at the study area during winter 2020/2021. Initial assessment determined that the only suitable winter bird foraging/roosting habitat within the study area was located within the Phase 3 'North Fields' site boundary. The dominance of scrub habitat at the Phase 1 'The Meadows' development site means that this does not provide suitable habitat for foraging/roosting waterfowl/waders. The tree, wall and building cover make the Phase 2 'The Farm' development site largely undesirable for waterfowl and waders which prefer open sites with good visibility for roosting and foraging.

The Phase 3 'North Fields' development site includes an area of large open grassland which could potentially be used as foraging or high tide roost location for wading birds. The Phase 3 'North Fields' site is separated from the Mahon Golf Course and Cork Harbour SPA, located to the west of the site, by a large band of mature trees.

Small numbers of Herring Gull, Lesser Black-backed Gull were recorded overflying the site at a height during several survey days, but no waterfowl, waders or gulls were recorded within the study area. Small flocks of Woodpigeon *Columba palumbus*, Startling *Sturnus vulgaris* and Rook Corvus frugilegus were recorded here on several occasions.

Personal communication from Bessborough staff indicate that this site was historically used by Curlew *Numenius arquata*, but it has been several years since these birds were recorded onsite. The Red List species Meadow Pipit *Anthus pratensis* appears to be resident in the Phase 3 'North Fields' site. Common passerine species were recorded within the study area throughout the winter surveys including Goldfinch *Carduelis carduelis*, Jackdaw *Corvus monedula*, Rook, Magpie *Pica pica*, Robin *Erithacus rubecula*, Hooded Crow *Corvus cornix*, Blackbird *Turdus merula*, Woodpigeon and Songthrush *Turdus philomelos*. Goldcrest and Starling are Amber List species of conservation concern (Gilbert *et al.* 2021).

Further detail on the impact of the proposed development on Cork Harbour SPA is included in the Natura Impact Statement (NIS) for each phase (ref Appendix 9-5 and Appendix 9-6).

Breeding Birds

Breeding bird surveys were carried out at the study area on 28 April and 22 June 2021. The study area supports relatively high numbers of common bird species. However the numbers and diversity of threated species such as BOCCI Red List and Amber List species was low. No Annex I species were recorded within the study area. Birds recorded during breeding bird surveys are listed in **Table 9.13**.

Table 9.13. Birds recorded during breeding bird surveys of the study area

Species		Birds Directive Annex	BOCCI		Potential number of territories within site boundary	Breeding Status*
		I	Red List	Amber List		
Phase 1 'The Meadows' development site						
Turdus merula	Blackbird				6+	Confirmed
Cyanistes caeruleus	Blue Tit				2	Probable
Fringilla coelebs	Chaffinch				3	Confirmed
Phylloscopus collybita	Chiffchaff				1	Probable
Prunella modularis	Dunnock				3	Probable
Regulus regulus	Goldcrest			X	2	Probable
Parus major	Great Tit				2	Probable
Corvus cornix	Hooded Crow				NA	Overflying
Garralus glandarius	Jay				NA	Overflying
Pica pica	Magpie				NA	Overflying
Turdus viscivorus	Mistle Thrush				2	Probable
Erithacus rubecula	Robin				3	Confirmed
Turdus philomelas	Song thrush				1	Probable
Phylloscopus trochilus	Willow Warbler			X	1	Probable
Columba palumbus	Wood Pigeon				2	Probable
Troglodytes troglodytes	Wren				3	Probable
Phase 2 'The Farm' Development Site						
Turdus merula	Blackbird				2	Confirmed
Cyanistes caeruleus	Blue Tit				2	Proablbe
Pyrrhula pyrrhula	Bullfinch				1	Probable
Fringilla coelebs	Chaffinch				2	Confirmed
Prunella modularis	Dunnock				2	Probable
Regulus regulus	Goldcrest			X	1	Probable
Parus major	Great Tit				2	Probable
Corvus monedula	Jackdaw				1	Confirmed
Pica pica	Magpie				NA	Overflying
Erithacus rubecula	Robin				3	Confirmed
Turdus philomelas	Song thrush				1	Probable
Hirundo rustica	Swallow			X	3	Confirmed
Columba palumbus	Wood Pigeon				1	Confirmed
Troglodytes troglodytes	Wren				2	Probable
Phase 3 'North Fields' Development Site						
Turdus merula	Blackbird				3	Confirmed
Cyanistes caeruleus	Blue Tit				2	Confirmed
Fringilla coelebs	Chaffinch				2	Confirmed
Phylloscopus collybita	Chiffchaff				2	Probable
Prunella modularis	Dunnock				3	Probable
Regulus regulus	Goldcrest			X	1	Probable
Corvus cornix	Goldfinch				2	Confirmed
Parus major	Great Tit				2	Probable
Corvus cornix	Hooded Crow				NA	Overflying
Garralus glandarius	Jay				1	Probable
Pica pica	Magpie				1	Confirmed
Anthus pratensis	Meadow Pipit		X		2	Confirmed
Turdus viscivorus	Mistle Thrush				2	Probable
Erithacus rubecula	Robin				2	Probable
Turdus philomelas	Song thrush				1	Probable
Sturnus vulgaris	Starling			X	NA	Overflying
Hirundo rustica	Swallow			X	NA	Overflying
Phylloscopus trochilus	Willow Warbler			X	1	Probable
Columba palumbus	Woodpigeon				2	Confirmed
Troglodytes troglodytes	Wren				3	Probable
Anas platyrhynchos	Mallard			x	NA	Foraging in pond

*BTO Breeding bird status

A total of sixteen bird species were recorded within the Phase 1 'The Meadows' site boundary. No Red List species were recorded within the Phase 1 'The Meadows' site. Two Amber List species i.e. Willow warbler *Phylloscopus trochilus* and Goldcrest *Regulus regulus* were recorded during the breeding season. The remaining species recorded were common Green List species e.g. Blackbird *Turdus merula*, Robin *Erithacus rubecula* Wren *Troglodytes troglodytes* and Great tit *Parus major*. The vegetation cover both as scrub within the site interior and the treeline/woodland on the eastern boundary of the site means that the Phase 1 'The Meadows' site supports a high number of nesting birds, in particular Blackbird. The majority of birds appeared to be nesting within the treeline habitat where mature trees provide valuable nest site for a range of bird species. The areas of grassland both within the Phase 1 'The Meadows' site and as well as a larger areas of grassland and patches of recolonising vegetation within the study area provide a range of foraging habitat for these woodland edge bird species.

A total of fourteen bird species were recorded within the Phase 2 'The Farm' site boundary. No Red List species were recorded within the Phase 2 'The Farm' site. Two Amber List species i.e. Goldcrest *Regulus regulus* and Swallow *Hirundo rustica* were recorded during the breeding season. Swallows were recorded foraging within the formal walled

garden and nesting within the buildings onsite (**Figure 9.11**). Jackdaw was recorded nesting on the farm building which bordered the parkland. The remaining species recorded were common Green List species e.g. Blackbird *Turdus merula*, Bullfinch *Pyrrhula pyrrhula*, Robin *Erithacus rubecula,* Wren *Troglodytes troglodytes* and Blue Tit *Cyanistes caeruleus.* The formal garden (parkland habitat) with scattered trees within the Phase 2 'The Farm' site provides ideal habitat for common bird species such as Blackbird, Robin and Song Thrush. The trees here provide nesting habitat, while the open short sward grassland provides foraging habitat and ready access to invertebrate species. The maintenance regime within the Phase 2 'The Farm' site means that the habitat is more homogenous, with little ground cover and understorey vegetation. For this reason is supports a lower diversity of birds than other sites within the study area.

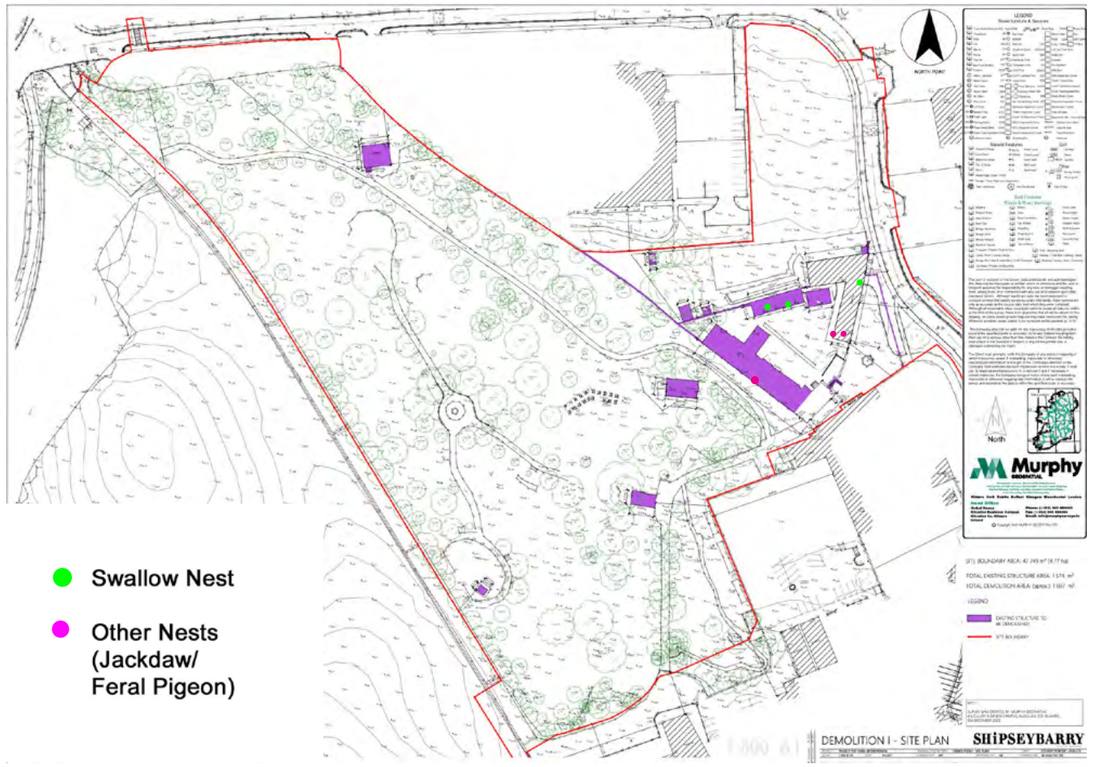


Figure 9.11. Location of Swallow and other bird species nests in Phase 2 'The Farm' site buildings

A total of twenty one bird species were recorded within the Phase 3 'North Fields' site boundary. One Red List species, Meadow Pipit was breeding here as well as four Amber List species i.e. Goldcrest, Willow Warbler, Swallow, Starling *Sturnus vulgaris*. The Phase 3 'North Fields' site is covered largely by two large fields which are occasionally grazed by horses. The large area of grassland habitat within the Phase 3 'North Fields' site supports resident Meadow Pipit which were recorded throughout the winter and summer surveys. Meadow Pipit are a ground nesting species which makes them particularly vulnerable to disturbance and egg damage during the breeding season. The maintenance regime on the southern field in Phase 3 'North Fields' was less intensive and patches of early successional plant species recorded here during the 2020/2021 surveys supported flocks of foraging Goldfinch *Carduelis carduelis*. However it is noted that this area has been recently sprayed/cleared (in 2022). A broad treeline/mature woodland habitat runs along the southern and eastern boundary of the Phase 3 'North Fields' site, separating it from the national route N40 to the south and the Mahon Gold Course to the west. This provides valuable nesting habitat for a range of common bird species. Mallard were recorded on the pond within the woodland along the western boundary.

The highest value habitat for birds is the woodland on the western boundary of Phase 3 'North Fields' development site as this habitat is uncommon in the wider landscape. It supports a range of passerine species (See **Table 9.13**) and is likely to attract predatory species such as Kestrel and Sparrowhawk. The formal garden in Phase 2 'The Farm' is utilised by common woodland edge species such as Blackbird and Dunnock. In Phase 1 'The Meadows' areas of scrub provide cover and areas of and recolonising bare ground and unmanaged grassland provide foraging resources provide habitat for species such as Goldfinch and Chaffinch. Swallow nests were recorded in some of the buildings within Phase 2 'The Farm', however nesting sites are unlikely to be a limited resource for this species in the context of an urban/suburban landscape.

Overall the study area provides valuable habitat for a range of common bird species. Mature trees within boundary habitats as well as scrub habitat provide a range of nesting habitats. Meadow Pipit are an increasing rare species throughout Ireland, but are especially rare in Cork City due to the absence of low maintenance grassland habitats which this species require for breeding and foraging. The study area is of Local importance (Higher value) for terrestrial bird species that are relatively common in the Irish countryside.

9.4.3.6 Other species

A search of the NBDC database was carried out to determine if any protected, rare or notable species of invertebrates within 2km of the study area (W77A and W77F). A number of threated invertebrate species have been recorded within W77A and W77F i.e. *Andrena (Melandrena) nigroaenea*, Gipsy Cuckoo Bee (*Bombus (Psithyrus) bohemicus*), *Halictus (Seladonia) tumulorum*, Hill Cuckoo Bee (*Bombus (Psithyrus) rupestris)*, Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*), Blind Snail (*Cecilioides (Cecilioides) acicula*), Point Snail (*Acicula fusca*) and Silky Snail (*Ashfordia granulata*).

During the habitats survey no rare or notable species of invertebrate species were observed within the application site. Whilst no site is without invertebrate interest, it is considered unlikely, given the habitat types, that the study area would support any protected invertebrate species.

9.5 Impact Assessment

Potential effects have been described according to Section 3.7 of the *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'*, (EPA 2017) which provides standard definitions to classify the effects in respect of ecology. Further information on this classification scheme is outlined in Chapter 1- Introduction.

9.5.1 Do-Nothing Scenario

9.5.1.1 Phase 1 'The Meadows'

The general pattern of succession from scrub to woodland would be expected to continue. Formally disturbed areas and areas that have been left unmanaged are being recolonised by vegetation. In the absence of development, it is expected that the Phase 1 'The Meadows' site would largely remain under the same management regime. Bee Orchid is unlikely to persist in the absence of active management as it requires open conditions. In the absence of management invasive species are likely to spread and potentially impact on other scrub and woodland habitat. No significant changes to the boundary treeline/woodlnad is likely to occur in the absence of development. Bats and common birds species which use this area would be expected to continue to use this area in the absence of development.

9.5.1.2 Phase 2 'The Farm'

The current management regime of regular mowing and tree trimming within the formal gardens would be expected to continue. This regime means that natural patterns of succession will not occur and habitats will remain as described in **Table 9.4**. Bats and common birds species which use the Phase 2 'The Farm' site would be expected to continue to use this area in the absence of development.

Within habitats outside the formal parkland setting, the general pattern of succession from scrub to woodland would be expected to continue. Formally disturbed areas and areas that have been left unmanaged are being recolonised by vegetation. In the absence of development, it is expected that the proposed works areas would largely remain under the same management regime. Bee Orchid is unlikely to persist in the absence of active management as it requires open conditions In the absence of management invasive species are likely to spread and potentially impact on other scrub and woodland habitat. No significant changes to the boundary treelines are likely to occur in the absence of development.

9.5.1.3 Combined Phase 1 'The Meadows' and Phase 2 'The Farm'

No combined effect has been identified.

9.5.2 Construction

In the absence of mitigation measures, construction phase impacts have the potential to remove/damage habitats and disturb or displace protected species throughout the estimated 24 month duration of construction. Significant potential impacts to terrestrial biodiversity include habitat loss, noise and visual disturbance (including lighting) to protected fauna species, and the potential for suspended solids or other contaminants to be carried into local waterbodies, particularly following topsoil stripping.

It is noted that main sources of noise and vibration associated with the construction of the proposed development is from piling works. Construction works will take place during normal daytime hours.

9.5.2.1 Phase 1 'The Meadows'

9.5.2.2 Potential Effects on Habitats

The majority of habitats and flora within the site's interior will be removed. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Effects on terrestrial habitats are generally restricted to direct removal of habitats and possible impacts from the spread of invasive species. The predicted impacts are detailed in **Table 9.14**.

Table 9.14. Predicted Impacts on Habitats within the Phase 1 'The Meadows' development site

Habitat	Habitat Value (NRA Guidelines)	Potential Impacts
Buildings and artificial surfaces BL3	Local value (lower importance)	This habitat will be removed as part of Phase 1 'The Meadows' development. Negative, not significant, long-term
Treeline WL2/ Broadleaved woodland WD1	Local value (higher importance)	Most of this habitat will be retained. However, three trees will be removed for the wayleave and footbridge and some trimming of existing trees will be required. Negative, slight, long-term
Scrub WS1/Dry meadow and grassy verge GS2/Recolonising bare ground ED3	Local value (higher importance)	This habitat will be removed as part of Phase 1 'The Meadows' development. Negative, slight, long-term
Scrub WS1	Local value (lower importance)	Part of this habitat will be removed for the wayleave and footbridge. Negative, not significant, long-term
Scattered trees and parkland WD5/ Recolonising bare ground ED3	Local value (higher importance)	Approximately ten trees will be removed within this habitat for the Phase 1 wayleave. Negative, slight, long-term
Improved agricultural grassland GA1	Local value (lower importance)	This habitat will be removed Negative, not significant, long-term
Broadleaved woodland WD1	Local importance (higher value)	Small section of woodland on western periphery of study area affected, by removal three to four trees and ground disturbance. Negative, slight, long-term

Bee Orchid was recorded within the Phase 1 'The Meadows' site. This species has a widespread but local distribution and is not listed in the Flora Protection Order 2015. As scrub will continue to develop in the absence of development this species is unlikely to persist as it requires open conditions. The habitats within the footprint of the proposed development are not rare, threatened nor do they require any special protection under existing or pending legislation. Potential impacts on habitats within Natura 2000 sites within the ZoI are included in the NIS for Phase 1 'The Meadows' which accompanies this application. This report concluded the following:

It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted effects from the proposed development and with the implementation of the mitigation measures proposed, that the construction and operation of the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects. There is no reasonable scientific doubt in relation to this conclusion. The competent authority will make the final determination in this regard.

There are no aquatic habitats located within the Phase 1 'The Meadows' development site. The mature treeline/ woodland along the eastern boundary of the site will be largely retained as part of the proposed development. However, three trees within the treeline/woodland will be removed for the footbridge and ten trees for the wayleave to the west of the site. Some trimming of retained trees will also be required.

Potential Effects from Non-native Invasive Species

Three Third Schedule invasive species were recorded within the Phase 1 'The Meadows' development site i.e., Japanese Knotweed, Himalayan Knotweed and Rhododendron. The third schedule invasive species Himalayan Balsam was recorded immediately south of the Phase 1 'The Meadows' site boundary. Two other invasive species were also recorded i.e. the medium impact species Buddleia and Wild Clematis and the low impact species Winter Heliotrope. There is potential during the construction phase for invasive species to be spread within the boundary of the proposed development, thus impacting negatively on adjoining habitats.

It is noted that while there is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland including Japanese and Himalayan Knotweed, the other medium impact species i.e. Buddleia, Wild Clematis and Winter Heliotrope, are not listed under these regulations. In the absence of mitigation measures the effect of the proposed development on the spread of invasive species during the construction phase is predicted to be negative, slight and short-term.

Potential Effects on Water Quality and Aquatic Ecology

Surface water emissions associated with the construction phase of the proposed development could have potential effects on aquatic/estuarine habitats via increased silt levels in surface water run-off and inadvertent spillages of chemicals such as hydrocarbons from fuel and hydraulic fluid. It is noted discharges to the Douglas Estuary will be via the existing pipe and no works are required adjacent to the Douglas Estuary.

Inadvertent spillages of hydrocarbon and/or other chemical substances during construction could introduce toxic chemicals into the aquatic environment via direct means, surface water run-off or groundwater contamination. Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion or turbulence. Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water; these penetrate into the fish and can have a direct toxic effect. The lighter oil fractions (including kerosene, petrol, benzene, toluene and xylene) are much more toxic to fish than the heavy fractions (heavy paraffins and tars). In the case of turbulent waters, the oil becomes dispersed as droplets into the water. In such cases, the gills of fish can become mechanically contaminated and their respiratory capacity reduced.

If of sufficient severity, aquatic invertebrates may be smothered by excessive deposits of silt from suspended solids. In areas of stony substrate, silt deposits may result in a change in the macro-invertebrate species composition, favouring less diverse assemblages and impacting on sensitive species. Cement can also affect fish, plant life and macroinvertebrates by altering pH levels of the water. Aquatic plant communities may also be affected by increased siltation. Submerged plants may be stunted, and photosynthesis may be reduced.

Potentially, impacts could arise from any inadvertent spills of hydrocarbons or other chemicals during construction. High levels of suspended solids in surface water run-off could potentially have localised impacts on aquatic ecology.

The impact of construction works on the surface water and aquatic ecology in the absence of mitigation will be negative, slight and short-term at a local geographic level.

Potential Effects from Air Emissions (Dust)

Dust emissions during the construction phase could impact on habitats and theoretically could have impacts on associated flora and fauna. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for effects from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations.

Given that there are no sensitive or high value habitats within the proposed development area or in proximity to it, and the limited duration of the construction works, the impacts from dust generation, if any, will be neutral, imperceptible and short-term.

Potential Effects on Bats

No buildings are located within the Phase 1 'The Meadows' site boundary. Three mature trees will be removed within the treeline/woodland on the eastern site boundary for the footbridge access and some trimming of retained trees will be required. Ten trees will be removed in the parkland at the west of the site. The preliminary roost assessment indicated that no trees with significant value for bats will be removed. One bat box is in situ on a semi-mature Oak that is located within the works area adjacent to the Blackrock-Passage greenway. This tree will be retained with the removal of a small number of side branches which are not of value for bats.

Small numbers of Common Pipistrelle and Leisler's bat were recorded foraging along the treeline along on the eastern site boundary of the Phase 1 'The Meadows'. This mature treeline and scrub which runs adjacent to the Blackrock-Passage greenway has moderate suitability as a foraging/commuting route, to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. The scrub, grassland and recolonising bare ground habitat which covers most of the Phase 1 'The Meadows' site has low suitability for foraging/commuting bats. Continuous treeline and hedgerow provides connectivity within the landscape for bats commuting between foraging sites. Even gaps as small as 10m may prevent bats foraging/commuting along hedgerows and treelines (JNCC 2001). The removal of a section of treeline habitat for the wayleave will leave a gap of 9m at ground level, however the gap in the foliage will be smaller than this and will not create a significant barrier to bat movement.

It is noted that outside the Phase 1 'The Meadows' site boundary, there are gaps in this treeline due to tree removal (north of the site) and the N40 route (south of the site). During construction all internal scrub habitat mosaic within the interior of the site will be removed. However, this habitat has a low suitability for foraging bats.

In the absence of mitigation, the construction phase of the proposed development will result in the long-term loss of low to moderate value bat foraging and commuting habitat. This may result in fragmentation impacts or loss of connectivity within the wider landscape.

Noise and lighting during construction has the potential to significantly impact foraging habitats of Common Pipistrelle and Leisler's Bat. Construction works will be confined to daytime hours and therefore disturbance from lighting during construction works will be minimal. However, subject to the agreement of the local authority, out-of-hours working may be required for water main connections, foul drainage connections, tower crane erection and removal etc. Lighting deters some bat species, in particular Myotis species, from foraging. No Myotis species were recorded within Phase 1 'The Meadows' development site or within the study area. Pipistrelle species appear to be more tolerant of light and disturbance (Speakman 1991; Stones *et al*. 2009; Haffner 1986). It is also noted that Leisler's Bats will opportunistically feed on such insect gatherings in lit areas (Bat Conservation Ireland 2010).

Overall, the loss of semi-natural habitat and increased lighting and disturbance during construction (occasional) will reduce the feeding area available for bats. The impact on foraging bats will be negative, slight and long term at a local geographic level.

Potential Effects on Otter

While Otter is known to occur south of the study area along the Douglas Estuary, no valuable habitat for Otter is located within the Phase 1 'The Meadows' development site and no signs of Otter were recorded here. There are no watercourses at the site and wetland habitat along the Douglas Estuary is cut off from the site by heavy traffic on the N40. Given the nature of the proposed development and the existing noise environment, construction activities are not expected to generate significant noise beyond the Phase 1 'The Meadows' site boundary. It is noted that the surrounding landscape are already subject to high levels of disturbance from traffic and human activity. Any mammal species currently utilizing the site are expected to be habituated to ongoing disturbance factors in these circumstances.

Surface water discharges during the construction phase will tie into the existing storm water drainage system. In the absence of mitigation, there is potential for minor silt and hydrocarbon spillage into nearby aquatic receptors, which could potentially impact on Otter prey availability. Therefore, the likely effect on Otter during the construction phase is predicted to be a negative, slight and short-term.

Potential Effects on Other Mammals

The loss of scrub, grassland and recolonising bare ground habitat within the site's interior will displace other protected mammals species e.g. Hedgehog, Stoat and Pygmy Shrew. Red Squirrel could potentially use the large mature treelines at the site. However, no signs of dreys or Red Squirrel was recorded during site surveys.

The limited semi-natural habitat outside the study area means that Phase 1 'The Meadows' site could potentially provide valuable refuges for local mammals. Overall, habitat loss and disturbance during the construction phase at Phase 1 'The Meadows' is predicted to have a negative, moderate and long-term impact in the absence of mitigation measures.

Potential Effects on Amphibians and Reptiles

No amphibian species were recorded within the Phase 1 'The Meadows' development site. There are no aquatic or wetland habitats which could provide suitable habitat for amphibians and no impact on these species during the construction phase. No impact from on amphibian species in predicted to occur.

No reptile species were recorded within the Phase 1 'The Meadows' development site. While Common Lizard could potentially occur, the site is unlikely to form critical habitat for this species. No impact from on reptile species in predicted to occur.

Potential Effects on Birds

The most significant impacts on breeding birds will be direct impacts during the construction phase through habitat loss, fragmentation and modification. The scrub, grassland and recolonising bare ground habitat within the interior of Phase 1 'The Meadows' development site will be removed during the construction phase and will displace the common bird species which use these habitats. However the majority of mature trees within the treeline/woodland along the eastern boundary will be retained. Habitat removal during construction will lead to a loss of moderate value nesting and foraging habitat for birds.

During the construction phase it is expected that there will be indirect impacts with considerable disturbance of the site, particularly during site clearance works. The duration of works (approximately 24 months) means that works will overlap with two breeding bird seasons. This is likely to displace foraging and breeding birds from the Phase 1 'The Meadows' site boundary. Birds which use this area appear to be habituated to regular disturbance by walkers and dogs. Noise levels within the site will be elevated during the construction phase. However, noise levels will fall off quickly outside the site boundary even during peak construction works.

The scrub, grassland and recolonising bare ground habitat at the site provide a range of breeding and foraging habitats for a relatively high number of common bird species. Early successional plant species within recolonising bare ground habitat can potentially support seed eating bird species such as Goldfinch. A small number of breeding territories of BOCCI species i.e. Amber List species Willow Warbler *Phylloscopus trochilus* and Goldcrest *Regulus regulus* will be removed during the construction phase. Several territories of many common Green List bird species (Blackbird, Blue Tit, Great Tit, Wren, Mistle Thrush etc) will be removed. In the absence of mitigation, potential impacts include disturbance and injury to eggs, young and nests, and long-term loss of potential nesting sites and foraging habitat. While displaced birds are likely to use alternative treeline/woodland habitats in the vicinity, as there will be nett loss of scrub, grassland and recolonising bare ground habitat in this largely suburban setting, alternative nesting habitats may not be readily available.

Phase 1 'The Meadows' site does not provide *ex situ* foraging/roosting habitat for wintering waders and waterfowl. Further detail on the potential impacts of the proposed development on Special Conservation Interest (SCI) birds within Cork Harbour SPA is included in the NIS which accompanies this application. However, given the existing noise environment and distance of Phase 1 'The Meadows' from the SPA, no significant impacts from disturbance during construction is predicted to occur.

Overall, the effect of habitat loss and disturbance on birds during the construction phase of Phase 1 'The Meadows' is predicted to be negative, slight and long-term.

Potential Effects on Other Fauna

The proposed development area is only likely to support common invertebrate species. There are no aquatic habitats onsite to support fish or aquatic invertebrates. Given that the habitats which will be affected are relatively common in the surrounding landscape and, given the limited scale and short-term nature of the construction works, any effect on these species will be negative, imperceptible and short-term during construction.

9.5.2.3 Phase 2 'The Farm'

9.5.2.4 Potential Effects on Habitats

It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Effects on terrestrial habitats are generally restricted to direct removal of habitats and possible impacts from the spread of invasive species. Based on the criteria outlined by EPA (2017) and CIEEM (2018), the predicted impacts are detailed in **Table 9.15**.

Table 9.15. Predicted Impacts on Habitats within the Phase 2 'The Farm' development site

Habitat	Habitat value	Potential Impact
Scattered trees and parkland WD5	Local importance (higher value)	Most of this habitat will be retained. However, some areas of this habitat including mature trees will be removed. Negative, slight, long-term
Broadleaved woodland WD1	Local importance (higher value)	Small section of woodland on western periphery of study area affected, by removal three to four trees and ground disturbance. Negative, slight, long-term
Stonewalls and other stonework BL1	Local importance (lower value)	Sections of stone wall within the formal garden which support some specialist species will be affected. Negative, not significant, long-term
Scrub WS1	Local importance (lower value)	Low value scrub habitat will be removed. Negative, slight, long-term
Treelines WL2	Local importance (higher value)	Generally retained but some trees removed Negative, slight, long-term
Treeline WL2/ Broadleaved woodland WD1	Local value (higher importance)	Most this habitat will be retained. However, three trees will be removed for the footbridge and some trimming of retained trees will be required. Negative, slight, long-term

Dry Meadow and grassy verges GS2	Local importance (lower value)	Will be removed. Negative, not significant, long-term
Scrub WS1/Recolonising Bare ground ED3/ Spoil and bare ground ED2	Local importance (lower value)	Will be removed, Negative, not significant, long-term
Scrub WS1/Dry meadow and grassy verge GS2/Recolonising bare ground ED3	Local importance (higher value)	Only a small section of this habitat will be removed. Negative, not significant, long-term
Buildings and artificial surfaces BL3	Local importance (lower value)	Twelve buildings will be affected. Negative, slight, long-term
Improved agricultural grassland GA1	Local importance (lower value)	Small proportion of this habitat type affected. Negative, not significant, long-term
Horticultural BC2	Local importance (lower value)	This habitat will be removed. Negative, not significant, long-term

Bee Orchid was recorded within the Phase 2 'The Farm' site. This species has a widespread but local distribution and is not listed in the Flora Protection Order 2015. As scrub will continue to develop in the absence of development this species is unlikely to persist as it requires open conditions. The habitats within the footprint of the proposed development are not rare, threatened nor do they require any special protection under existing or pending legislation. Potential impacts on habitats within Natura 2000 sites within the ZoI are included in the NIS for Phase 2 'The Farm which accompanies this application. This report concluded the following:

> *It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted effects from the proposed development and with the implementation of the mitigation measures proposed, that the construction and operation of the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects. There is no reasonable scientific doubt in relation to this conclusion. The competent authority will make the final determination in this regard.*

There are no aquatic habitats located within the Phase 2 'The Farm' development site. Treelines, mixed broadleaved woodland and scattered trees and parkland habitat have a higher local value.

Potential Effects from Non-native Invasive Species

Three Third Schedule invasive species were recorded within the Phase 1 'The Meadows' development site i.e., Japanese Knotweed, Himalayan Knotweed and Rhododendron. The third schedule invasive species Himalayan Balsam was recorded immediately south of the Phase 1 'The Meadows' site boundary. Two other invasive species were also recorded i.e. the medium impact species Buddleia and Wild Clematis and the low impact species Winter Heliotrope. There is potential during the construction phase for invasive species to be spread within the boundary of the proposed development, thus impacting negatively on adjoining habitats.

It is noted that while there is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland including Japanese and Himalayan Knotweed. Cherry Laurel, Buddleia, Wild Clematis and Winter Heliotrope are not listed under these regulations. In the absence of mitigation measures the effect of the proposed development on the spread of invasive species during the construction phase is predicted to be negative, slight and short-term.

Potential Effects on Water Quality and Aquatic Ecology

Surface water emissions associated with the construction phase of the proposed development could have potential effects on aquatic/estuarine habitats via increased silt levels in surface water run-off and inadvertent spillages of chemicals such as hydrocarbons from fuel and hydraulic fluid. It is noted discharges to the Douglas Estuary will be via the existing pipe and no works are required adjacent to the Douglas Estuary.

Inadvertent spillages of hydrocarbon and/or other chemical substances during construction could introduce toxic chemicals into the aquatic environment via direct means, surface water run-off or groundwater contamination. Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion or turbulence. Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water; these penetrate into the fish and can have a direct toxic effect. The lighter oil fractions (including kerosene, petrol, benzene, toluene and xylene) are much more toxic to fish than the heavy fractions (heavy paraffins and tars). In the case of turbulent waters, the oil becomes dispersed as droplets into the water. In such cases, the gills of fish can become mechanically contaminated and their respiratory capacity reduced.

If of sufficient severity, aquatic invertebrates may be smothered by excessive deposits of silt from suspended solids. In areas of stony substrate, silt deposits may result in a change in the macro-invertebrate species composition, favouring less diverse assemblages and impacting on sensitive species. Cement can also affect fish, plant life and macroinvertebrates by altering pH levels of the water. Aquatic plant communities may also be affected by increased siltation. Submerged plants may be stunted, and photosynthesis may be reduced.

Potentially, impacts could arise from any inadvertent spills of hydrocarbons or other chemicals during construction. High levels of suspended solids in surface water run-off could potentially have localised impacts on aquatic ecology.

The impact of construction works on the surface water and aquatic ecology in the absence of mitigation will be negative, slight and short-term at a local geographic level.

Potential Effects from Air Emissions (Dust)

Dust emissions during the construction phase could impact on habitats and theoretically could have impacts on associated flora and fauna. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for effects from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations.

Given that there are no sensitive or high value habitats within the proposed development area or in proximity to it, and the limited duration of the construction works, the impacts from dust generation, if any, will be neutral, imperceptible and short-term.

Potential Effects on Bats

Ten buildings are earmarked for demolition and two buildings for refurbishment in the Phase 2 'The Farm' site boundary. Buildings within the Phase 2 'The Farm' development site vary and include small stand-alone buildings of modern construction and various buildings which are part of a complex. Overall, the buildings on site are not considered of high potential value for roosting bats and no signs of bats or of bat emergence was recorded during bat surveys.

As detailed above some mature trees will be removed as a result of the Phase 2 'The Farm' development, however most of the mature trees within the study area will be retained. **In total 51 trees will be removed for Phase 2 'The Farm'**. No significant potential roost features (PRFs) were recorded in any of the trees earmarked for removal. None of the trees to be removed in the parkland are considered of significant roosting value for bat. However the presence of occasional

roosting bats cannot be altogether ruled out and in the absence of mitigation, the removal of these trees has the potential to have a negative, slight and long-term impact on local bat populations.

A small number of Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat were recorded foraging within the Phase 2 'The Farm' development site, largely along the treeline on the western boundary (overlapping with Phase 3 'North Fields). Smaller numbers of bats were recorded foraging within the formal garden. This treeline within the formal garden has low to moderate suitability as foraging areas. This treeline has the potential to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. Other habitat within the Phase 2 'The Farm' site boundary i.e. improved agricultural grassland, scrub/grassland/recolonising bare ground, roads have low potential for foraging bats.

Three mature trees will be also be removed within the treeline/woodland on the eastern site boundary for the wayleave and footbridge access and some trimming of retained trees will be required. The preliminary roost assessment indicated that no trees with significant value for bats will be removed One bat box is in situ on a semi-mature Oak that is located within the works area adjacent to the greenway, and this tree will be retained with the removal of a small number of side branches which are not of value for bats.

Continuous treeline and hedgerow provides connectivity of the landscape for bats commuting between foraging sites. Even gaps as small as 10m may prevent bats using hedgerows and treelines (JNCC 2001). The removal of a section of treeline habitat for the wayleave will leave a gap of 9m at ground level. However the gap in the foliage will be smaller than this and will not create a significant barrier to bat movement. Only three trees will be removed in the Phase 1 'The Meadows' treeline/woodland habitat and no significant gap will be created.

The scattered trees which will be removed in Phase 2 'The Farm' have low potential for commuting bats as they do not form a linear feature and there will be no significant impact on the trees within the linear treeline along the approach road.

In the absence of mitigation, the construction phase of the proposed development will result in the long-term loss of low to moderate value bat foraging and commuting habitat. This may result in fragmentation impacts or loss of connectivity within the wider landscape.

Lighting during construction has the potential to significantly impact foraging habitats of Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat. Construction works within will be confined to daytime hours and therefore disturbance from lighting during construction works will be minimal. However, subject to the agreement of the local authority, out-of-hours working may be required for water main connections, foul drainage connections, tower crane erection and removal etc. Lighting deters some bat species, in particular Myotis species, from foraging. No Myotis species were recorded within Phase 2 'The Farm' development site or within the study area. Pipistrelle species appear to be more tolerant of light and disturbance (Speakman 1991; Stones et al. 2009; Haffner 1986). It is also noted that Leisler's Bats will opportunistically feed on such insect gatherings in lit areas (Bat Conservation Ireland 2010).

Overall, the loss of semi-natural habitat and increased lighting and disturbance during construction will reduce the feeding area available for bats. The impact on foraging bats will be negative, slight and long term at a local geographic level.

Potential Effects on Otter

While Otter is known to occur south of the study area along the Douglas Estuary, no valuable habitat for Otter is located within the Phase 2 'The Farm' development site and no signs of Otter were recorded here. There are no watercourses at the site and wetland habitat along the Douglas Estuary is cut off from the Phase 2 'The Farm' development site by heavy traffic on the N40. Given the nature of the proposed development and the existing noise environment, construction activities are not expected to generate significant noise beyond the Phase 2 'The Farm' site boundary.

It is noted that the surrounding landscape are already subject to high levels of disturbance from traffic and human activity. Otters currently utilizing the site are expected to be habituated to ongoing disturbance factors in these circumstances.

Surface water discharges during the construction phase will tie into the existing storm water drainage system. In the absence of mitigation, there is potential for minor silt and hydrocarbon spillage into nearby aquatic receptors, which could potentially impact on Otter prey availability. Therefore, the likely effect on Otter during the construction phase is predicted to be a negative, slight and short-term.

Potential Effects on Other Mammals

The loss of scattered trees and parkland habitat, which covers most of the Phase 2 'The Farm' site, could potentially impact on other protected mammals species e.g. Hedgehog, Stoat and Pygmy Shrew. However the mowing and trimming maintenance within the Phase 2 'The Farm' site boundary and the limited ground flora and understory vegetation to provide cover and refuges for mammals species means that this site has limited potential for small mammal species. It is noted that the grassland (in parkand) areas within Phase 2 'The Farm', where Rabbits were recorded will be retained as part of the proposed landscape plan and they are likely to continue to use this site.

The loss of scrub, grassland and recolonising bare ground habitat within the Phase 2 'The Farm' site boundary will at least temporarily displace other protected mammals species e.g. Hedgehog, Stoat and Pygmy Shrew. Red Squirrel could potentially use the large mature treelines (which overlap with the Phase 3 'North Fields' site boundary) . However, no signs of dreys or Red Squirrel was recorded during site surveys.

Although the habitats to be directly affected may form part of the territories of various mammal species such as Hedgehog, they do not provide critical resources for these species.

Overall, the construction phase of the loss of habitat associated with Phase 2 'The Farm' is predicted to have a negative, slight and long-term impact on other mammal species in the absence of mitigation measures.

Potential Effects on Amphibians and Reptiles

No amphibian species were recorded within the Phase 2 'The Farm' development site. There are no aquatic or wetland habitats which could provide suitable habitat for amphibians and no impact on these species during the construction phase. No impact from on amphibian species in predicted to occur.

No reptile species were recorded within the Phase 2 'The Farm' development site. While Common Lizard could potentially occur, the site is unlikely to form critical habitat for this species. No impact from on reptile species in predicted to occur.

Potential Effects on Birds

The most significant impacts on breeding birds will be direct impacts during the construction phase through habitat loss, fragmentation and modification. A number of trees will be removed within the formal garden and along the woodland habitat (at the west of the site) during the construction phase. In total 52 trees will be removed within the Phase 2 'The Farm' boundary (See **Appendix 3-3b** for full detail on tree removal). Buildings with nesting sites for Swallow (and Jackdaw) will also be removed. This will lead to a nett loss of breeding and roosting habitat within the site boundary. It is noted that these trees are largely confined to the southern area of the Phase 2 'The Farm' development site and therefore habitat fragmentation within Phase 2 'The Farm' site will be limited. The remaining treeline, woodland and parkland will be maintained. The loss of small areas of scrub, recolonising bare ground, grassland and paved area within the Phase 2 'The Farm' boundary will be small and not impact significant on local bird populations. However, the removal of mature trees on the west of the Phase 2 'The Farm' site (overlapping with Phase 3 'North Fields' site), is likely to remove nesting sites for common bird species. The Phase 2 'The Farm' development will result in the loss of moderate value nesting and foraging habitat for birds.

During the construction phase it is expected that there will be indirect impacts with considerable disturbance of the site, particularly site clearance works. The duration of works (approximately 24 months) means that works will overlap with two breeding bird seasons. This is likely to displace foraging and breeding birds from the Phase 2 'The Farm' site boundary. The habitats within the formal garden, which covers most of the Phase 2 'The Farm' site, is in regular use by maintenance staff, residents and visitors. Birds which use this area appear to be habituated to regular disturbance. Noise levels within the site will be elevated during the construction phase. However, noise levels will fall off quickly outside the site boundary even during peak construction works. Given the mobile nature of birds and the availability of alternative foraging habitat in the immediate vicinity, the impact from disturbance will be moderate during the construction phase at a local level.

The habitats within the Phase 2 'The Farm' site provide breeding and foraging habitat for common bird species. No birds of conservation concern were recorded in this area. However it is noted that the Red List specie Meadow Pipit breed within the fields within the Phase 3 'North Fields' site boundary, which overlap in part with the Phase 2 'The Farm' site boundary. Several territories of many common Green List bird species (Blackbird, Blue Tit, Great Tit, Wren, Mistle Thrush etc) will be removed. In the absence of mitigation, potential impacts include disturbance and injury to eggs, young and nests, and long-term loss of potential nesting sites and foraging habitat. Displaced birds are likely to use alternative treeline/woodland habitats in the vicinity.

The Phase 2 'The Farm' site does not provide *ex situ* foraging/roosting habitat for wintering waders and waterfowl and the proposed development will not impact on these species during construction. Further detail on the potential impacts of the proposed development on Special Conservation Interest (SCI) birds within Cork Harbour SPA is included in the NIS which accompanies this application. However, given the existing noise environment and distance of Phase 2 'The Farm' from the SPA, no significant impacts from disturbance during construction is predicted to occur.

Overall, the effect of habitat loss and disturbance on birds during the construction phase of Phase 2 'The Farm' is predicted to be negative, slight and long-term.

Potential Effects on Other Fauna

The proposed development area is only likely to support common invertebrate species. There are no aquatic habitats onsite to support fish or aquatic invertebrates. Given that the habitats which will be affected are relatively common in the surrounding landscape and, given the limited scale and short-term nature of the construction works, any effect on these species will be negative, imperceptible and short-term during construction.

9.5.2.5 Combined Phase 1 'The Meadows' and Phase 2 'The Farm'

Potential Effects on Habitats

No combined effects from habitat loss has been identified.

Potential Effects from Non-native Invasive Species

No combined effects from the spread of invasive species have been identified.

Potential Effects on Water Quality and Aquatic Ecology

The Phase 1 'The Meadows' and Phase 2 'The Farm' developments are planned to be constructed sequentially so the individual impacts noted above will take effect over a period of time, with many of the Phase 1 impacts repeated again when the Phase 2 development is taking place. However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place. No significant combined effects from changes in water quality, including any potential impacts during excavation or from concrete spillage or wash water during construction have been identified.
Potential Effects on Air Quality

Potential Effects on Air Quality

No combined effects from changes in air quality have been identified.

Potential Effects on Bats

The habitats proposed for removal in Phase 1 'The Meadows' and Phase 2 'The Farm' have low potential as bat roosts and no signs of roosting bats were recorded. There will be no in combination effects from the loss of trees and buildings between both sites.

Where sites are located in proximity to one another, tree removal could potentially result in fragmentation and affect the connectivity of sites for foraging bats. The habitats/trees earmarked for removal are not connected. The retention of a high proportion of the treeline and woodland habitat in both Phase 1 'The Meadows' and Phase 2 'The Farm' means that there will be no significant in-combination effects on the foraging habitat for bats.

No in-combination disturbance impacts to bat have been identified as construction will largely be confined to daytime hours.

Potential Effects on Otter

No combined effects from changes on Otter have been identified.

Potential Effects on Other Mammals

During the construction phase, mammals will generally move to alternative sites in the vicinity. Should construction works for Phase 1 'The Meadows' and Phase 2 'The Farm' run concurrently, alternative refuges and foraging habitat for mammals may be limited. However, it is proposed that all stages of the proposed development would run sequentially and therefore in combination noise impacts are unlikely.

While the semi-natural habitats in Phase 1 'The Meadows' may provide moderate value habitat for mammals, within Phase 2 'The Farm' the habitat value for mammals is low. Therefore, no significant in-combination effects have been identified.

Potential Effects on Amphibians and Reptiles

No effects have been identified to amphibians and reptiles during the operational phase.

Potential Effects on Birds

During the construction phase, birds will generally move to alternative sites in the vicinity. Should construction works for Phase 1 'The Meadows' and Phase 2 'The Farm' run concurrently, alternative foraging and nesting site for birds may be limited. However, it is proposed that all stages of the proposed development would run sequentially and therefore in combination impacts are unlikely.

The potential in-combination effects on birds are negative, moderate and short-term.

Potential Effects on Other Fauna

No combined impact on other fauna have been identified.

9.5.3 Operation

During operation the occupancy of the proposed dwellings and associated traffic will increase noise and disturbance at the site. In the absence of mitigation measures, significant operational impacts could include light spill onto retained vegetation within and outside the study area used for feeding or breeding by protected species. Impacts from habitat removal have been considered during the construction phase of this report.

9.5.3.1 Phase 1 'The Meadows' – The Meadows

Potential Effect on Habitats

The development site is not identified as an area susceptible to flooding and no history of flooding at the site by the Cork City Development Plan and CFRAM mapping. The CFRAMS Map and Cork City Council Flood Map both indicate that the site lies outside of Flood Zones A and B and can therefore be considered to be located within Flood Zone C.

A site-specific Flood Risk Assessment has been carried out by J B Barry and Partners for the proposed development site and this FRA confirms that the site is located in Flood Zone C, the lowest flood risk designation.

Therefore no impacts on habitats have been identified during the operational phase.

Potential Effects from Non-native Invasive Species

Any potential risks from invasive species will be managed during the construction phase and therefore, no risk from the spread of invasive species during the operational phase has been identified.

Potential Effects on Water Quality and Aquatic Ecology

During operation surface water runoff from the site will discharge to the Douglas Estuary via an existing surface water pipe. It is proposed to construct a new dedicated surface water system to serve the proposed development which will feed into the existing surface water drainage network.

The surface water strategy for the development will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Within the development site, the surface water runoff will be collected to a range of source control SuDS before discharging to a storm sewer which will convey the flows towards the natural low point at the south of the site into StormTech attenuation tanks before ultimate discharge via existing stormwater outfall.

Surface water runoff directed to the SuDS features will therefore benefit from their pollutant removal qualities. However, to ensure water quality standards are met, dedicated attenuation facilities that are sized on the basis of a design storm with 100-year return period will be installed. The proposed rate of surface water discharge from the development will be limited to that of the greenfield runoff for a 100-year storm event. Surface water design measures will ensure there is no significant impact on local water quality or on aquatic receptors within the Douglas Estuary or any other waterbodies.

Foul Water from the proposed development will ultimately discharge to the Carrigrennan WWTP for treatment and disposal to Lough Mahon which overlap with that of the Cork Harbour SPA. This discharge will incrementally increase over a four to five-year period as the development is completed and occupied with a final estimated daily discharge of 131 m3/day. Calculations on foul water emissions for Phase 1 'The Meadows' are included in Section 6.3.1 of this EIAR. Increased nutrients can potentially impact on estuarine habitats by changing baseline ecological conditions and increasing algal growth, which in turn could impact on feeding success for birds listed as qualifying interests for the Cork Harbour SPA.

A Pre-Connection Enquiry was submitted to Irish Water, the response to which confirmed that the proposed development can be serviced by the existing wastewater infrastructure network in the area. A copy of the confirmation is included in Appendix 6-1 of this EIAR. The Confirmation of Feasibility (COF) states that sufficient capacity is available in the IW network to facilitate a wastewater connection of 280 units. IW have advised that the proposed connection should be made directly to the Bessborough Wastewater Pumping Station (WWPS) via a new inlet sewer. Details on the operational design capacity and current loadings at Carrigrennan WWTP are included in Chapter 6 Material Assets Infrastructure and Utilities . Based on the current capacity, no significant impacts on local water quality are predicted to occur.

Therefore, the impacts from the proposed development will be negligible given the current operating conditions at the WWTP. Likewise, minor increases in nutrient levels potentially discharged by the WWTP will not have a significant impact on feeding conditions for birds listed as qualifying interests for the Cork Harbour SPA. No impact from wastewater discharges during operation are predicted to occur.

Potential Effects on Air Quality

No operational effects from changes in air quality have been identified.

Potential Effects on Bats

Increased activity and human presence, noise and artificial lighting may impact and disturb or displace bats during the operational phase of the proposed development.

Lighting around the proposed buildings and outdoor areas including parking areas, the new footbridge and access roads means that bat foraging in this area is likely to be reduced. Light spillage from the development onto the treeline boundary habitats could prevent bats from foraging along the treelines. Lighting deters some bat species, in particular Myotis species, from foraging. No Myotis species were recorded within the Phase 1 'The Meadows' site or study area. Pipistrelle species appear to be more tolerant to light and disturbance (Speakman 1991; Stones *et al*. 2009; Haffner 1986). It is also noted that Leisler's Bats will opportunistically feed on such insect gatherings in lit areas (Bat Conservation Ireland 2010).

In the absence of mitigation operational lighting and activity will to impacts on low to moderate value foraging habitats for bats. Impacts to bats during operation are predicted to be negative, slight and long-term at a local level in the absence of mitigation.

Potential Effects on Otter

Increased activity and human presence, noise, fencing and additional lighting may disturb or displace other Otter during the operational phases of the proposed development. Inappropriate fencing and/or site boundaries could create a barrier to movement for Otter to valuable habitats along the Blackrock-Passage Greenway. However it is noted that the proposed design for Phase 1 'The Meadows' will allow connectivity to the wider area with tracks/pathways travelling north, east and west.

It is noted that the surrounding landscape is already subject to high levels of disturbance from traffic and human activity and Otters currently utilizing the site are expected to be habituated to ongoing disturbance factors in these circumstances. Given the relatively low value of the habitats for Otter, levels of disturbance within adjacent habitats and the retention of large areas of semi-natural habitat the operational phase will have a negligible impact on low value foraging habitats for Otter. Impacts on Otter during operation are predicted to be negative, not significant and long-term.

Potential Effects on Other Mammals

Increased activity and human presence, noise, fencing and additional lighting may disturb or displace other mammal species such Hedgehog and Pygmy Shrew from favoured foraging habitats during the operational phases of the proposed development. Inappropriate fencing and/or site boundaries could create a barrier to movement for mammal species to valuable habitats along the Blackrock-Passage Greenway. However it is noted that the proposed design for

Phase 1 'The Meadows' will allow connectivity to the wider area with tracks/pathways travelling north, east and west.

Given the location of the Phase 1 'The Meadows' site within a suburban setting, with limited areas of semi-natural habitat in the wider landscape this could potentially displace mammal species. However, given the retention of treelines at the site and the mobile nature of these species, potential impacts on other mammals during operation are predicted to be negative, slight and long-term at a local level.

Potential Effects on Amphibians and Reptiles

No effects on amphibians and reptiles during the operational phase has been identified.

Potential Effects on Birds

Following scrub removal during construction it is likely that the Amber List species Willow Warbler will be displaced and no longer likely to use the site during operation. The nett reduction in trees/scrub habitat will mean there will be a reduction in the numbers/territories of birds which the Phase 1 'The Meadows' site can support. However, the majority of the bird species recorded in the Phase 1 'The Meadows' surveys are common species which regular occur in sub-urban and urban settings and these birds are likely to recolonise the site during the operational phase, albeit is smaller numbers than previously.

Visible human presence in previously undisturbed areas and increased noise and lighting may prevent birds from nesting or foraging in retained habitats within or adjacent to the site. In areas where nesting habitat is retained within the site, operational lighting may impact on breeding birds. Night-length can be very important for birds, as it can determine the onset of the breeding season and migration. Artificial lighting can induce hormonal, physiological and behavioural changes that initiate breeding in birds (Lofts and Merton 1968). Timing of singing and sleep are also strongly affected by light pollution (Kempenaers *et al*., 2010; Da Silva *et al*. 2014; Raap et al. 2015), and such changes are suggested to have physiological consequences (Dominoni *et al.* 2016). These changes in behaviour may have an impact on the productivity of breeding birds which use habitats within and adjoining the site.

Given the existing noise environment and distance of Phase 1 'The Meadows' from the SPA, no significant disturbance impacts on SCI birds within Cork Harbour SPA is predicted to occur during operation.

The impact on birds is likely to be negative, slight and long-term at a local level due to disturbance.

Potential Effects on Other Fauna

No significant impacts on other species during the operational phase have been identified.

9.5.3.2 Phase 2 'The Farm' – The Farm

Potential Effect on Habitats

The development site is not identified as an area susceptible to flooding and no history of flooding at the site by the Cork City Development Plan and CFRAM mapping. The CFRAMS Map and Cork City Council Flood Map both indicate that the site lies outside of Flood Zones A and B and can therefore be considered to be located within Flood Zone C.

A site-specific Flood Risk Assessment has been carried out by J B Barry and Partners for the proposed development site and this FRA confirms that the site is located in Flood Zone C, the lowest flood risk designation.

Therefore no impacts on habitats have been identified during the operational phase.

Potential Effects from Non-native Invasive Species

Any potential risks from invasive species will be managed during the construction phase and therefore, no risk from the spread of invasive species during the operational phase has been identified.

Potential Effects on Water Quality and Aquatic Ecology

During operation surface water runoff from the site will discharge to the Douglas Estuary via an existing surface water pipe. It is proposed to construct a new dedicated surface water system to serve the proposed development. The intention is to discharge surface water off site to the south to an existing surface water pipe discharge point.

The surface water strategy for the development will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Within the development site, the surface water runoff will be collected to a range of source control SuDS before discharging to a storm sewer which will convey the flows towards the natural low point at the south of the site into StormTech attenuation tanks before ultimate discharge via existing stormwater outfall.

Surface water runoff directed to the SuDS features will therefore benefit from their pollutant removal qualities. However, to ensure water quality standards are met, dedicated attenuation facilities that are sized on the basis of a design storm with 100-year return period will be installed. The proposed rate of surface water discharge from the development will be limited to that of the greenfield runoff for a 100-year storm event. Surface water design measures will ensure there is no significant impact on local water quality or on aquatic receptors within the Douglas Estuary or any other waterbodies.

Foul Water from the proposed development will ultimately discharge to the Carrigrennan WWTP for treatment and disposal to Lough Mahon which overlap with that of the Cork Harbour SPA. This discharge will incrementally increase over a four to five-year period as the development is completed and occupied with a final estimated daily discharge of 131 m3/day. Calculations on foul water emissions for Phase 1 'The Meadows' are included in **Section 6.3.2 of this EIAR.** Increased nutrients can potentially impact on estuarine habitats by changing baseline ecological conditions and increasing algal growth, which in turn could impact on feeding success for birds listed as qualifying interests for the Cork Harbour SPA.

A Pre-Connection Enquiry was submitted to Irish Water, the response to which confirmed that the proposed development can be serviced by the existing wastewater infrastructure network in the area. A copy of the confirmation is included in Appendix 6-2 of of this EIAR. The Confirmation of Feasibility (COF) states that sufficient capacity is available in the IW network to facilitate a wastewater connection of 140 units. IW have advised that the proposed connection should be made directly to the Bessborough Wastewater Pumping Station (WWPS) via a new inlet sewer. Details on the operational design capacity and current loadings at Carrigrennan WWTP are included in **Chapter 6 Material Assets Infrastructure and Utilities**. Based on the current capacity, no significant impacts on local water quality are predicted to occur.

Therefore the impacts from the proposed development will be negligible given the current operating conditions at the WWTP. Likewise, minor increases in nutrient levels potentially discharged by the WWTP will not have a significant impact on feeding conditions for birds listed as qualifying interests for the Cork Harbour SPA. No impact from wastewater discharges during operation are predicted to occur.

Potential Effects on Air Quality

No combined effects from changes in air quality have been identified.

Potential Effects on Bats

Increased activity and human presence, noise and artificial lighting may impact and disturb or displace bats during the operational phase of the proposed development. Lighting around the proposed buildings and outdoor areas including parking areas, footbridge and access roads means that bat foraging in this area is likely be reduced. Light spillage from the development onto the retained habitats could prevent bats from foraging. Lighting deters some bat species, in

particular Myotis species, from foraging. No Myotis species were recorded within the Phase 2 'The Farm' site or study area. Pipistrelle species appear to be more tolerant to light and disturbance (Speakman 1991; Stones et al. 2009; Haffner 1986). It is also noted that Leisler's bats will opportunistically feed on such insect gatherings in lit areas (Bat Conservation Ireland 2010).

In the absence of mitigation operational lighting and activity may lead to the loss of low to moderate value foraging habitats for bats. Impacts to bats during operation are predicted to be negative, moderate and long-term at a local level in the absence of mitigation.

Potential Effects on Otter

Increased activity and human presence, noise, fencing and additional lighting may disturb or displace other Otter during the operational phases of the proposed development. Inappropriate fencing and/or site boundaries could create a barrier to movement for Otter to valuable habitats along the Blackrock-Passage Greenway. However it is noted that the proposed design for Phase 2 'The Farm will allow connectivity to the wider area with tracks/pathways travelling south, east and west.

It is noted that the surrounding landscape is already subject to high levels of disturbance from traffic and human activity and Otters currently utilizing the site are expected to be habituated to ongoing disturbance factors in these circumstances. The formal garden which covers most of the Phase 2 'The Farm' site has low potential for Otter. Given the relatively low value of the habitats for Otter, levels of disturbance within the site and the retention of large areas of semi-natural habitat, the operational phase will have a negligible impact on low value foraging habitats for Otter. Impacts on Otter during operation are predicted to be negative, not significant and long-term.

Potential Effects on Other Mammals

Increased activity and human presence, noise, fencing and additional lighting may disturb or displace other mammal species such Hedgehog and Pygmy Shrew from favoured foraging habitats during the operational phases of the proposed development. Inappropriate fencing and/or site boundaries could create a barrier to movement for mammal species to valuable habitats along the Blackrock-Passage Greenway.

The formal garden which covers most of the Phase 2 'The Farm' site have low potential for mammal species. Given the availability of similar habitat in the vicinity and the mobile nature of these species, potential impacts on other mammals during operation are predicted to be negative, not significant and long-term at a local level.

Potential Effects on Amphibians and Reptiles

No effects on amphibians and reptiles during the operational phase has been identified.

Potential Effects on Birds

Visible human presence in previously undisturbed areas and increased noise and lighting may prevent birds from nesting or foraging in retained habitats within or adjacent to the site. In areas where nesting habitat is retained within the site, operational lighting may impact on breeding birds. Night-length can be very important for birds, as it can determine the onset of the breeding season and migration. Artificial lighting can induce hormonal, physiological and behavioural changes that initiate breeding in birds (Lofts and Merton 1968). Timing of singing and sleep are also strongly affected by light pollution (Kempenaers *et al.,* 2010; Da Silva *et al.* 2014; Raap *et al.* 2015), and such changes are suggested to have physiological consequences (Dominoni *et a*l. 2016). These changes in behaviour may have an impact on the productivity of breeding birds which use habitats within and adjoining the site.

Given the existing noise environment and distance of Phase 2 'The Farm' from the SPA, no significant disturbance impacts on SCI birds within Cork Harbour SPA is predicted to occur during operation.

The impact on birds is likely to be negative, slight and long-term at a local level due to disturbance.

Potential Effects on Other Fauna

No significant impacts on other species during the operational phase have been identified.

9.5.3.3 Combined Phase 1 and Phase 2

Potential Effect on Habitats

No combined effects to habitats have been identified during operation.

Potential Effects from Non-native Invasive Species

No combined effects from the spread of invasive species during operation have been identified.

Potential Effects on Water Quality and Aquatic Ecology

The Phase 1 and Phase 2 developments are to be constructed sequentially (and not in parallel) and also will be become operational sequentially, with Phase 1 being occupied first and the Phase 2 development being occupied later. In this context the impacts of each development will not be additive but will take place over an extended period of time given that the construction work and operational phases will take place sequentially.

Given that the operational impacts on water and groundwater are considered to be In the absence of significant impacts on water quality during operation, no combined effects from changes in water quality have been identified.

Potential Effects on Air Quality

No combined effects from changes in air quality during operation have been identified.

Potential Effects on Bats

Badly designed lighting could create barriers to connectivity outside the Phase 1 'The Meadows' and Phase 2 'The Farm' site boundaries. However given the separation distance of the Phase 1 'The Meadows' and Phase 2 'The Farm' sites and the retention of boundary habitats no significant in-combination lighting effects on the foraging habitat for bats will occur.

Potential Effects on Mammals

Given the foraging range of some mammal species, mammals within the study area could use both the Phase 1 'The Meadows' and Phase 2 'The Farm' habitats. Given the location of the Phase 1 'The Meadows' and Phase 2 'The Farm' sites within a suburban setting, with limited areas of semi-natural habitat in the wider landscape this could potentially displace mammal species. However, given the retention of treelines, grassland and mature trees at the site and the mobile nature of these species, potential impacts on other mammals during operation are predicted to be negative, slight and long-term at a local level.

This has the potential to have a negative, slight and long-term impact on local mammals species.

Potential Effects on Birds

Given the location of the Phase 1 'The Meadows' and Phase 2 'The Farm' sites within a suburban setting, with limited areas of semi-natural habitat in the wider landscape this could potentially displace bird species. However, given the

retention of treelines, grassland and mature trees at the site and the mobile nature of birds, potential impacts on other mammals during operation are predicted to be negative, slight and long-term at a local level.

This has the potential to have a negative, slight and long-term impact on local bird species.

Potential Effects on Other Fauna
No significant impacts on other species during the operational phase have been identified.

9.6 Mitigation Measures and Monitoring

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts. The following mitigation measures will be implemented.

Outline Construction Environmental Management Plans (CEMP) have been prepared for Phase 1 'The Meadows' and Phase 2 'The Farm' (**included in Appendix 2-1 and Appendix 2-2**). These CEMPs contain the construction mitigation measures, which are set out in this EIAR and the NIS. This will have particular emphasis on the protection of valuable habitats which adjoin the site as well as the Cork Harbour SPA. It is essential that all construction staff, including all sub-contracted workers, be notified of valuable habitats and be made aware that no construction waste of any kind (rubble, soil, etc.) is to be deposited in these areas and that care must be taken with liquids or other materials to avoid spillage

Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA. Masters-Williams et al (2001)

Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA. Murnane, *et al.* (2006)

All personnel involved with the proposed development will receive an onsite induction relating to construction and operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

All staff and subcontractors have the responsibility to:

- Understand the importance of avoiding pollution onsite, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the project manager and the project ecologist;
- Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and
- Co-operate as required, with site inspections.

As part of the assessment of the required construction mitigation, best practice construction measures which will be implemented for the Proposed Development were considered. A summary of the measures relevant to hydrology are provided as follows and are in accordance with Construction Industry Research and Information Association (CIRIA) guidance – *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors* (Masters-Williams *et al*. 2001).

9.6.1 Construction Phase

9.6.1.1 Phase 1 'The Meadows' – The Meadows

Water Quality
Details of water quality mitigation measures are included in Chapter 8 – Water (Hydrology and Hydrogeology) and in the CEMP included in Appendix 2-1

Noise
The employment of good construction management practice, as described in the OCEMP and in Chapter 10 Noise and Vibration, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.

Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimised. The preferred approach for controlling construction noise is to reduce source levels where possible, but with due regard to practicality.

The CEMP will be updated by the contractor, prior to construction, to include any specific conditions attached to the approval and other specific construction information, but will at a minimum, include the measures described in Chapter 11, Noise and Vibration.

Lighting
Lighting associated with the site works could cause disturbance/displacement of fauna. If of sufficient intensity and duration, there could be impacts on reproductive success.

Construction works will take place during normal daytime hours. Where site lighting is required, this will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. Lighting mitigation measures will follow Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers (Bat Conservation Ireland, 2010). The following measures will be applied in relation to construction works lighting

- Lighting will be provided with the minimum luminosity necessary for safety and security purposes.
- The construction phase lighting scheme will be designed to minimise light spillage nuisance on retained/new wildlife corridors by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates).
- The primary area of concern is the potential impact at the treeline along the Blackrock-Passage Greenway. No light spillage will occur in relation to the tree-dominated eastern boundary. This will benefit bats as well as other fauna active/resting at night.

Protection of Habitats and Flora Species
The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1 March to the 31 August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. If works are carried out during the breeding season, a pre-construction survey will be carried out by the project ecologist and if birds are detected appropriate mitigation measures will be implemented.

Although the removal of a small number of trees will be required for the construction of the footbridge and the trenching and construction of watermains, foul and surface-water drainage, this will be kept to a minimum and all other trees will be retained.

All mitigation measures to be put in place to protect such trees and vegetation shall be prepared in consultation with a qualified Arborist, who shall supervise works for which an Arboriculture Method Statement is required.

The specific Arboriculture Method Statement shall be prepared for any works within the root protection area of any tree to be retained and the measures outlined shall be strictly enforced on site.

Trees will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction. Recommendations and any further agreed procedures.

Reinstatement of trees and vegetation will be undertaken by a suitably qualified landscape contractor

Bee Orchid was located within the redline boundary and this species has a localised distribution. The current distribution of this species is indicated on **Figure 9.6.** The following mitigation measures will be implemented to ensure that this species remains extant within the site post construction. When considering the relocation of plants the following general guidelines (*The Scottish Code for Conservation Translocations - Best Practice Guidelines for Conservation Translocations in Scotland, 2014)* apply:

- Work out whether translocation is the best option: could other conservation actions provide a lower-risk and lower-cost solution;
- Where translocation is the best option, develop a clear plan to deliver a well-defined conservation benefit;
- Obtain all necessary permissions and licences;
- Maximise the chances of success by understanding the biological needs of the species;
- Take great care to protect the species being moved, the habitat it is being released into, and avoid the spread of invasive species, pests and diseases;
- Monitor the translocation and respond to any issues that arise and
- Keep people informed and share information about the translocation to guide future projects

The area of habitat which supports Bee Orchid will be permanently removed and thus translocation of the plants from within the development area is recommended. It is noted that this plant may not be present on the site at the time of construction due to ongoing encroachment of scrub. Therefore, the site will be surveyed by the project ecologist prior to the commencement of site works to determine if this species is present and to assess current distribution.

If this species is present, it will be carefully moved by tracked machine and stored on site until the translocation site is prepared. It will be stored in a fenced area to prevent inadvertent damage during construction and will be watered appropriately

A small area within the southern section of the study area will be prepared under the supervision of the project ecologist who will specify requirements for the size of the translocation area based on up to date survey data, soil type and fertility, shade/light levels, ongoing management and access and usage of this area post construction.

Ongoing monitoring is a key element in the translocation process and the project ecologist will carry out an annual survey for three years to assess the success translocation process and to modify management of same where required. Requirements for further monitoring will be assessed at the end of the three-year period by the project ecologist in consultation with the client.

Bats

During the site works, general mitigation measures for bats will follow the National Road Authority's '*Guidelines for the Treatment of Bats during the Construction of National Road Schemes*' NRA (2005c) and *'Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25*' (Kelleher, C. & Marnell, F. (2006)). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats, or prevent avoidable effects resulting from significant alterations to the immediate landscape.

No bat roosts were recorded within the site boundary. However, the presence of occasional roosting bats cannot be altogether ruled out. Mitigation measures will be agreed with the National Parks and Wildlife Service prior to any tree removal and will include the following:

A number of trees will be removed prior to construction. The following precautionary measures will be implemented.

- The bat specialist will work with the contractor to ensure that the loss of trees is minimised and that trees earmarked for retention are adequately protected.
- Prior to construction a survey of bat use of trees at appropriate times of the year, within and adjacent to the Phase 1 'The Meadows' site, as well the wider study area, shall be carried out by the project ecologist, to determine the use of trees by bat species, and following best-practice in tree bat surveys (Collins 2016). A report of the results shall be complied and forwarded to the planning authority and the NPWS.
- Tree-felling will ideally be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- No 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.
- It is proposed that ten bat boxes will be located within the Phase 1 'The Meadows' (https://www.wildcare.co.uk/vincent-pro-bat-box-10651.html for box proposed or similar). The boxes will be erected by the Project ecologist taking into account landscape plans, vehicle movements and lighting.
- Monitoring of the use of the Phase 1 'The Meadows' development site and adjacent part of the study area by bats shall be carried out during construction, and for two years after construction is complete. Monitoring reports will be forwarded each year to the NPWS.

As noted above, lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010).

All mitigation measures including detailed method statements will be agreed with the NPWS prior to commencement of works, which could affect any bat populations on site.

Birds

As noted above where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the study area boundary.

As a biodiversity enhancement measure ten bird nesting boxes (various types including open fronted and entrance hole) will be located within the site boundary of Phase 1 'The Meadows' at locations specified by the Project ecologist.

It is proposed that ten Swift boxes will be placed on the Phase 1 'The Meadows' buildings. These will be located on the northern side of the buildings in areas free from overhanging vegetation, ledges and/or glazing. These will be built into the walls of the structure using Schwegler 17A (or similar see https://www.nhbs.com/no-17a- schwegler-swift-nest-box-triple-cavity). The location of these nest boxes will be specified by the Project ecologist.

It is noted that provision of woodland planting and the use of more diverse grassland planting will provide additional nesting and feeding sites for birds, particularly as these habitats mature.

Biodiversity and Landscaping plans

Details of the landscaping plan for the proposed development are included in the landscape plan which created by Ilsa Rutgers Landscape Architecture and submitted with this application (**Drawing 210221_2500**) This includes provisions for planting of native trees or local provenance and includes the planting of a hedgerow or Irish Yew.

Five insect nesting boxes suitable for *Hymenoptera* spp. (bees and wasps) will be put in place within the site boundary as a biodiversity enhancement measure.

Log piles in woodland area to north to allow sites for Hedgehog and Pygmy Shrew.

Invasive species

Prior to the commencement of construction works an invasive species survey will be undertaken within the proposed development boundary by a competent ecologist to determine if invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 have established in other areas in the period between pre-planning and post consent.

An invasive species management plan has been drawn up as part of the application (**Appendix 9.3**) and provides details on the current distribution of high-risk invasive species and guidelines/recommendations for treatment including methods of treatment, site hygiene and follow up treatment and monitoring. In particular the plan specified outline methodologies for the treatment of the high-risk species Japanese and Himalayan Knotweed via mechanical and chemical treatment. The method for the elimination of these species on the site will be implemented with reference to the relevant codes of practice and guidelines.

No significant impediments to the successful implementation of these control measures have been identified and it is expected that the treatment programme will successfully eradicate these species from the applicant's landholding. The exact treatment details will be outlined in a detailed management plan prepared by the treatment contractor and project ecologist and which will be finalised prior to the commencement of treatment and based on up-to-date surveys.

9.6.1.2 Phase 2 'The Farm' – The Farm

Water Quality

Details of water quality mitigation measures are included in **Chapter 8 – Water (Hydrology and Hydrogeology)** and in the CEMP included in **Appendix 2-2 of this EIAR**.

Noise

The employment of good construction management practice, as described in the OCEMP and in Chapter 10 Noise and Vibration, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.

Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimised. The preferred approach for controlling construction noise is to reduce source levels where possible, but with due regard to practicality.

The CEMP will be updated by the contractor, prior to construction, to include any specific conditions attached to the approval and other specific construction information, but will at a minimum, include the measures described in Chapter 11 Noise and Vibration.

Lighting

Lighting associated with the site works could cause disturbance/displacement of fauna. If of sufficient intensity and duration, there could be impacts on reproductive success.

Construction works will take place during normal daytime hours. Where site lighting is required, this will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. Lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010).

The following measures will be applied in relation to construction works lighting.

- Lighting will be provided with the minimum luminosity necessary for safety and security purposes.
- The construction phase lighting scheme will be designed to minimise light spillage nuisance on retained/new wildlife corridors by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates).
- The primary area of concern is the potential impact on retained treelines/trees within the formal garden and the woodland on the western boundary of the Phase 2 'The Farm'.

Protection of Habitats and Flora

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1 March to the 31 August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. If works are carried out during the breeding season, a pre-construction survey will be carried out by the Project ecologist and if birds are detected appropriate mitigation measures will be implemented.

Removal of trees will be required for the construction phase. All mitigation measures to be put in place to protect such trees and vegetation shall be prepared in consultation with a qualified Arborist, who shall supervise works for which an Arboriculture Method Statement is required.

The specific Arboriculture Method Statement shall be prepared for any works within the root protection area of any tree to be retained and the measures outlined shall be strictly enforced on site.

Trees will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction. Recommendations and any further agreed procedures.

Reinstatement of trees and vegetation will be undertaken by a suitably qualified landscape contractor.

Bee Orchid was located within the redline boundary and this species has a localised distribution. The current distribution of this species is indicated on **Figure 9.7**. The following mitigation measures will be implemented to ensure that this species remains extant within the site post construction. When considering the relocation of plants the following general guidelines (*The Scottish Code for Conservation Translocations - Best Practice Guidelines for Conservation Translocations in Scotland, 2014)* apply:

- Work out whether translocation is the best option: could other conservation actions provide a lower-risk and lower-cost solution;
- Where translocation is the best option, develop a clear plan to deliver a well-defined conservation benefit;
- Obtain all necessary permissions and licences;
- Maximise the chances of success by understanding the biological needs of the species;
- Take great care to protect the species being moved, the habitat it is being released into, and avoid the spread of invasive species, pests and diseases;
- Monitor the translocation and respond to any issues that arise and
- Keep people informed and share information about the translocation to guide future projects

The area of habitat which supports Bee Orchid will be permanently removed and thus translocation of the plants from within the development area is recommended. It is noted that this plant may not be present on the site at the time of construction due to ongoing encroachment of scrub. Therefore, the site will be surveyed by the project ecologist prior to the commencement of site works to determine if this species is present and to assess current distribution.

If this species is present, it will be carefully moved by tracked machine and stored on site until the translocation site is prepared. It will be stored in a fenced area to prevent inadvertent damage during construction and will be watered appropriately

A small area within the southern section of the study area will be prepared under the supervision of the project ecologist who will specify requirements for the size of the translocation area based on up to date survey data, soil type and fertility, shade/light levels, ongoing management and access and usage of this area post construction.

Ongoing monitoring is a key element in the translocation process and the project ecologist will carry out an annual survey for three years to assess the success translocation process and to modify management of same where required. Requirements for further monitoring will be assessed at the end of the three-year period by the project ecologist in consultation with the client.

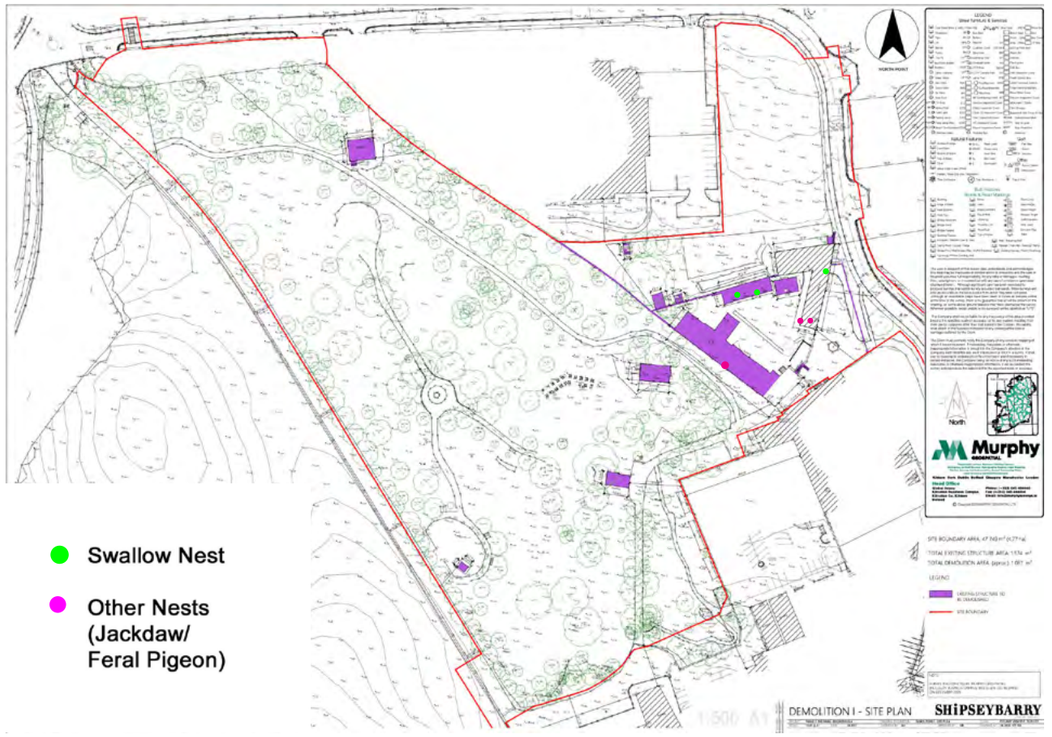


Figure 9.12. Bee Orchid Phase 2 'The Farm' location

Bats

During the site works, general mitigation measures for bats will follow the National Road Authority's 'Guidelines for the Treatment of Bats during the Construction of National Road Schemes' NRA (2005c) and 'Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25' (Kelleher, C. & Marnell, F. (2006)). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats, or prevent avoidable effects resulting from significant alterations to the immediate landscape.

Ten buildings within the site will be demolished and two buildings retained and repurposed as part of the development. No signs of bats were recorded within these buildings and they have a low potential as roosting habitat. However, as a precautionary measure, the following measures will be implemented prior to and/or during demolition. Mitigation measures will be agreed with the National Parks and Wildlife Service prior to any demolition works.

- Ideally work on buildings will take place outside the summer season between and October March inclusive when bats will be hibernating as the buildings to be removed have negligible potential as winter hibernation sites.
- In all cases immediately in advance of demolition a bat specialist will undertake an examination of the building. Emergence surveys will be carried out if buildings are affected during the April to September period. If bats are present at the time of examination it is essential to determine the nature of the roost (i.e. number, species, whether it is a breeding population) as well as its exact location.

- If bats are recorded in buildings earmarked for demolition, special mitigation measures to protect bats will be put in place and a license to derogate from the conservation legislation will be sought from the NPWS.
- The contractor will take all required measures to ensure works do not harm individuals by altering working methods or timing to avoid bats, if necessary.
- If roosting habitat for bats is removed, replacement habitat will be provided.

Mature trees will be removed as part of the Phase 2 'The Farm' development. It is noted that no signs of bats or roosting habitat was recorded within these trees. Although mature trees with the potential of be of value as bat roosts are absent from the site, the following precautionary measures will be implemented.

- The bat specialist will work with the contractor to ensure that the loss of trees is minimised and that trees earmarked for retention are adequately protected.
- Prior to construction a survey of bat use of trees at appropriate times of the year, within and adjacent to the Phase 2 'The Farm' site, as well the wider study area, shall be carried out by one or more qualified bat-workers, competent in tree-survey methods, and where necessary with a licence, to determine the use of trees by bat species, and following best-practice in tree bat survey (Collins 2016). A report of the results shall be complied and forwarded to the planning authority and the NPWS.
- Tree-felling will ideally be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- No 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.
- It is proposed that eight bat boxes will be located within the Phase 2 'The Farm' (https://www.wildcare.co.uk/vincent-pro-bat-box-10651.html for box proposed or similar). The boxes will be erected by the Project ecologist taking into account landscape plans, vehicle movements and lighting.
- Monitoring of the use of the Phase 2 'The Farm development site and adjacent part of the study area by bats shall be carried out during construction, and for two years after construction is complete. Monitoring reports will be forwarded each year to the NPWS.

As noted above, lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010).

All mitigation measures including detailed method statements will be agreed with the NPWS prior to commencement of works, which could affect any bat populations on site.

Birds

Swallows were recorded nesting within buildings in the Phase 2 'The Farm' site (See **Figure 9.11**). Prior to demolition buildings will be checked for nesting Swallows (and other birds). If nesting birds are recorded, all demolition operations will be carried out between October and March, when birds have finished breeding. Alternatively if buildings are to be demolished during the breeding season and where Swallow nests are present windows and doors will be sealed to prevent birds from accessing the building prior to the breeding season. This work will be carried out prior to the commencement of the nesting season between October and March.

As above where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the study area boundary.

As a biodiversity enhancement measure ten bird nesting boxes (various types) will be located within the Phase 2 'The Farm' site boundary at locations specified by the Project ecologist. It is noted that provision of woodland planting and the use of more diverse grassland planting will provide additional nesting and feeding sites for birds, particularly as these habitats mature.

It is noted that provision of woodland planting and the use of more diverse grassland planting will provide additional nesting and feeding sites for birds, particularly as these habitats mature.

Biodiversity and Landscaping plans during construction

Details of the landscaping plan for the proposed development are included in the landscape plan which created by Ilsa Rutgers Landscape Architecture and submitted with this application **(Drawing 210604 2500**)

The woodland planting mix will be dominated by species including *Quercus robur, Quercus petrea and Pyrius avium.* The objective of these elements is to create natural, multi-layered woodland habitat which will be of local ecological value and has the potential to support native flora and fauna. Linear tree planting will help to maintain connectivity between habitats in the wider landscape.

As detailed in **Drawing 210604 2500** a more diverse rough grassland sward which is of higher ecological value for invertebrates and birds will be allowed to develop. Perennial Rye Grass or other vigorous amenity/agricultural grass species will not be utilised as they tend to over-dominate the sward and reduce overall biodiversity. The final grassland/wildflower mix for same will be specified by the Project ecologist based on final ground conditions including alkalinity, fertility and moisture levels.

Based on the seed mix utilised and on prevailing ground conditions, the Project ecologist will specify the management regime, including weed control and mowing regime, necessary to maximise biodiversity and habitat value.

Five insect nesting boxes suitable for *Hymenoptera* spp. (bees and wasps) will be put in place within the site boundary as a biodiversity enhancement measure.

Log piles in woodland area to north of Phase 2 'The Farm' to allow sites for Hedgehog and Pygmy Shrew.

A narrow section of habitat which will be disturbed in the western treeline along the wayleave. Excavated soil within the woodland should be carefully stockpiled and used to cover the excavation, when complete. The use of commercial grass seed mixture is not recommended.

Invasive Species

Prior to the commencement of construction works an invasive species survey will be undertaken within the proposed development boundary by a competent ecologist to determine if invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 have established in other areas in the period between pre-planning and post consent.

An invasive species management plan has been drawn up as part of the application (**Appendix 9-3**) and provides details on the current distribution of high-risk invasive species and guidelines/recommendations for treatment including methods of treatment, site hygiene and follow up treatment and monitoring. In particular the plan specified outline methodologies for the treatment of the high-risk species Japanese and Himalayan Knotweed via mechanical and chemical treatment. The method for the elimination of these species on the site will be implemented with reference to the relevant codes of practice and guidelines.

No significant impediments to the successful implementation of these control measures have been identified and it is expected that the treatment programme will successfully eradicate these species from the applicant's landholding. The exact treatment details will be outlined in a detailed management plan prepared by the treatment contractor and project ecologist and which will be finalised prior to the commencement of treatment and based on up-to-date surveys.

9.6.1.3 Combined Phase 1 'The Meadows' and Phase 2 'The Farm'

None specified.

9.6.2 Operational Phase

9.6.2.1 Phase 1 'The Meadows'

Lighting during operation

The primary mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night time lighting. It is noted that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as Otter and Hedgehog. . The mature treeline/woodland habitat and scrub which runs adjacent to the Blackrock-Passage Greenway has moderate suitability as a foraging/commuting route, to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. The external lighting design was therefore designed to minimise light spillage into these areas within Phase 1 'The Meadows'. Based on the design/mitigation measures specific below, light spillage onto the boundary treeline will be from zero to less than 0.1lx during the operational phase.

- The lighting scheme has taken into account best practice, as published by the UK Bat Conservation Trust and Bat Conservation Ireland (Bat Conservation Ireland 2010, Stone 2013), in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations.
- Asymmetric diffusers will be applied to the proposed pole top light on the Eastern boundary as opposed to symmetric ones and orientated so that the glass of the luminaries is positioned parallel to the eastern boundary ground as recommended. This will ensure that the light is cast in a downward direction and avoids horizontal spillage of the light.
- The use of LED lighting with no/low UV component due to the phosphors within an LED lamp converting UV to white light will also play a great part to keep disruption to a low level.
- The light fittings also have a dimming capability for a possible night tome mode subject to the local authorities approval.
- Height of the columns have been minimised to 4 metres to further reduce light spill or trespass.

Lighting types that emit a narrow spectrum with no / little UV attract relatively less insects than broad spectrum types with high UV. Therefore, the narrow spectrum lights have a relatively lower impact on bats, by preventing invertebrate prey from congregating around the lit areas. The use of directional lighting and luminaire accessories (shield, louvre) are also very successful approaches to reducing light spillage nuisance into the surrounding environment in relation to bats. Where artificial lighting is managed and/or designed to avoid light spillage into the wider environment, potential effects on foraging/commuting bats would be considered neutral imperceptible. In this case, this would include avoiding light spillage onto the existing tree areas on the eastern boundary of the Phase 1 'The Meadows' site.

9.6.2.2 Phase 2 'The Farm'

Lighting during operation

The primary mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night time lighting. It is noted that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as Otter and Hedgehog. The treeline which ordered to the entrance road along the western boundary of the Phase 2 'The Farm' site. This area has moderate suitability as a foraging/commuting route, to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. The external lighting design was therefore designed to minimise light spillage into these areas within Phase 2 'The Farm. Based on the design/mitigation measures specific below, light spillage onto the boundary treeline will be from zero to less than 0.1lx during the operational phase.

- The lighting scheme has taken into account best practice, as published by the UK Bat Conservation Trust and Bat Conservation Ireland (Bat Conservation Ireland 2010, Stone 2013), in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations.
- Asymmetric diffusers will be applied to the proposed pole top light on/near identified bat foraging areas as opposed to symmetric ones and orientated so that the glass of the luminaries is positioned parallel to boundary habitats as recommended. This will ensure that the light is cast in a downward direction and avoids horizontal spillage of the light.
- The use of LED lighting with no/low UV component due to the phosphors within an LED lamp converting UV to white light will also play a great part to keep disruption to a low level.
- The light fittings also have a dimming capability for a possible night tome mode subject to the local authorities approval.
- Height of the columns have been minimised to 4 metres to further reduce light spill or trespass.

Lighting types that emit a narrow spectrum with no / little UV attract relatively less insects than broad spectrum types with high UV. Therefore, the narrow spectrum lights have a relatively lower impact on bats, by preventing invertebrate prey from congregating around the lit areas. The use of directional lighting and luminaire accessories (shield, louvre) are also very successful approaches to reducing light spillage nuisance into the surrounding environment in relation to bats. Where artificial lighting is managed and/or designed to avoid light spillage into the wider environment, potential effects on foraging/commuting bats would be considered neutral imperceptible. In this case, this would include avoiding light spillage onto the existing tree areas on the eastern boundary of the Phase 2 'The Farm site.

9.7 Residual Impacts

9.7.1 Phase 1 'The Meadows' – The Meadows

Habitat

Replacement planting of native and non-native tree species within the site will provide alternative forging and commuting habitat for fauna **(Drawing 210221_2500)**. This will compensate for some of the habitat loss at the site including scrub and treeline habitat. The replacement planting will ensure there is no nett loss of trees at the site, although there will be a nett loss of common habitats such as the Scrub, Dry meadow and grassy verge and /Recolonising bare ground mosaic. There will be minor impacts on the treeline along the western boundary.

Table 9.16. Residual Impacts on Habitats within the Phase 1 'The Meadows' site boundary following mitigation

Habitat	Habitat Value (NRA Guidelines)	Residual impacts
Buildings and artificial surfaces BL3/ Recolonising Bare Ground ED3	Local value (lower importance)	Will be removed. Negative, not significant, long-term
Treeline WL2/ Broadleaved woodland WD1	Local value (higher importance)	Generally retained but a small number of trees removed (Three trees). Negative, slight, long-term
Scrub WS1/Dry meadow and grassy verge GS2/Recolonising bare ground ED3	Local value (higher importance)	This habitat will be removed. Negative, slight, long-term
Scrub WS1	Local value (lower importance)	This habitat will be removed. Negative, not significant, long-term
Scattered trees and parkland WD5/ Recolonising bare ground ED3	Local value (higher importance)	Approximately ten trees will be removed including mature trees Negative, slight, long-term
Improved agricultural grassland GA1	Local value (lower importance)	Small area affected. Negative, not significant, long-term
Broadleaved woodland WD1	Local importance (higher value)	Small numbers of trees removed. Negative, not significant, and long-term

Water Quality and Aquatic Habitats

Residual impacts on water quality are predicted to be imperceptible. The impact of residual impact on fish and aquatic invertebrates will be not significant.

Air Quality

No residual impacts predicted.

Spread of Invasive Species

No residual impacts identified.

Bats

No significant roosting habitats for bats will be affected. Replacement planting of native and non-native tree species within the site boundary will provide some alternative foraging and commuting habitat for bats however there will be a net loss of low to moderate value foraging habitat for bats. The small gap (9m at ground level) that will be created within the eastern treeline for the development of the footbridge is limited in extent and will not have a significant impact on commuting and foraging bats using this treeline. Construction and operational lighting design will minimise the impact on commuting and foraging bats. The residual impact of the proposed development is expected to be negative, slight and long-term at a local level on Common Pipistrelle and Leisler's Bat.

Otter

Although Otter could potentially use the Phase 1 'The Meadows' site, this is not a valuable area of Otter. It is noted that the surrounding landscape are already subject to high levels of disturbance from traffic and human activity. Otters currently utilizing the site are expected to be habituated to ongoing disturbance factors in these circumstances. The residual impact on these species is predicted to the negative, not significant and long-term at a local level.

Other Mammals

Red Squirrel could potentially use the Phase 1 'The Meadows' site. These are a highly mobile species which can move away from the site of disturbance. There will be a small net loss of potential feeding habitat. The residual impact on these species is predicted to the negative, slight and long-term at a local level.

Hedgehog and Pygmy Shrew are likely to recolonise newly planted hedgerows/treelines at the site following the new landscape planting. The residual impact is predicted to the negative, slight and long-term at a local level.

Amphibians and reptiles

No residual Impacts

Birds

Breeding birds will be displaced from scrub/grassland/recolonising bare ground habitats which cover most of the site. Noise levels during construction are likely to be significant and birds will be displaced during peak construction works. During operation and following the implementation of the landscape plan, common woodland edge species are likely to recolonise the trees and landscaped areas at the site, albeit in lower numbers than prior to development. Willow Warbler are unlikely to use the site following during operation. The residual impact will be negative, slight and long-term at a local level.

Other Species

No residual impacts identified.

9.7.1.1 Phase 2 'The Farm' – The Farm

Habitat

Replacement planting of native and non-native tree species within the site will provide alternative forging and commuting habitat for fauna. This will compensate for some of the habitat loss at the site including scattered, trees and parkland habitat. The replacement planting will ensure there is no nett loss of trees at the site, although there will be a nett loss of common habitats such as scrub. Lighting and human activity levels and therefore levels of noise and activity will increase during construction and during operation.

Table 9.17. Residual Impacts on Habitats within the Phase 2 'The Farm' site boundary following mitigation

Habitat	Habitat value	Residual Impact
Scattered trees and parkland WD5	Local importance (higher value)	Most of this habitat will be maintained. New trees will be planted. Negative, slight, long-term
Broadleaved woodland WD1	Local importance (higher value)	Small number of trees removed Negative, not significant, long-term
Stonewalls and other stonework BL1	Local importance (lower value)	Negative, not significant, long-term
Scrub WS1	Local importance (lower value)	Negative, slight, long-term
Treelines WL2	Local importance (higher value)	Generally retained but some trees removed. Negative, slight, long-term
Dry Meadow and grassy verges GS2	Local importance (lower value)	Negative, not significant, long-term
Scrub WS1/Recolonising Bare ground ED3/ Spoil and bare ground ED2	Local importance (lower value)	Negative, not significant, long-term
Scrub WS1/Dry meadow and grassy verge GS2/Recolonising bare ground ED3	Local importance (higher value value)	Negative, not significant, long-term
Buildings and artificial surfaces BL3/ Recolonising Bare Ground ED3	Local value (lower importance)	Will be removed, Negative, not significant, long-term
Buildings and artificial surfaces BL3	Local importance (lower value)	Twelve buildings will be affected. Negative, slight, long-term
Improved agricultural grassland GA1	Local importance (lower value)	Negative, not significant, long-term
Horticultural BC2	Local importance (lower value)	Negative, not significant, long-term

Water Quality and Aquatic Habitats

Residual impacts on water quality are predicted to be imperceptible. The impact of residual impact on fish and aquatic invertebrates will be not significant.

Air Quality

No residual impacts predicted.

Spread of Invasive Species

No residual impacts identified.

Bats

No bats were recorded roosting within structures in Phase 2 'The Farm' and no significant bat roosting habitat was recorded within trees to be removed. New roosting habitat will be provided via bat boxes. Replacement planting of native and non-native tree species within the site boundary will provide some alternative foraging and commuting habitat for bats. However there will be a net loss of low to moderate value foraging habitat for bats. Habitat loss will include a number trees (including mature trees) largely within the formal garden as well as the loss of grassland habitat. As replacement planting matures this will provide some alternative foraging habitat for foraging bats. .

The small gap that will be created within the western woodland is limited in extent and will not have a significant impact on commuting and foraging bats using this treeline. Construction and operational lighting design will minimise the impact on commuting and foraging bats. The residual impact of the proposed development is expected to be negative, slight and long-term at a local level on Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat. The impact on Brown Long Eared Bat will be negative, not significant and long-term.

Otter

Although Otter could potentially use the Phase 2 'The Farm' site, this is not a valuable area of Otter. It is noted that the surrounding landscape are already subject to high levels of disturbance from traffic and human activity. Otters currently utilizing the site are expected to be habituated to ongoing disturbance factors in these circumstances. The residual impact on these species is predicted to the negative, not significant and long-term at a local level.

Other Mammals

Red Squirrel could potentially use the Phase 2 'The Farm site. These are a highly mobile species which can move away from the site of disturbance. There will be a net loss of feeding habitat. The residual impact on these species is predicted to the negative, slight and long-term at a local level.

Hedgehog and Pygmy Shrew are likely to recolonise newly planted hedgerows/treelines at the site following the new landscape planting. The residual impact is predicted to the negative, slight and long-term at a local level.

Amphibians and reptiles

No residual Impacts

Birds

Breeding birds will be displaced from the formal garden and other habitats within the site during construction works. Noise levels within terrestrial habitats during construction are likely to be significant and birds will be displaced during peak construction works. During operation and following the implementation of the landscape plan, common woodland edge species are likely to recolonise the trees and hedgerows at the site, albeit in lower numbers than prior to development. The residual impact will be negative, slight and long-term at a local level.

Other Species

No residual impacts identified.

9.7.1.2 Combined Phase 1 'The Meadows' and Phase 2 'The Farm'

Habitat
No in-combination effect.

Water Quality and Aquatic Habitats
No in-combination effect.

Air Quality
No in-combination effect.

Spread of Invasive Species
No in-combination effect.

Bats
No in-combination effect.

Otter
No in-combination effect.

Other Mammals
No in-combination effect.

Amphibians and reptiles
No in-combination effect.

Birds
No in-combination effect.

Other Species
No in-combination effect.

9.8 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 2, Biodiversity, Flora and Fauna as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *To protect and where appropriate, enhance the diversity of habitats, ecosystems, geological features and species in their natural surroundings*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 2 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in a positive interaction for biodiversity, flora and fauna with EPO 2.

A number of developments are proposed and permitted in the vicinity of the proposed development and the potential for cumulative impacts with these projects were considered.

These projects are assessed in **Table 9.18**

Table 9.18. Potential Cumulative Effects

Plans and Key Policies/Issues/Objectives		
River Basin Management Plan 2018-2021	The project should comply with the environmental objectives of the Irish RBMP which are to be achieved generally by 2021. Ensure full compliance with relevant EU legislation Prevent deterioration Meeting the objectives for designated protected areas Protect high status waters Implement targeted actions and pilot schemes in focus sub-catchments aimed at: targeting water bodies close to meeting their objective and addressing more complex issues which will build knowledge for the third cycle.	The implementation in accordance with key environmental policies, issues and objectives of this management plan will result in positive cumulative effects to European sites. The implementation of this plan will have a positive impact for the biodiversity. It will not contribute to cumulative impacts with the proposed development.
Inland Fisheries Ireland Corporate Plan 2016 -2020	To ensure that Ireland's fish populations are managed and protected to ensure their conservation status remains favourable. That they provide a basis for a sustainable world class recreational angling product, and that pristine aquatic habitats are also enjoyed for other recreational uses. To develop and improve fish habitats and ensure that the conditions required for fish populations to thrive are sustained and protected. To grow the number of anglers and ensure the needs of IFI's other key stakeholders are being met in a sustainable conservation focused manner. EU (Quality of Salmonid Waters) Regulations 1988. All works during development and operation of the project must aim to conserve fish and other species of fauna and flora habitat; biodiversity of inland fisheries and ecosystems and protect spawning salmon and trout.	The implementation in accordance with key environmental issues and objectives of this corporate plan will result in positive on-combination effects to European sites. The implementation of this corporate plan will have a positive impact for biodiversity of inland fisheries and ecosystems. It will not contribute to cumulative impacts with the proposed works.
Irish Water Capital Investment Plan 2014-2016	Proposals to upgrade and secure water services and water treatment services countrywide.	Likely net positive impact due to water conservation and more effective treatment of water.
Water Services Strategic Plan (WSSP, 2015)	Irish Water has prepared a Water Services Strategic Plan (WSSP, 2015), under Section 33 of the Water Service No. 2 Act of 2013 to address the delivery of strategic objectives which will contribute towards improved water quality and biodiversity requirements through reducing: Habitat loss and disturbance from new / upgraded infrastructure; Species disturbance; Changes to water quality or quantity; and Nutrient enrichment /eutrophication.	The WSSP forms the highest tier of asset management plans (Tier 1) which Irish Water prepare, and it sets the overarching framework for subsequent detailed implementation plans (Tier 2) and water services projects (Tier 3). The WSSP sets out the challenges we face as a country in relation to the provision of water services and identifies strategic national priorities. It includes Irish Water's short, medium, and long-term objectives and identifies strategies to achieve these objectives. As such, the plan provides the context for subsequent detailed implementation plans (Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management. The WSSP also sets out the strategic objectives against which the Irish Water Capital Investment Programme is developed. The current version of the CAP outlines the proposals for capital expenditure in terms of upgrades and new builds within the Irish Water owned assets. The overarching strategy was subject to AA and highlighted additional plan/project environmental assessments to be carried out at the tier 2 and tier 3 level. Therefore, no likely significant cumulative effects are envisaged.
WWTP discharges	Ringaskiddy Village WWTP, Cobh WWTP, Whitegate-Aghada WWTP, Carrigtwohill and Envrions WWTP, Cork City (Carrigrennan) WWTP, Passage-Monkstown WWTP,	Discharges from municipal WWTPs are to meet water quality standards. Irish Water Capital Investment Plan 2014-2016 and 2017 – 2021 proposes to upgrade water treatment services countrywide. Discharges from municipal WWTPs are to meet water quality standards Given that no significant effect on water quality is predicted from this proposed project no significant cumulative effects on water quality will occur.

Other developments – developments under construction in vicinity of study area	The following developments are currently under construction in the vicinity of the study area. Cork City Council Ref: 17/37565 Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas. Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction. Cork City Council Ref: 18/37820 The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three storey apartment block (comprising 20 no. apartments) and a four storey apartment block (comprising 27 no. apartments) and 1 no. creche Granted by way of Material Contravention of City Development Plan on 28/02/2019. Cork City Council Ref: 21/40481 Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works. Conditionally granted on the 13/12/2021. Cork City Council Ref: 2140503 Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure. Conditionally granted on the 22/12/2021. Cork City Council Ref: 2140453 Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works. Conditionally granted on the 22/12/2021. Decision pending	If the construction of these projects were to run concurrently with the Phase 1 'The Meadows' and/or Phase 2 'The Farm' developments, there is potential for in-combination disturbance effects, as the sites are located in proximity to each other. Should this situation arise, construction activities will be planned and phased, in consultation with the Phase 1 'The Meadows' and Phase 2 'The Farm' construction management teams. No in-combination impacts were identified during the operational phase of the proposed development. The proposed development will not result in any significant impacts on water quality or aquatic ecology. Therefore, no cumulative impacts on water quality have been identified. No cumulative impacts are predicted to occur within the Cork Harbour SPA as a result of these proposed and permitted projects.
Other developments under consideration/recently refused	The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021: Cork City Council Ref: 2039705/ABP-309560-1 Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessborough, Ballinure, Blackrock, Co Cork. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential.	If the construction of these projects were to run concurrently with the Phase 1 'The Meadows' and/or Phase 2 'The Farm' developments, there is potential for in-combination disturbance effects, as the sites are located in proximity to each other. Should this situation arise, construction activities will be planned and phased, in consultation with the Phase 1 'The Meadows' and Phase 2 'The Farm' construction management teams. No in-combination impacts were identified during the operational phase of the proposed development. The proposed development will not result in any significant impacts on water quality or aquatic ecology. Therefore, no cumulative impacts on water quality have been identified. No cumulative impacts are predicted to occur within the Cork Harbour SPA as a result of these proposed and permitted projects.
Future development in landholding	As set out in the submitted site masterplan, the applicant has intentions for a third follow-on phase of development to the west and south of Bessborough House, subject to zoning which is under consideration as part of the preparation of the Cork City Development Plan 2022-2028. The prepared masterplan provides for 200 no. apartments across 5 blocks ranging in height from 2-4 storeys as part of a landscaped parkland setting. The development will consist of 5 no. 3-bedroom apartments, 100 no. 2-bedroom apartments, 92 no. 1-bedroom apartments, and 3 no. studio apartments. The proposal includes a National Memorial and Archive Centre building and remembrance park to the south. Provision is made for a creche and shared communal facilities across the buildings comprising gym, lounges and home work areas. The development includes new pedestrian/cycle path infrastructure, including connections to the Passage West Greenway. Vehicular access to the proposed development will also be provided via the existing estate access road off the Bessborough Road, with the entrance subject to modification and upgrade works. Phase 3 will be subject to a separate planning consenting process, with the designed particulars of the proposal assessed as part of that application. Notwithstanding this, the EIAR considers the full combined development for the purposes of completing a robust assessment of the entire project and having regard to the outline level of design detail that presently exists for the North Fields.	See **Section 9.8.1.4 and 9.8.2.4**

9.8.1 Construction Phase

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These are listed in Table 9.18.

9.8.1.1 Phase 1 'The Meadows'

If the construction of these projects were to run concurrently with the Phase 1 'The Meadows' development, there is potential for in-combination disturbance effects, as the sites are located in proximity to each other. Should this situation arise, construction activities will be planned and phased, in consultation with the Phase 1 'The Meadows' construction management team.

The Phase 1 'The Meadows' development will not result in any significant impacts on water quality or aquatic ecology. Therefore, no cumulative impacts on water quality have been identified.

No cumulative impacts are predicted to occur within the Cork Harbour SPA as a result of these proposed and permitted projects.

9.8.1.2 Phase 2 'The Farm'

If the construction of these projects were to run concurrently with the Phase 2 'The Farm' development, there is potential for in-combination disturbance effects, as the sites are located in proximity to each other. Should this situation arise, construction activities will be planned and phased, in consultation with the Phase 1 'The Meadows' construction management team.

The Phase 2 'The Farm' development will not result in any significant impacts on water quality or aquatic ecology. Therefore, no cumulative impacts on water quality have been identified.

No cumulative impacts are predicted to occur within the Cork Harbour SPA as a result of these proposed and permitted projects.

9.8.1.3 Combined Phase 1 'The Meadows' and Phase 2 'The Farm'

The combined impact of habitat loss between Phase 1 'The Meadows', Phase 2 'The Farm' and other developments listed in Table 9.23 will reduce the areas of low to moderate value transitional habitats in the general area i.e. largely immature trees, scrub and recolonising bare ground habitats. In both the Phase 1 'The Meadows' and Phase 2 'The Farm' sites the more valuable habitats i.e. mature treelines and parkland, will be largely retained which will essentially maintain the integrity of semi-nature habitats in the study area. Therefore the cumulative impacts from other developments will not be significant.

No significant combined cumulative impacts have been identified

9.8.1.4 Combined Masterplan Area (including Phases 1 - 3)

While the design of Phase 3 'North Fields' has yet to be finalised, the outline development for Phase 3 'North Fields' includes the following

As set out in the submitted site masterplan, the applicant has intentions for a third follow-on phase of development to the west and south of Bessborough House, subject to zoning which is under consideration as part of the preparation of the Cork City Development Plan 2022-2028. The prepared masterplan provides for 200 no. apartments across 5 blocks ranging in height from 2-4 storeys as part of a landscaped parkland setting. The development will consist of 5 no. 3-bedroom apartments, 100 no. 2-bedroom apartments, 92 no. 1-bedroom apartments, and 3 no. studio apartments. The proposal includes a National Memorial and Archive Centre building and remembrance park to the south. Provision is made for a creche and shared communal facilities across the buildings comprising gym, lounges and home work areas. The development includes new pedestrian/cycle path infrastructure, including connections to the Passage West Greenway. Vehicular access to the proposed development will also be provided via the existing estate access road off the Bessborough Road, with the entrance subject to modification and upgrade works.

Phase 3 will be subject to a separate planning consenting process, with the designed particulars of the proposal assessed as part of that application. Notwithstanding this, the EIAR considers the full combined development for the purposes of completing a robust assessment of the entire project and having regard to the outline level of design detail that presently exists for the North Fields.

The large mature treeline, particular on the western boundary of the Phase 3 'North Fields' site, as well as large areas of grassland habitat provide foraging habitat for a range of bird and mammal species. Phase 3 'North Fields' has the most valuable habitats within the study area and has the greatest habitat heterogeneity. However, the high levels of disturbance via the tracks/paths under the woodland and treeline means that its value for larger mammal species such as Badger and Otter is low. A notable feature within the Phase 3 'North Fields' site is a large eutrophic pond in the southern corner of this woodland. At present this has limited ecological value due to its poor water quality. However, given the proximity of this pond the Douglas Estuary, there is potential for this to form part of the biodiversity enhancement during the Phase 3 'North Fields' development.

Large areas of mature trees, as with the Phase 1 'The Meadows' and Phase 2 'The Farm' developments, will be maintained within the Phase 3 'North Fields' development site. This will ensure the diversity of flora and fauna described in **Section 9.4** of this report will be largely maintained. While tree removal is likely to form part of the Phase 3 'North Fields' development, as with the Phase 1 'The Meadows' and Phase 2 'The Farm' developments, the retention of large areas of mature and semi-mature trees will ensure that the integrity of higher value habitats will be maintained.

The Red List species Meadow Pipit use grassland within the site throughout the year and were recorded breeding here during the spring/summer months. Although large parts of the Phase 3 'North Fields' site will be set aside as a biodiversity/wildlife area, it is highly unlikely that Meadow Pipit will continue to breed within the study area following development.

9.8.2 Operational Phase

Assessing the cumulative impacts of the operational phase of the development is similarly contingent on other permitted developments in the area as listed in **Table 9.23**.

9.8.2.1 Phase 1 'The Meadows'

During operation there will be increased disturbance and lighting and this is likely to reduce the diversity and density of fauna using site. The increase in activity combined with a reduction in semi-natural habitats will reduce the overall numbers of birds and mammals using the area. However, the fauna which use the site are largely habituated to life in the busy suburban setting and are likely to recolonise the area during the operational phase, albeit in lower numbers.

No in-combination impacts from changes in water or air quality were identified during the operational phase of the proposed development.

9.8.2.2 Phase 2 'The Farm'

During operation there will be increased disturbance and lighting and this is likely to reduce the diversity and density

of fauna using site. The increase in activity combined with a reduction in semi-natural habitats will reduce the overall numbers of birds and mammals using the area. However, the fauna which use the site are largely habituated to life in the busy suburban setting and are likely to recolonise the area during the operational phase, albeit in lower numbers.

No in-combination impacts from changes in water or air quality were identified during the operational phase of the proposed development.

9.8.2.3 Combined Phase 1 'The Meadows' and Phase 2 'The Farm'

During operation there will be increased disturbance and lighting and this is likely to reduce the diversity and density of fauna using site. The increase in activity combined with a reduction in semi-natural habitats will reduce the overall numbers of birds and mammals using the area. However, the fauna which use the site are largely habituated to life in the busy suburban setting and are likely to recolonise the area during the operational phase, albeit in lower numbers.

No in-combination impacts from changes in water or air quality were identified during the operational phase of the proposed development.

9.8.2.4 Combined Masterplan Area (including Phases 1 - 3)

During operation there will be increased disturbance and lighting and this is likely to reduce the diversity and density of fauna using site. The increase in activity combined with a reduction in semi-natural habitats will reduce the overall numbers of birds and mammals using the area. However, the fauna which use the site are largely habituated to life in the busy suburban setting and are likely to recolonise the area during the operational phase, albeit in lower numbers.

No in-combination impacts from changes in water or air quality were identified during the operational phase of the proposed development.

9.9 References

Bat Conservation Ireland (2010). Bats & Lighting Guidance Notes for:Planners, engineers, architects and developers December 2010

Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000) Bird Census Techniques. Academic Press, London

Chartered Institute of Ecology and Environmental Management (CIEEM) 2016 Guidelines on Ecological Impact Assessment in the UK and Ireland, 2nd edition

Chartered Institute of Ecology and Environmental Management (CIEEM) (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.1

Collins, J. 2016 Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).

Da Silva, A., Samplonius, J. M., Schlicht, E., Valcu, M., and Kempenaers, B. H. A. (2014). Artificial night lighting rather than traffic noise affects the daily timing of dawn and dusk singing in common European songbirds. Behav. Ecol. 25, 1037–1047.

Dominoni, D. M., Borniger, J. C., and Nelson, R. J. (2016). Light at night, clocks and health: from humans to wild organisms. Biol. Lett. 12:20160015.

Dwyer, R.G., Bearhop, S., Campbell, H.A. & Bryant, D.M. (2013). Shedding light on light: benefits of anthropogenic illumination to a nocturnally foraging shorebird. Journal of Animal Ecology, 82, 478– 485.

EPA 2017 Draft Guidelines on the Information to be Contained in Environmental Impact

Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 43: 1-22

Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods - a Manual of Techniques for Key UK Species. RSPB: Sandy.

Haffner M, Stutz HP (1986) Abundance of Pipistrellus pipistrellus and Pipistrellus kuhlii foraging at street-lamps. Myotis 23-24: 167–168.

Hutterer, R., Ivanova, T., Meyer-Cords, C. & Rodrigues, L. (2005). Bat Migrations in Europe. A Review of Banding Data and Literature. Naturschutz und BiologischeViefalt 28. Federal Agency for Nature Conservation, Bonn.

JNCC (2001). Habitat management for bats A guide for land managers, land owners and their advisors

Kelleher, C. & Marnell, F. (2006). Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25.

Kempenaers, B., Borgström, P., Loës, P., Schlicht, E., and Valcu, M. (2010). Artificial night lighting affects dawn song, extra-pair siring success, and lay date in songbirds. Curr. Biol. 20, 1735–1739.

Lofts, C.; Merton, D. (1968). Photoperiodic and physioligical adaptations regulating avian breeding cycles and their ecological significance. J. of the Zoological Society of London 155: 327-394.

NRA (2005a) Guidelines for the treatment of Badgers prior to the construction of national road schemes. National Road Authority

NRA (2005b) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. National Road Authority

NRA (2005c) Guidelines for treatment of bats during construction of National Road Schemes. National Road Authority

NRA (2006) Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes. National Roads Authority

NRA (2008) Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. National Road Authority

NRA (2009) Guidelines for assessment of ecological impacts of National Road Schemes. National Road Authority

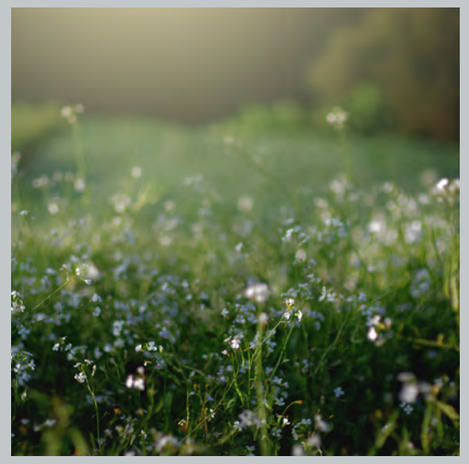
Raap, T., Casasole, G., Costantini, D., AbdElgawad, H., Asard, H., Pinxten, R., et al. (2016a). Artificial light at night affects body mass but not oxidative status in free-living nestling songbirds: an experimental study. Sci. Rep. 6:35626.

Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Stace, C.A. New Flora of the British Isles 4th Edition.

Stone EL, Jones G, Harris S (2009) Street lighting disturbs commuting bats. Curr Biol 19: 1123– 1127.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. and Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.



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CHAPTER 10

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CHAPTER 10

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CHAPTER 10

10 Cultural Heritage

10.1 Introduction

10.1.1 Chapter Author

This Chapter has been prepared by John Cronin of John Cronin and Associates. Mr Cronin holds qualifications in archaeology (B.A., University College Cork (UCC), 1991), regional and urban planning (MRUP (University College Dublin (UCD) 1993) and post-graduate qualifications in urban and building conservation (MUBC (UCD), 1999). He has over 27 years' experience in the compilation of archaeological, architectural and cultural heritage impact assessments.

10.1.2 Chapter Context

This chapter assesses the impacts of the proposed development, as described in Chapter 2, on the known and potential cultural heritage resource. The term 'Cultural Heritage' encompasses heritage assets relevant to both the tangible resource (archaeology and architectural heritage); and non-tangible resources (history, folklore, tradition, language, placenames, etc.).

(Note on place name: For consistency the name "Bessborough" is used throughout this chapter as it is the name of the historic estate. Other variants include "Bessboro", "Besborough" and "Bisboro".)

10.1.3 Methodology

10.1.3.1 Legislation and Guidance

This section presents a concise summary of the legal and planning policy frameworks relevant to this assessment in order to provide a context for the statutory protection assigned to the cultural heritage resource. The management and protection of cultural heritage in Ireland is achieved through a framework of national laws and policies which are in accordance with the provisions of the Valetta Treaty (1995) (formally the European Convention on the Protection of the Archaeological Heritage, 1992) ratified by Ireland in 1997; the Granada Convention (1985) (formally the European Convention on the Protection of Architectural Heritage), ratified by Ireland in 1997; and the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, 2003, ratified by Ireland in 2015. The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed and none are located within the region of the country containing the proposed development.

The National Monuments Service (NMS), which is currently based in the Department of Housing, Local Government and Heritage is responsible for the protection and promotion of Ireland's archaeological heritage.

The national legal statutes, guidelines and planning documents relevant to this assessment include:

- National Monuments Acts 1930-2014;
- Heritage Act 1995, as amended;
- National Cultural Institutions Act 1997;
- The Architectural Heritage (National Inventory) and Historic Monuments (Misc) Provisions Act 1999;
- Planning and Development Act 2000, as amended;
- Department of Arts, Heritage and Gaeltacht 2011 *Architectural Heritage Protection: Guidelines for Planning Authorities;*
- Department of Arts, Heritage, Gaeltacht and the Islands 1999 *Framework and Principles for the Protection of Archaeological Heritage;*
- Cork City Development Plan 2015 and
- Draft Cork City Development Plan 2022 - 2028.

The National Monuments Service (NMS), which is currently based in the Department of Housing, Local Government and Heritage is responsible for the protection and promotion of Ireland's archaeological heritage. The National Monuments Act 1930 and its Amendments, the Heritage Act 1995 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains. There are a number of mechanisms under the National Monuments Acts that are applied to secure the protection of archaeological monuments. These include the designation of National Monument status for sites of national significance, the Register of Historic Monuments (RHM), the Record of Monuments and Places (RMP), the Sites and Monuments Record (SMR), and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites . The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed as part of the assessment and none are located in the vicinity of the proposed development.

Section 2 of the National Monuments Act, 1930 defines a National Monument as 'a monument or the remains of a monument, the preservation of which is a matter of national importance'. The State may acquire or assume guardianship of examples through agreement with landowners or under compulsory orders. Archaeological sites within the ownership of local authorities are also deemed to be National Monuments. The prior written consent of the Minister is required for any works at, or in proximity to, a National Monument or at sites which are subject to a Preservation Order. There are no National Monuments in State Ownership or Guardianship located within the study area.

The RMP was established under Section 12 (1) of the National Monuments (Amendment) Act, 1994 and was based on the earlier SMR and RHM records. It comprises lists and maps of all known archaeological monuments and places for each county in the State and all listed archaeological sites receive statutory protection under the National Monuments Act 1994. No works can be undertaken at their locations or within their surrounding designated Zones of Notification without providing two months advance notice to the NMS. There are five recorded archaeological sites located within the study area and these are described in **Section 10.2** and are mapped in **Appendix 10.1 (Figure 10.1**). None of these sites are included in the current list of monuments that have been assigned Preservation Orders by the NMS[1].

[1] https://www.archaeology.ie/sites/default/files/media/publications/po19v1-all-counties.pdf

The Cork City Development Plan 2015-2021 includes the following objectives in relation to the protection of the archaeological resource within the Council's administration area:

Objective 9.4 Archaeological Heritage: Cork City Council will aim to protect, record and promote the rich archaeological heritage of the city

Objective 9.5 Sites of Established Archaeological Interest: Cork City Council will protect and enhance the archaeological value of the sites (and their settings) listed in the Record of Monuments and Places (RMP).

Objective 9.6 Newly Discovered Sites: Cork City Council will protect and preserve archaeological sites discovered since the publication of the Record of Monuments and Places (RMP)

Objective 9.7 Preservation of archaeological remains in-situ: In accordance with national policy (and in the interests of sustainability) impacts on the buried archaeological environment should be avoided where possible.

Objective 9.15 Surveys, Test Trenching and Monitoring: Archaeological surveys, test excavation and /or monitoring will be required for development proposals in areas of archaeological importance, if the application is likely to impact upon in-situ archaeological structures or deposits

Objective 9.16 Large-scale Development (outside the boundaries of a RMP): Outside the Zone of Archaeological Potential of a RMP, where in the opinion of the City Council a development involves major ground disturbance; archaeological conditions may be applied particularly in the vicinity of known monuments.

Objective 9.18 Industrial Archaeology: All development proposals for industrial buildings and sites of industrial archaeological importance must be accompanied by an archaeological assessment of the building(s) and their surrounding environment. Retention and/or incorporation of industrial buildings will be encouraged. Where in exceptional circumstances demolition is permitted, a detailed building report will be required.

Objective 9.20 Underwater Archaeology: All development proposals which will impact on riverine, intertidal and sub-tidal environments should be accompanied by an archaeological assessment

The protection of the architectural heritage resource is provided for through a range of legal instruments that include the Heritage Act 1995, the Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act 1999, and the Planning and Development Act 2000. The Planning and Development Act 2000 requires all Planning Authorities to keep a 'Record of Protected Structures' (RPS) of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Since the introduction of this legislation, planning permission is required for any works to a protected structure that would affect its character. A protected structure also includes the land and other structures within its curtilage. While the term 'curtilage' is not defined by legislation, the *Architectural Heritage Protection Guidelines for Local Authorities* (Department of Arts, Heritage and the Gaeltacht 2011), describes it as the parcel of land immediately associated with a structure and which is (or was) in use for the purposes of the structure. The guidelines also note that the attendant grounds of a country house could include the entire demesne, or pleasure grounds, and any structures or features within it such as follies, plantations, earthworks and lakes. A planning authority has the power to protect all features of importance which lie within the attendant grounds of a protected structure. However, such features must be specified in the RPS and the owners and occupiers notified in order for the features to be protected (*ibid.*).

In addition, local authorities must provide for the preservation of places, groups of structures and townscapes of architectural heritage significance through designation of Architectural Conservation Areas (ACAs).

The National Inventory of Architectural Heritage (NIAH) was established to record architectural heritage structures within the State and while inclusion in the NIAH does not provide statutory protection it is intended to advise local authorities on compilation of their Record of Protected Structures. The NIAH also includes a Survey of Historic Gardens and Landscapes which comprises a non-statutory, desk-based survey of such features.

There is one Protected Structure as well as two other structures listed in NIAH located within the Bessboro property, and these are detailed in **Section 10.2** of this chapter and are mapped in **Appendix 10.1 (Figure 10.1**). All of the listed structures within the study area are rated as 'Regional' by the NIAH. The study area does not extend into an Architectural Conservation Area, and none are located within its close environs.

Figure 10.1: Location of designated cultural heritage assets within subject site and surrounding 500m area

The Cork City Council Development Plan 2015-2021 presents a number of objectives intended to protect the architectural heritage resource within the city and these include the following:

Objective 9.23 Record of Protected Structures (RPS): Cork City Council will maintain a Record of Protected Structures within the Cork City Development Plan, which shall include structures or parts of structures which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest, and which it is an objective to protect.

Objective 9.25 Recording of Protected Structures: Any alteration or demolition of a Protected Structure shall require a full record to Best Conservation Practice.

Objective 9.26 Historic Landscapes: Cork City Council will ensure the historic landscapes and gardens throughout the city are protected from inappropriate development.

Objective 9.27 Enabling Development: Cork City Council will consider permitting the following, notwithstanding the zoning objectives of the area: - The restoration of a Protected Structure, or other buildings of architectural or other merit, currently in poor condition, to conservation best practice standard for any purpose compatible with the character of the building; - The conservation of a Protected Structure or other building of architectural merit or other merit, independent of its current condition, to a tourist related use, in cases where, in the City Councils opinion, the converted building is capable of functioning as an important additional tourist attraction or facility, and the use is compatible with the character of the building.

Objective 9.28 Protection of NIAH and other structures of built heritage interest: The City Council as planning authority aims to protect structures of built heritage interest. The "Ministerial Recommendations", made under Section 53 of the Planning Acts, asking the City Council to protect structures will be taken into account when the City Council as planning authority is considering proposals for development that would affect the historic interest of these structures of significance. The City Council will protect structures by making additions to the Record of Protected Structures, designating Architectural Conservation Areas, or other appropriate means.

*Objective 9.29 Architectural Conservation Area*s: To seek to preserve and enhance the designated Architectural Conservation Areas in the City.

Objective 9.34 Individual buildings of character in suburban areas/ villages: There will be a presumption against the demolition of buildings of Historic or Vernacular character in suburban areas/villages.

Objective 9.35 Elements of the Built Heritage: To ensure the protection of important elements of the built heritage and their settings as appropriate.

9.38 Curtilage and Attendant Grounds - Setting of Protected Structures: Curtilage is normally taken to be the parcel of grounds associated with the protected structure. Attendant grounds are those areas that may not be immediate to the protected structure but are associated with them. Both the curtilage and attendant grounds of a Protected Structure are included for their protection within the definition of a Protected Structure as they are defining elements of the building/structure.

Objective 9.26 Historic Landscapes: Cork City Council will ensure the historic landscapes and gardens throughout the city are protected from inappropriate development.

10.1.3.2 Desktop Study

Documentary research on the recorded and potential cultural heritage resource within the study area and its environs was carried out in order to identify any recorded archaeological, architectural and other cultural heritage sites and features. This information has provided an insight into the development of the study area over time and also assisted in an evaluation of known assets and potential presence of unrecorded cultural heritage sites or features.

The principal sources reviewed for the assessment of the recorded archaeological resource were the Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP) maintained by the Department of Housing, Local Government and Heritage (DHLGH). Cork City Council's Record of Protected Structures (RPS) and the National Inventory of Architectural Heritage (NIAH) were consulted to assess the designated architectural heritage resource. Summaries of the legal and planning frameworks designed to protect these elements of the cultural heritage resource are also provided within the chapter.

Other sources consulted as part of the assessment included, but were not limited to, the following:

- *Development Plan*: The study area is located within the Cork City Council administrative boundary and the current Cork City Development Plan 2015-2021 was reviewed as part of the assessment. This outlines the Cork City Council's policies and objectives for the protection of the archaeological and architectural heritage resource. The Draft Cork City Council Development Plan 2022-2028 was also reviewed.
- *Archaeological Inventory of County Cork Vol. 2: South and East Cork*: This publication presents summary descriptions of the recorded archaeological sites within this area of the county and the relevant entries are included within the chapter. In addition, the current national online database resources pertaining to same were accessed on Historical Environment Viewer at www.archaeology.ie in February 2022.
- *National Museum of Ireland Topographical Files*: This archive is stored in the museum's premises in Kildare Street, Dublin and contains records of the find places of Irish archaeological artefacts and objects.
- *Database of Irish Excavations*: This database contains summary accounts of licensed archaeological excavations carried out in Ireland (North and South) from 1970 onward. Current data was accessed via www.excavations.ie in February 2022 and this included a review of archaeological investigations within development sites in the wider environs of the study area to assist with the assessment of potential cumulative impacts.
- *Literary Sources*: Various published sources were consulted in order to assess the archaeological, historical, architectural and industrial heritage of the study area and these are identified in **Section 10.7** of this chapter.
- *Historic Maps and Photographs*: The detail on historic maps sources can indicate the presence of past settlement patterns, including features of archaeological and architectural heritage significance that no longer have any surface expression. Available cartographic sources dating from the 17th century onward were reviewed.
- *Aerial/Satellite/LiDAR Imagery*: A review of available online images of the study area was undertaken in order to ascertain if any traces of unrecorded archaeological sites were visible and to review the nature and extent of development within the study area during recent decades.
- *Irish Heritage Council: Heritage Map Viewer*: This online mapping source (www.heritagemaps.ie) is a spatial data viewer which collates various cultural heritage datasets sourced from, among others, the National Monuments Service, National Museum of Ireland, local authorities, the Royal Academy of Ireland and the Office of Public Works.
- Irish National Folklore Collection: A review of transcribed material from the National Folklore Collection archive published online (www.duchas.ie) was carried out to ascertain if the study area is associated with intangible cultural heritage assets.
- *Placenames Database of Ireland*: This online database (www.logainm.ie) provides a comprehensive management system for data, archival records and place names research conducted by the State.

10.1.3.3 Field Surveys

Following the completion of the main phase of desktop research and a review of the project description, the study area was inspected by the author in January 2022. No constraints were encountered during the inspection and all areas of the proposed development were accessible. The lands within the study area were assessed in terms of existing land use, vegetation cover and the potential for the presence of previously unrecorded archaeological sites or structures of architectural heritage interest. The field survey results are described in **Section 10.2** while extracts from the photographic record are presented in **Appendix 10.1**. Further details on the built environment within the site, including detailed photographic surveys, are provided in the Historic Building Record in **Appendix 10.3**.

10.1.3.4 Assessment Criteria and Significance

The following section presents a summary of the methodology used to determine the nature of impacts which has been informed by the Environmental Protection Agency (EPA) *Draft Guidelines for Information to be Contained in EIAR* (2017), in accordance EIA requirements of codified EU Directive 2011/92/EU as amended by EU Directive 2014/52/EU, per current Planning Legislation, concerning EIA assessment: Planning and Development Act, 2000 (as amended)

(Part X) and in Part 10 of the Planning and Development Regulations, 2001 (as amended). The following summation of the criteria used to assess impacts is provided in order to outline the methodology specifically applied to the cultural heritage resource.

Duration of Impact: This is assessed based on the following criteria:

- Momentary (seconds to minutes)
- Brief < 1 day
- Temporary <1 year
- Short-term 1-7 years
- Medium Term 7-15 years
- Long Term 15-60 years
- Permanent > 60 years
- Reversible: Impacts that can be undone, for example through remediation or restoration

Quality of Impact: The quality of an impact on the cultural heritage resource can be positive, neutral or negative:

- Positive: a change which improves the quality of the cultural heritage environment (e.g. increasing amenity value of a site in terms of managed access, signage, presentation etc. or high-quality conservation and re-use of an otherwise vulnerable derelict structure).
- Neutral: no change or effects that are imperceptible, within the normal bounds of variation for the cultural heritage environment.
- Negative: a change which reduces the quality of the cultural heritage resource (e.g. visual intrusion on the setting of an asset, physical intrusion on features/setting of a site etc.).

Type of Impact: The type of impact on the cultural heritage resource can be direct, indirect or no predicted impact:

- Direct Impact – where a cultural heritage site is physically located within the footprint of the proposed development, which will result in its complete or partial removal.
- Indirect Impact – where a cultural heritage site or its setting is located in close proximity to the footprint of the proposed development.
- No predicted impact – where the proposed development will not adversely or positively affect a cultural heritage site.

Magnitude of Impact: This is based on the degree of change, incorporating any mitigation measures, on a cultural heritage asset and can be negative or positive. The magnitude is ranked without regard to the value of the asset according to the following scale: High; Medium; Low and Negligible and has been informed by criteria published in the International Council on Monuments and Sites *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011) (**Table 10.1**).

Magnitude	Description
High	Most or all key archaeological or architectural materials affected such that the resource is totally altered. Comprehensive changes to setting Changes to most or all key historic landscape elements, parcels or components; extreme visual effects; fundamental changes to use or access; resulting in total change to historic landscape character. Major changes to area that affect Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Medium	Changes to many key archaeological or historic building materials/elements such that the resource is clearly/significantly modified. Considerable changes to setting that affect the character of the archaeological asset. Changes to the setting of a historic building, such that it is significantly modified. Change to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, considerable changes to use or access, resulting in moderate changes to historic landscape character. Considerable changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Low	Changes to key archaeological materials/historic building elements, such that the resource is slightly altered/slightly different. Slight changes to setting of an archaeological monument. Change to setting of a historic building, such that it is noticeably changed. Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; slight changes to use or access; resulting in limited change to historic landscape character. Changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Negligible	Very minor changes to key archaeological materials or setting. Slight changes to historic building elements or setting that hardly affect it. Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes to use or access; resulting in very small change to historic landscape character. Very minor changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.

Table 10.1: Magnitudes of Impact on Cultural Heritage Assets

Value Assessment: While various national and local authority legal and planning designations exist for elements of the Irish cultural heritage resource (see **Section 10.1.3.1**), there are currently no formal criteria for grading the values of individual elements of this resource. The National Inventory of Architectural Heritage (NIAH) does apply a ranking system (Local, Regional and National) to sites included in that inventory and, while these rankings do not confer a graduated level of protection they have been utilised as a value indicator for NIAH sites for the purpose of this assessment.

Given the absence of formal criteria the assessment of asset values (**Table 10.2**) has been adapted from guidelines presented in the ICOMOS *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS

2011). The evaluation of the values of cultural heritage assets is, therefore, not intended as definitive but rather as an indicator which contributes to a wider judgment based the individual circumstances of each asset. The application of values included a consideration of their legal designations (e.g., National Monuments), condition/preservation; documentary/historical significance, group value, rarity, visibility in the landscape, fragility/vulnerability and amenity value on a case-by-case basis. Archaeological sites with no surviving or partially surviving surface expressions may possess a lower value in relation to potential amenity attributes but do retain the potential to possess high value sub-surface elements, such as artefacts or other archaeological remains. This cannot be discerned without recourse to archaeological excavation, but such sub-surface remains are unlikely to be affected in the absence of direct negative impacts. The locations of archaeological sites which have likely been removed by later developments or have been previously subject to a systematic full archaeological excavation are of likely negligible value but can form indicators of the archaeological potential of the landscape within their environs.

The value of all known or potential assets within the study area are ranked according to the following scale as defined by ICOMOS: Very High; High; Medium; Low and Negligible. The values assigned to relevant cultural heritage assets within the area were determined following the completion of the desktop research combined with subsequent field surveys and are identified in **Section 10.3**.

Value	Description
Very High	*International Significance which may potentially include:* World Heritage Sites (including Tentative List sites) Assets of acknowledged international importance Assets that can contribute significantly to international research objectives
High	*National Significance which may potentially include*: National Monuments in State Care Assets of significant quality, rarity, preservation and importance that can contribute significantly to acknowledged national research objectives, including extant RMP sites Archaeological Landscapes with significant group value Newly discovered archaeological sites of potential national importance Protected Structures NIAH National Grade Buildings Conservation Areas containing significant buildings of importance, including group value
Medium	Regional Significance which may potentially include: Assets of moderate quality, preservation and importance Assets that can contribute significantly to acknowledged regional research objectives NIAH Regional Grade structures Undesignated buildings that can be shown to have exceptional qualities in their fabric or historical associations Newly discovered archaeological sites of potential regional importance Conservation Areas containing buildings that contribute significantly to its historic character Historic townscape or built-up areas with notable historic integrity in their buildings and settings
Low	*Local Significance which may potentially include:* Assets of local importance, including structures graded as Local by NIAH Assets compromised by poor preservation and/or poor survival of contextual associations Assets of limited value, but with potential to contribute to local research objectives Historic townscapes or built-up areas of limited historic integrity in their buildings or settings
Negligible	Assets with very little or no surviving archaeological interest Buildings of no architectural or historical note; buildings of an intrusive character

Table 10.2 Indicative factors used for assessment of values of cultural heritage assets

Significance of Impacts: This is based on a consideration of the Magnitude of the Impact (graded from High to Negligible, based on a consideration of character, duration, probability and consequences) combined with the Value (graded from High to Negligible, based on a consideration of significance/sensitivity) of the cultural heritage asset. The Significance can be described as Profound, Very Significant, Significant, Moderate, Slight, Not Significant or Imperceptible (**Tables 10.3 and 10.4**).

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

Table 10.3: Significance of Impact (per EPA Draft EIAR Guidelines 2017)

Magnitude of Impact					
	High	Not Significant/ Slight	Moderate/ Significant	Significant/ Very Significant	Very Significant/ Profound
	Medium	Not Significant	Slight	Moderate/ Significant	Significant/ Very significant
	Low	Not Significant/ Imperceptible	Slight/ Not Significant	Slight	Moderate
	Negligible	Imperceptible	Not Significant/ Imperceptible	Not Significant/ Slight	Slight
		Negligible	**Low**	**Medium**	**High**
		Value/Sensitivity of the Asset			

Table 10.4 Significance of Impacts Matrix (after EPA Draft EIAR Guidelines 2017)

10.1.3.5 Consultations

A process of consultation was maintained with the Cork City Council Archaeologist and Conservation Officer during the design and assessment phase of the proposed development.

Correspondence in relation to the proposed development was issued by the Project Team to the Department of Housing, Local Government and Heritage via the Development Applications Unit (DAU). The Department's observations and recommendations in relation to the proposed development (received 17th December 2021) contained no content in relation to archaeology, architectural or cultural heritage.

10.2 Description of Existing Baseline Environment

10.2.1 Definition of Chapter Study Area

The study area assessed for purposes of the Cultural Heritage assessment comprises the proposed development and the lands extending for 500m from its boundary. This study area represents the receiving environment area and facilitated an appraisal of the baseline cultural heritage context and the assessment of any identified impacts on the cultural heritage resource. Given the current absence of published guidance on the identification and/or assessment application of 'Zone of Influence' relevant to the cultural heritage resource, a rationale has been adopted that aimed to address the assessment of potential sensitivities of known assets within the study area that may extend beyond their immediate settings or interact with assets within the wider landscape, e.g., monuments with ritual astronomical alignments or which rely on intervisibility with other monuments as part of their setting.

10.2.2 Desktop Study

Relevant datasets cited within this section of the chapter have been interrogated and retrieved from current state and local authority sources and are considered accurate at the time of writing in February 2022. The dating framework used for each period of the archaeological record is based on the framework presented in the Guidelines for Authors of Reports on Archaeological Excavations as published by the National Monuments Service[2]. The following section provides high-level overviews of the general nature of various archaeological periods to present summary contextual information for the general reader and also includes references to relevant sources intended to direct the reader to more detailed information that has been published elsewhere. . The published inventory descriptions of recorded archaeological and NIAH sites within the study area are presented in tables below.

[2] ·https://www.archaeology.ie/sites/default/files/media/publications/excavation-reports-guidelines-for-authors.pdf

10.2.2.1 Archaeological and Historical Background

Prehistoric Periods

Until the recent identification of Palaeolithic human butchery marks on a bear bone recovered from a cave site in County Clare, the earliest recorded evidence for human activity in Ireland dated to the Mesolithic period (7000–4000 BC) when groups of hunter-gatherers lived on the heavily wooded island. The archaeological record indicates that these mobile groups favoured coastal, lake and river shores which provided a transport and food resource. They did not construct any settlements or monuments that have left any above ground traces although their presence in an area can often be identified by scatters of worked flints in ploughed fields or during earth-moving undertaken as part of development works. The Neolithic period (4000-2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns in farmlands within areas of cleared forestry. As a consequence of the more settled nature of agrarian life, new site-types, such as more substantial rectangular timber houses and various types of megalithic tombs, and artefacts such as pottery begin to appear in the archaeological record during this period. The advent of the Bronze Age period (c. 2400–500 BC) in Ireland saw the introduction of a new artefactual assemblage and manufacturing techniques to the island, including the use of metal and ceramic objects. This period was also associated with the construction of new monument types such as standing stones, stone rows and circles as wells as burnt mounds known as fulachta fia. The development of new burial practices during this period also saw the construction of funerary monuments such as wedge tombs, cairns, barrows, boulder burials and cists. The arrival of iron-working technology in Ireland saw the advent of the Iron Age (600 BC – 400 AD). Relatively little has been known about Iron Age settlement and ritual practices until recent decades when the corpus of evidence has been greatly increased by the discovery of sites dating to the period during archaeological investigations associated with developments such as road construction projects.

While there are no known extant prehistoric sites located within the study area, archaeological investigations carried out in 2003 in advance of the construction of the Mahon Point centre within a former green field location to the east of the proposed development uncovered sub-surface evidence for the remains of prehistoric settlement activity[3]. The site, which contained a hearth, stakeholes and a series of pits with inclusions of stone tools, was subject to a full archaeological excavation in advance of construction works and its former location is now occupied by a commercial building at a distance of 300m to the east of the proposed development. While no longer *in situ* the former location of this prehistoric site has been added to the SMR (C0074-130----). The National Museum of Ireland (NMI) Topographical Files also record that a Bronze Age flat axe (NMI ref. 1935:441) was discovered in 1935 within the grounds of Lakelands House which is now occupied by the Mahon commercial centre to the east, and this further attests to the presence of late prehistoric human settlement within the area. It is also noted that proposed development is located close to the shore of a river channel which is a geographical setting that has attracted human settlement since the earliest occupation of the island.

Early Medieval Period

This period began with the introduction of Christianity in Ireland and continued up to the arrival of the Anglo-Normans during the 12th-century (c. 400–1169 AD). The establishment of the Irish church was to have profound implications for political, social and economic life and is attested to in the archaeological record by the presence of church sites, associated places for burial and holy wells. The early medieval church sites were morphologically similar to settlement sites of the period but are often differentiated by the presence of features such as church buildings, graves, stone crosses and shrines. While this period saw the emergence of the first phases of urbanisation around the Hiberno-Norse ports, including the historic core of Cork city centre located c. 4.6km to the northwest of the study area, the dominant settlement pattern continued to be rural-based and centred around enclosed farmsteads known as ringforts. These are the most common early medieval site type within the Irish landscape and comprise enclosed farmsteads and their ubiquity within the Irish landscape is attested to by the fact that their original Gaelic names (*rath* and *lios*) still form

[3] http://excavations.ie/report/2003/Cork/0009609/

some of the most common place-name elements in the country. While there are no recorded early medieval sites located within the study area or its close environs, the rural areas to the south of the Rochestown and Douglas suburbs contain various recorded ringforts indicating the presence of farming communities within the wider landscape during this period.

High and Late Medieval Periods

The arrival of the Anglo-Normans in the late 12th century broadly marks the advent of the Irish high medieval period which continued to c.1400 and was followed by the late medieval period which extended to c.1550. These periods saw the continuing expansion of Irish urbanisation as many of the port cities developed into international trading centres and numerous villages and towns began to develop throughout the country, often within the environs of Anglo-Norman manorial centres which were defended by masonry castles. The descendants of the Anglo- Norman gentry began the widespread construction of tower-houses as fortified residences within their landholdings at the start of the 15th century and this trend was subsequently adopted by wealthy Irish families within areas under Gaelic control. There are no known archaeological sites dating to the high and late medieval periods located within the study area, which likely formed part of the wider agricultural hinterland of Cork city during this period.

Post-Medieval and Early Modern Periods

The centuries following 1550 comprise the post-medieval period which continued into the middle of the 19th century and the period thereafter is often described as early modern. The part of the post-medieval period was a turbulent time in Ireland's history and saw a prolonged period of wars between the 1560s and 1603 with further conflicts arising during the Cromwellian Wars (1649–53). The post-medieval period saw the development of high and low status stone houses throughout the Irish countryside and rural settlement clusters at this time typically consisted of single-storey thatched cottages with associated farm buildings while two-storey farmhouses became more common as the 19th century progressed. An agricultural boom in the late 18th and early 19th centuries saw a rise in prices for both tillage and dairy produce and resulted in Irish landlords investing in extensive land improvement works within their holdings. This included widespread land drainage works, introduction of soil nutrients, grass planting and the enclosure of open lands into field systems that survive to the present-day. The popularity and success of potato farming contributed to a population boom during the 18th and early 19th centuries and its failure in the middle of the latter century was to have devasting consequences. The settlement pattern throughout much of the rural landscape was greatly affected by the Famine period and its aftermath which saw the depopulation of many areas. The following decades were marked by an increasing move away from small-scale subsistence farming towards more market-led pasture, assisted by the development of the Co-Op system, which also increased the extent of land reclamation of previously marginal lands.

The proposed development is located within the grounds of Bessborough House which was constructed in the 1760s by the Allen family with various extensions added during the 19th and 20th centuries. The house came into the ownership of Joseph Pike in 1820, who was the head of a prominent Quaker family involved in various merchant, banking and ship-building businesses in the city, including Pike's Bank and the City of Cork Steam Ship Company. The property was inherited by his son, Ebenezer Pike, in 1826 and was subsequently passed to Ebenezer's daughters Anne and Florence in 1900 and early 20th century records indicate that the grounds were in use as productive farmland at that time (Ó Drisceoil 2018, 158). Following the death of the last surviving sister in 1920 the house remained vacant for two years before being converted into a mother and baby home run by the Sisters of the Sacred Heart of Jesus and Mary in 1922. A number of structures were constructed within the grounds during the following decades, including a chapel, hospital and various single-storey buildings to the north. Bessborough House is a Protected Structure (RPS 490), a recorded archaeological site (C0074-077----) and is also listed in the NIAH (20872006). An icehouse structure within woodland near the western boundary of the property is also listed as an archaeological site (C0074-051----) while the NIAH also lists the farmyard (ref. 20872006) to the north of the house and a recently reconstructed folly structure to the southeast of the house (ref. 20872007) which is contained within a landscaped feature that also encompasses recorded burial activity. The parklands around the house have also been listed in the NIAH Survey of Historic Gardens (Site ID 3423) which note that the southern end has been truncated by the construction of the N40 road. The use of the property as a Mother and Baby Home during the 20th century has been investigated by the Commission of Investigation into Mother and Baby Homes[4] and the property comprises an area of extremely high sensitivity extending beyond the scope of its archaeological or architectural heritage attributes. Since 1990 many of the outbuildings comprising Bessborough Farm were renovated for use as a heritage centre (now defunct) and as office/educational units. In addition, a number of new structures, including a crèche and a meditation centre, have been constructed in the area which originally comprised the walled gardens. As part of the Heritage Park development the former parkland to the north of the house was fenced off and replanted. Further details on the location of the proposed development in relation to the house, associated buildings and its grounds are provided in the review of historical map sources and field survey descriptions provided below (**Sections 10.2.2.2** and **10.2.3**).

The former Cork, Blackrock and Passage Railway line extends along the east side of the proposed development and the origins and development of this line have been detailed in a number of publications which are summarised hereafter (e.g., Jenkins & Newham 1993, Creedon 1992 and Ó Drisceoil 2018). The construction of the railway commenced in the late 1840s to create a rail link between Cork and Passage West, in part due to the village's strategic importance as an unloading point for cargo and passengers from larger ships unable to reach the city docks. The railway project commenced construction in 1847 when the first sod was dug in the Blackrock section and the line was then excavated southwards to the Douglas River, including the cut section to the east end of the Bessborough grounds. By 1848 there were one hundred workers employed on the area of the line to the north of the estuary and the quarried stones were transported by cart to create the railway embankment over the estuary slob lands to the south. The construction of the railway line was largely completed by early 1850 and commenced operation on Saturday 8th of June of the same year. The railway continued in operation until its closure in 1932 and the line fell into disuse during the following decades. Works to create the existing walkway along the section of the line extending through the area from Blackrock to Passage, including the section adjoining the proposed development, were initiated as part of a youth employment scheme during the 1980s which saw extensive vegetation clearance works and the creation of surfaced footpath along the former line. The 500m study area around the proposed development contains one designated railway structure and this comprises a stone railway bridge located to the north of the proposed development which is listed as an archaeological site (C0074-121----) and is also included in the NIAH (20868052). While the railway line itself is not listed as an archaeological site or an architectural heritage structure it is deemed by the author to form an undesignated feature of cultural heritage interest within the area.

Archaeological Investigations

A programme of archaeological test trenching was carried out at across the proposed location of Phase 1 'The Meadows' development by Colm Chambers of John Cronin and Associates in 2019 (Licence 19E0003) and a fully copy of the report on these investigations is presented in **Appendix 10.2**. An osteoarchaeologist was on-site at all times during the test trenching investigations to examine any revealed human or potential human remains. An advance inspection of the area revealed no surface traces of potential unrecorded archaeological sites or features of architectural heritage interest. The northern portion of the area appeared to contain dumps of construction and waste material, especially at the northeast. Within the southern portion of this area topsoil was evident, indicating that ground disturbance in this part of the site may have been more limited. A modern road cut into down into natural subsoil and which was constructed in the mid-2000s, forms the western limit of this area, with the former Cork, Blackrock and Passage Railway line forming the eastern boundary. Test trenching revealed a mid-brown, silty topsoil layer across the investigated area. This was generally c.30-40cm deep along the eastern and central portion of the site, and up to c.1.2m deep at the west side, where it included up-cast material originating from the construction of the modern road to the west. Frequent fragments of modern pottery and occasional fragments of plastic, glass and metal objects, such as drinks cans and machine parts, were noted within the topsoil across the site. The topsoil overlay an orange/brown silty clay subsoil layer with some areas of red gravelly silty clay at the centre at the north end. The subsoil contained frequent angular stone and occasional rounded boulders. There were no archaeological features or artefacts noted in any of the test trenches.

[4] https://www.gov.ie/en/publication/4cef9-chapter-18-Bessboro/\

A review of the online Excavations Database also revealed that a 2009 programme of ground works during the installation of services adjacent to Bessborough House and within its grounds were archaeologically monitored and nothing of archaeological significance was identified[5].

In 2019, a programme of geophysical survey (19R0021) was carried out by Target Archaeological Geophysics within the area of open grassland to the west of the main access road. A number of discrete areas of limited archaeological potential were noted within the surveyed area.

Summary of designated cultural heritage sites within study area

The desktop review has revealed the presence of five known archaeological sites within the study area. One of these, Bessborough House, is also a listed as a Protected Structure in the Cork City Development Plan 2014-2021. The house is also included in the Record of Protected Structures published in the Draft Cork City Development Plan 2022-2028, which does not list any additional Protected Structures within the study area. The NIAH also lists a number of architectural heritage features within the study area, and two of these are also curtilage features associated with Bessborough House, namely the farm complex to the north of the house and a folly structure to the southwest. In addition, the house grounds are also listed in the NIAH Survey of Historic Gardens and Landscapes (NIAH Garden ID 3423).

Class/Name	RMP	RPS	NIAH	ITM E	ITM N
Bessborough House	C0074-077----	PS 490	20872005	571802	570287
Bessborough Farm	-	-	20872006	571822	570422
Icehouse	C0074-051----	-	-	571612	570226
Folly	-	-	20872007	572014	570254
Railway bridge	C0074-121----	570254	20868052	571802	570287
Midden	C0074-063----	-	-	571218	570058
Excavated site	C0074-130----	-	-	572344	570516

Table 10.5: Designated Cultural Heritage sites within study area

Class/Name	Inventory Descriptions
Bessborough House C0074-077----	Mid 18th century 3-storey house overlooking Douglas Estuary to S; 3 bays deep. Entrance front (S) of 7 bays, 3-bay central breakfront, pedimented with oculus. Central door with fanlight, pedimented; central Venetian window at 1st floor, central Diocletian window at 2nd floor; limestone surrounds around all three opes. Sash windows decrease in size with height, prominent limestone keystone. Rendered walls with cut limestone band course, quoins and cornice exposed. Hipped roof with central valley. Numerous additions to rear. Victorian conservatory on W elevation. Farm buildings to N, now been converted to heritage centre.
Icehouse C0074-051----	In woodland; built into SW-facing slope in demesne of Besborough House (C0074-077---). Interior circular (diam. 3.7m); pit infilled to ground floor level; walls constructed of mortared rough limestone. Domed roof (H 2.55m). Door ope (Wth 1.4m) to SW with remains of splayed retaining walls for former earthen covering mound on either side of entry. Exterior composed of very rough stone surface; no remains of covering mound.
Railway Bridge C0074-121----	No published inventory description.
Midden C0074-063----	On N side of Douglas river estuary. According to Coleman (1945, 62-3) 'an early vertical weathered face of clay and stones some 15 feet from high-water level shows a layer of shells, bones, etc., extending horizontally for about 6 feet, and 12 ins above the shore level. Over the layer is 3 feet of sandy clay and stones'. Layer was composed of opened shells, ox and pig bones. Fragments of modern pottery and glass were also found. Coleman concluded that the midden was 18th or early 19th century in date. Site now in Mahon golf course; no visible surface trace.
Excavation site C0074-130----	Archaeological excavation, prior to development works revealed a hearth surrounded by 50 stake-holes. A shallow, truncated, linear feature (L c. 2.4m) was discovered c. 1.5m west of the hearth. A further seven pits were found to the W, three of which were clustered and similarly sized (diam. 0.45-0.83m; D 0.22-0.3m). Finds from the pits ranged in date from the prehistoric to post-medieval periods. Two further isolated pits to the S produced no finds. (Purcell 2006b, 66-7)

Table 10.6: Archaeological inventory descriptions of archaeological sites in study area (Power 1994)

[5] http://excavations.ie/report/2009/Cork/0020495/

Class/Name	NIAH Descriptions
Bessborough House Ref. 20872005	*Rating:* Regional *Categories of Special Interest*: Architectural, Artistic, Historical, Social *Description:* Detached seven-bay three-storey house, built c.1760, having pedimented breakfront to the central bay and two-storey additions to rear c.1860. Originally flanked by single-storey wings with bow-ended room added to west wing c.1860 and first floor added to east wing 1922. Converted to use as convent, 1922, with hospital added to east, c.1930, chapel dated 1931 to west, and single-storey multiple-bay structure adjoining to the east, c.1960. Range of single-storey structures attached to north. Now in use as a health centre. Hipped slate roofs with rendered corbelled chimneystacks and carved limestone eaves course. Pitched slate roofs to chapel and some additions with later rooflights. Lined-and-ruled rendered walls having cut limestone quoins, platband and plinth course to main building, smooth-rendered walls to remaining buildings. Cut limestone cornice to west wing. Square-headed window openings with limestone keystones and sills, one-over-one timber sash windows to ground floor and some two-over-two sash windows to wings. Replacement windows to remaining openings. Cut limestone surrounds to Diocletian and Venetian windows with replacement windows. Blind elliptical oculus in breakfront pediment with cut limestone surround. Limestone doorcase, c.1870, comprising rusticated pilasters surmounted by console brackets supporting broken bed pediment framing round-headed window opening with fanlight and timber panelled door approached by limestone steps with replacement metal railings of c.1960. Glass and cast-iron conservatory to west wing having Corinthian capitals to pilasters. Quadrant gateway, c.1880, comprising four cylindrical limestone piers with carved finials and cast-iron railings and gates. *Appraisal*: This complex comprises buildings of several phases of development since the original Georgian country house was constructed in the mid eighteenth century. Despite interventions over the course of two centuries, many important original features are retained including the proportions of the front façade and the finely cut limestone architectural details of the main house. Later nineteenth century additions to the building are of a high standard of construction and also include the very fine conservatory, added by Richard Turner c.1860, which has survived almost completely in its original form. The conversion of the house to a convent in 1922 resulted in further buildings being added to the complex. The Sacred Heart Sisters are still in residence today in the main house, while the remaining buildings provide important community and healthcare functions. *Survey Date:* 15/03/2011

Class/Name	NIAH Descriptions
Bessborough Farm Ref. 20872006	*Rating*: Regional *Categories of Special Interest*: Architectural *Description*: Farmyard complex, built c.1880, to north of Bessboro House comprising two ranges of single- and two-storey outbuildings arranged around central yards. South yard houses stables and two-storey domestic building, north yard incorporates two-storey building, L-shaped barn and open corrugated-iron barn structure. Pitched slate roofs to south yard with dormer windows and corrugated-iron roofs to north yard. Coursed rubble stone walls with remnants of early render to walls of north buildings. Walls to south yard re-rendered in 1993. Square-headed window openings with red brick surrounds c.2000 and replacement windows to north yard. Square-headed window openings with replacement windows to south yard. Square-headed door openings with red brick surrounds c.2000 and replacement doors to north yard. Cut limestone piers to gateway to south yard. Extensive walled garden to north of house enclosed by coursed limestone walls, c.1880, and possibly incorporating earlier fabric dating to construction of Bessboro House, c.1760. Greenhouses constructed within garden c.1880 with three surviving. *Appraisal:* A large complex of farmyard buildings constructed as part of improvements to Bessboro House and gardens carried out in the mid to late nineteenth century which originally housed a large variety of functions, including stables, dairy, barns, and accommodation for farm workers. The buildings are of a high quality of construction, as are the garden walls and glasshouses which form a significant part of this historic complex of buildings. *Survey Date*: 15/03/2011
Folly	*Rating*: Regional *Categories of Special Interest*: Architectural, social *Description*: Detached three-bay two-storey stone folly, built c.1880, now in ruinous condition. Roof gone. Coursed limestone rubble walls with some traces of lime render remaining. Pointed arch window openings with stone voussoirs to arch. Lancet windows to upper floor. Pointed arch door openings with stone voussoirs to arch. Burial ground associated with Sacred Heart convent, located in the adjacent Bessboro House, situated to the immediate north. *Appraisal*: An important surviving landscape feature associated with the gardens of Bessboro House, located to the west. The small graveyard in use since the 1920s for the convent is of social significance and maybe located on the site of an earlier burial ground associated with the former country house. *Survey Date:* 15/03/2011 (Author's note: this structure was partially demolished and rebuilt in 2019)

Class/Name	NIAH Descriptions
Railway Bridge C0074-121----	*Rating*: Regional *Categories of Special Interest*: Architectural, technical *Description*: Single-arch limestone bridge, built c.1850, carrying road over former Cork to Blackrock and Passage West railway line. Limestone rusticated rock-faced walls with abutments, margined rock-faced voussoirs to segmental arches, dressed limestone platbands and ashlar limestone barrel and parapet with stone coping. Railway line now used as walk path. *Appraisal:* The rock-faced rustication reinforces the sense of strength and sturdiness of this structure. The bridge is one of a group of bridges that serviced the former railway line which formed a part of the development of the suburbs and port of Cork. It is an important part of the former Blackrock and Passage West railway line which is now used as an amenity walk. *Survey Date:* 10/04/2011

Table 10.7: NIAH descriptions of architectural heritage structures in study area

The legacy of the Mother and Baby Home

Bessborough House functioned as a Mother and Baby Home from the time of its purchase by the Sisters of the Sacred Hearts of Jesus and Mary in 1922 through to the 1990s. In total nearly 6000 births are registered at the home between 1929 and 1987. Births prior to 1929, and subsequent to 1987, are believed to have taken place at St. Finbarr's Hospital (Report of the Inter-Departmental Group on Mother and Baby Homes).

The mortality rate for children born at the Bessborough is estimated to have been over 50% for extended periods, especially during the 1940s and 50s (Irish Mirror, 11th August 2013; Examiner, 25th August 2014). While complete records are not available, the mortality rate is believed to have remained high though-out the operation of the home. Estimates for the total number vary but range from several hundred up to about two thousand child deaths during the operation of the home (RTE Prime Time, 17th May 2017; Independent, 25th March 2018). The Fifth Interim Report of the Commission of Investigation puts the figure at 904.

No complete records of deaths are known to exist for the Bessborough Home and burial records for both mothers and babies who died at Bessborough appear to not have been kept. The deaths of 470 children and 10 women are recorded at the home between 1934 and 1953 but no records of deaths in the subsequent years are known (Examiner, 7th March 2017; Examiner, 19th February 2018). The Fifth Interim Report has identified burial places for just 64 of the over 904 child deaths.

It has been suggested that a number of children who died at the home were buried at the 'Angel's Plot', at the nun's cemetery at Bessborough however the Fifth Interim Report only identified one child burial there. It is known that a small number of those who died there were buried in unmarked plots in various Cork city cemeteries (*Irish Examiner*, 19th February 2018). In May 2018, the Mother and Baby Homes Commission appealed for anyone who has personal knowledge, documentation or other information concerning the burial arrangements and/or burial places of children who died in Bessborough between 1922 and 1998 to come forward.

The 5th Interim report of the Commission of Investigation6 stated the following in relation to Bessborough:

> *It is not known where the vast majority of the children who died in Bessborough are buried. There is a small burial ground in the grounds of Bessborough. This was opened in 1956 for members of the congregation. It seems to have been assumed by former residents and advocacy groups that this is also where the children who died in Bessborough are buried as there are occasional meetings and commemoration ceremonies held there. The vast majority of children who died in Bessborough are not buried there; it seems that only one child is buried there. More than 900 children died in Bessborough or in hospital after being transferred from Bessborough. Despite very extensive inquiries and searches, the Commission has been able to establish the burial place of only 64 children. The Congregation of the Sacred Hearts of Jesus and Mary who owned and ran Bessborough do not know where the other children are buried.*

The Commission tried to establish where the Bessborough children were buried. Cartographic and landscape assessment was undertaken of possible unrecorded burial arrangements in the Bessborough grounds. A site survey was also conducted. It is clear that there are a number of locations within the grounds where burials could have taken place. However, there is no significant surface evidence of systematic burial anywhere except for the congregation burial ground.

The Commission considered that it is likely that some of the children are buried in the grounds but has been unable to find any physical or documentary evidence of this. In particular, during the 1940s (when many of the deaths occurred) and when petrol was scarce, the Commission considered that it would have been very expensive to arrange off-site burials. However, as no physical evidence of possible locations was found, the Commission did not consider it feasible to excavate 60 acres not to mention the rest of the former 200 acre estate. The Commission engaged forensic archaeologists to carry out a cartographic and landscape assessment of possible unrecorded burial arrangements in the Bessborough grounds. As already stated, the grounds measure approximately 60 acres. It is also possible that burials took place in the grounds that no longer form part of the Bessborough estate, that is, a total area of 200 acres.

As stated, the Commission has not ruled out the possibility that former Bessborough residents were buried onsite. However, the Commission has also actively investigated the possibility that former residents may have been buried in other locations. The Commission has expressed frustration that the Congregation of the Sacred Hearts of Jesus and Mary "do not know where the children who died in Bessborough are buried". The Commission have also stated that it is "difficult to understand that no member of the congregation was able to say where the children who died in Bessborough are buried".

In their final report (January 2021), the Commission[7] stated the following:

> *The Commission's Fifth Interim report (the Burials report), which was finalised in March 2019, described all that the Commission then knew about the burials of children who died in the main mother and baby homes. Since then, a number of individuals and organisations have contacted the Commission with information and submissions about the issues raised. The Final Report includes an addendum to the Fifth Interim Report on the basis of this additional information and the Commission's further inquiries since March 2019.*

In their final report, the Commission has made a number of recommendations. Chapter 18 of the Commission's Final Report deals specifically with Bessborough and presents the findings of research and observations of the Commission on the institution there. The chapter includes evidence of former Bessborough residents, and the chapter is also supplemented with statistical analysis.

In March 2020, the Cork Survivors and Supporters Alliance (CSSA) made a formal submission to the Mother and Baby Homes Commission of Investigation. Their submission was divided into two parts: (a) the Law on Burials and (b) the Children's Burial Ground at Bessborough.

In relation to the Law on Burials, CSSA states that the Congregation had a clear legal obligation to provide a decent and dignified burial, to record the locations of the graves, to facilitate the involvement of grieving mother and family members in the burial of their children and to facilitate access thereafter to the graves for relatives. The CSSA submission also states that the Congregation is "in breach of its duties by continuing failure to disclose the location of the children's graves" Finally they state that none of the international recognised human rights around burial have been respected.

6 https://www.gov.ie/en/press-release/169f8f-commission-of-investigation-into-mother-and-baby-homes-fifth-interim/

7 https://www.gov.ie/en/publication/d4b3d-final-report-of-the-commission-of-investigation-into-mother-and-baby-homes/

The Commission has noted that children who died in Bessborough prior to March 1929 were buried in St. Joseph's Cemetery (in Ballyphehane). In 1930, a maternity ward was created at Bessborough, and in 1935, the Sacred Heart Maternity Hospital was built alongside the Bessborough Home. The CSSA assert that the need for a burial ground at Bessborough arose sharply after 1935. The CSSA suggest that "Children's Burial Ground" identified in 1950's Ordnance Survey of Ireland (OSI) mapping was established after 1932. The CSSA note that the Ordnance Survey carried out a revision process in 1949/50 and that a 1949-50 Revision Tracing Map produced by OS surveyors records a "Children's Burial Ground" and that around the children's burial ground OS staff had "marked in blue crayon a delineation as to the extent of the burial ground." The CSSA note that the area "delineated is about three times the entire area of the circular area where the Folly is located." The CSSA submission states that the Tracing Map is "the best available evidence of the presence and location of the children's burial ground at Bessborough in 1950." (It should be noted that an alternative interpretation of the available information (but not shared by the CSSA) is that the Children's Burial Ground text appearing on the 1950's trace map relates to the circular feature, based on the proximity of the text to that physical feature. Therefore, this alternative interpretation is that the Children's Burial Ground text could potentially relate to that area.")

At a site meeting held in June 2021 between representatives of the CSSA and the developer (EVE), the CSSA outlined the area of concern in detail and communicated their aspirations for a memorial location currently outside the CSSA and applicant's control. The area of principal concern to the CSSA is located to the south of the main development area of The Meadows. From a review of OSI trace mapping of concern to the CSSA, the children's burial ground would be located approximately 50 metres to the south of the proposed development.

During the site inspection, the CSSA re-iterated their position as not being opposed to development on the wider lands at Bessborough. Their primary concerns and ambition relate to the areas highlighted at the site visit. Their preference is for no ground disturbance in these areas and the location to be memorialised and protected for survivors, families, and the public to visit. The CSSA also stated the proposed development locations ("The Meadows" and "The Farm") were not of direct concern to their sensitivities.

There is no evidence to suggest that the proposed development site contains any burials associated with the former Mother and Baby Home. Indeed, archaeological testing of the subject site conducted in early 2019 found no features or remains of note in any of the test trenches excavated on the footprint of the proposed development. These investigations were supervised by a human bone specialist.

Irrespective of these findings, the developer is fully aware of the findings of the Commission and the concerns of survivors and their families. Large numbers of children who died while resident in the Bessborough Mother and Baby Home. There are no records of burial arrangement and/or burial places for vast majority of children who died while resident at Bessborough. The developers remain conscious of the apprehensions and sensitivities of many survivors of the Mother and Baby Home at Bessborough.

In respect to the subject lands, it is proposed that a **forensic specialist (assisted by an osteoarchaeologist) appointed to monitor all ground works within the development site**. In effect, this would mean the work of mechanical excavators would be watched at all times by both a Forensic Specialist and an Osteoarchaeologist. To this end, the developer has engaged Mr Aidan Harte of Munster Archaeology, who is a professional consultant Forensic Archaeologist familiar with the Bessborough Estate and Mother and Baby Home Commission of Investigation to prepare a methodology for the undertaking of such work (see **Appendix 10.4**). Such a methodology was employed (with the knowledge of the CSSA and Cork City Council) when geotechnical site investigations were undertaken for the purpose of this proposed development.

10.2.2.2 Cartographic Review

The earliest cartographic depiction of the general location of the proposed development comprises the 17th century Down Survey mapping which was compiled in the 1650s as part of a nationwide survey of lands to be forfeited by the Catholic Irish in order to facilitate their redistribution to members of the Cromwellian army. These maps typically present high-level pictorial depictions of major features such as fortifications, residences, churches, towns, roads, bridges and topographical features. Ballinure townland, which contains the proposed development, is shown as a vacant area within the parish of St. Finbarrs on the survey mapping, indicating that no major structures were located within the townland in the middle of the 17th century. The map does show large structures within the environs of the River Lee shoreline in the Mahon and Dundanion areas further to the north which are likely the known tower houses in those townlands while a structure shown in Ballinlough townland further to the west is not listed as an archaeological site but may be associated with a large residence within that townland. None of the structures indicated within surrounding townlands are located within close proximity to the proposed development location. The Taylor and Alexander Skinner's 1778 map series of the of the roads of Ireland shows a roadway extending along the existing Blackrock Road to the north and a number of larger country houses within the general area, including Bessborough House which is labelled as "Bisboro" and the proprietor is named as Allen Esq (**Figure 10.3**). This map series is produced at a large scale and no details on the layout of the house or associated grounds are presented other than the presence of surrounding trees, but it does demonstrate the presence of the residence within the property in the second half of the 18th century, approximately a decade after it was constructed.

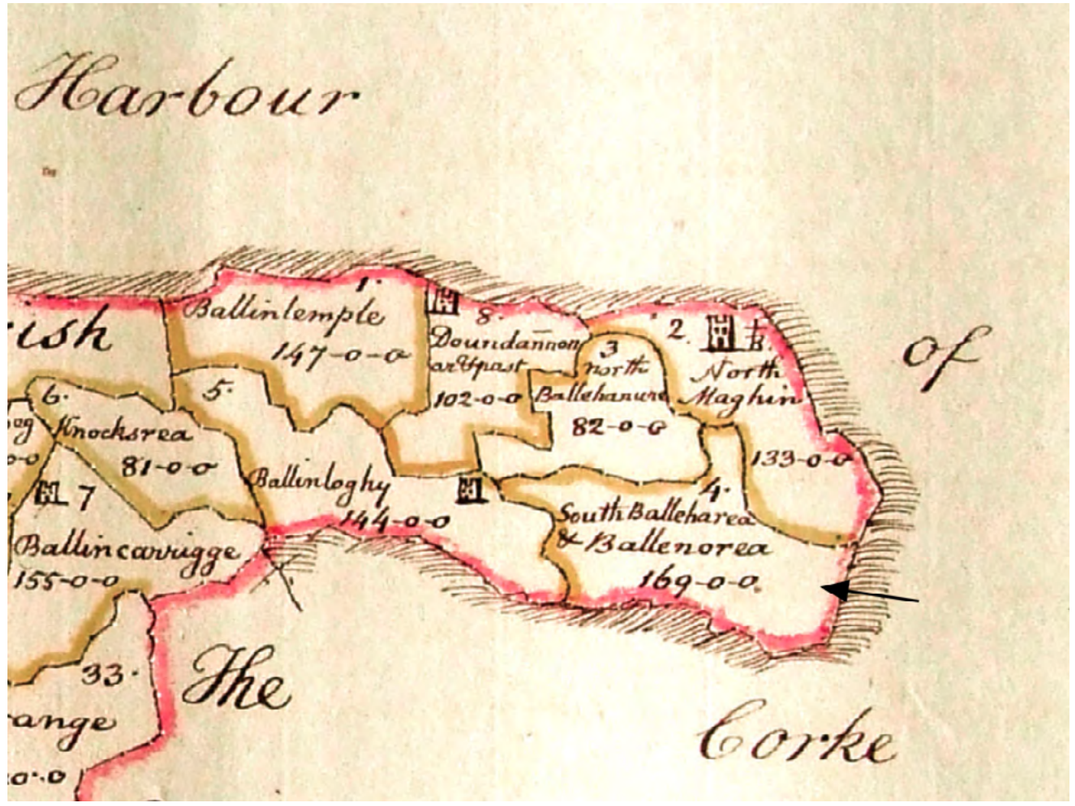


Figure 10.2: Extract from Down Survey Map with Ballinure townland indicated with arrow"

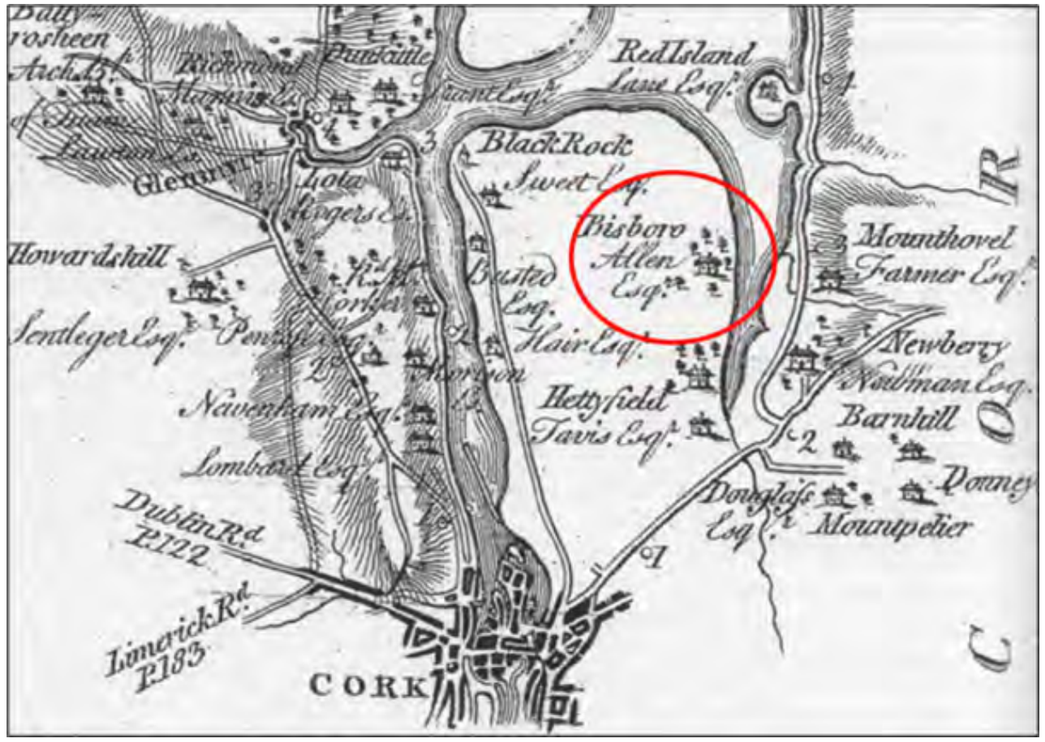


Figure 10.3: Extract from Taylor and Skinner 1778 with general location of Bessboro indicated with circle"

The first edition 6-inch Ordnance Survey (OS) map surveyed in 1841 indicates that at that time the house consisted of a central squarish block with a projecting wing to either side (**Figure 10.4**). The western wing terminated in what appears to be a pavilion. The eastern wing extended to the north forming a long range of buildings, possibly a service wing, which defined the east side of a yard to the rear of the house. The north side of the yard was enclosed by a further range of buildings, presumably out-offices, stables and/or coach-house (at the time, the house lacked a separate farmyard complex). The demesne surrounding the house was compact and well defined with a gate lodge indicated to the west of the main gateway in the northern boundary. An avenue led southwards from the gateway to the main house much as it does today. The demesne lands appear to have consisted in the main of informal parkland with scattered trees and denser tree belts around the perimeter. More formal, walled gardens are indicated to the east, northeast and north of the house and rectangular structures depicted within them probably correspond to glass houses and potting sheds. There were several pathways within the demesne: three lead southwards to the southern boundary where extensive mudflats bordered the estuary; a path also appears to have followed the demesne perimeter for much of its length inside the demesne wall; a further path lead westwards from the house to a wooded area on the western boundary. This latter path terminated in a triangular area which, although not clearly indicated on the map, is likely to have been the site of the icehouse which is still extant. Another feature of interest clearly indicated on the first edition map is a demi-hexagonal pond located in the southwestern quadrant of the demesne, abutting the demesne boundary. Five, regularly arranged islands are indicated in the lake. This was an artificially created feature which originally also included a number of stone bridges and was used by the Pike family for small paddle boats. To the east of the house, outside the shaded area indicating the demesne, a small rectangular structure is shown. This may well be the folly tower which is still extant.

Figure 10.4: First edition 6-inch (1:10,560) Ordnance Survey map (Surveyed 1841, published 1845) [OSI licence ref. 0003322]

By the time of the survey for 25" inch OS in 1899 the house had been extended and a large number of additional out buildings had been constructed on the northern side (**Figure 10.5**). As regards the house, it can be seen that two returns had been added to the rear elevation, one to the main house and one to the west wing, and the side wings had been modified: the west wing had a semi-circular bay added to its west elevation and the conservatory was constructed; the south elevation of the east wing also appears to have been altered and may in fact have been glazed. The other main area of construction was the creation of a complex of farm buildings, indicated as "Besboro' Farm" to the north northeast of the house. These buildings were arranged around two courtyards, a square one to the south and a triangular one adjacent to the north. The layout and composition of the lands remained much the same as on the earlier Ordnance Survey map but a windmill (used to pump water up to the house), a summerhouse and a well had been constructed adjacent to the southern boundary (no longer extant due to modern road construction) and a planted area had been created around the folly to the east of the house, accessed via a tree lined path. A major addition to the immediate landscape, although not within the actual demesne, was the construction of the Cork to Blackrock railway in 1850 the line of which is clearly indicated to the east of the demesne.

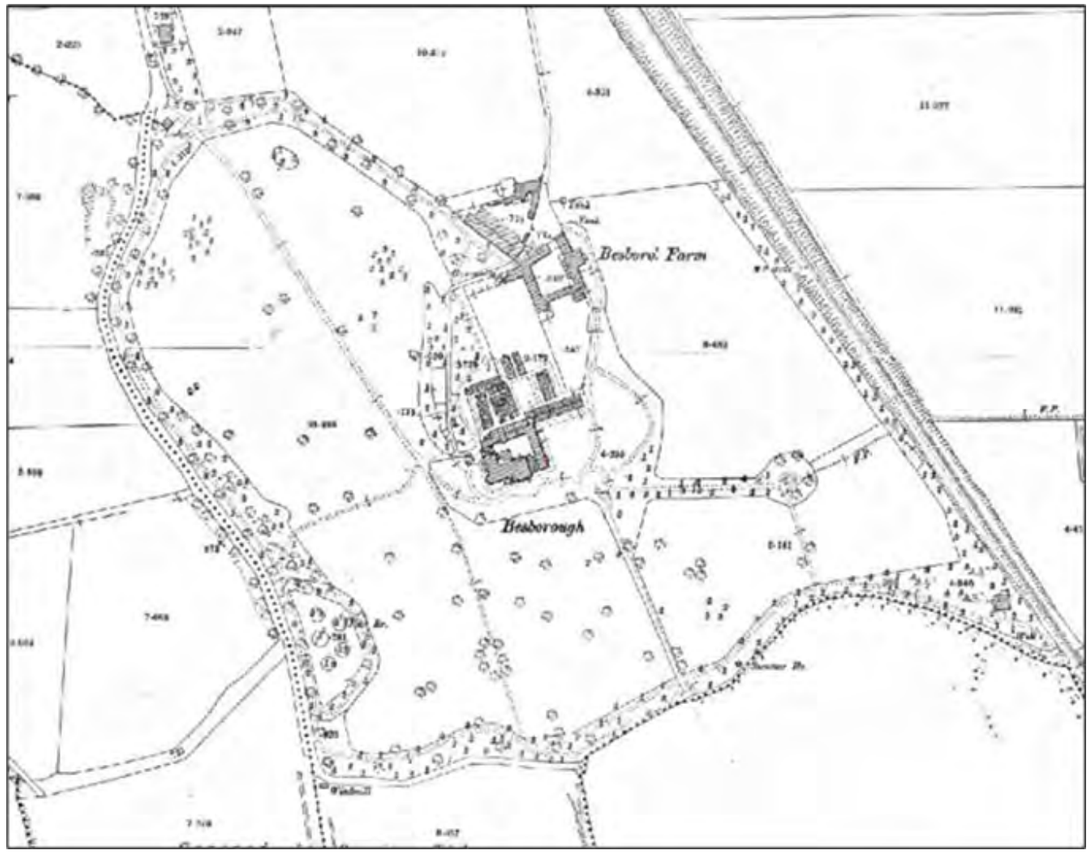


Figure 10.5: Extract from 25-inch (1:2500) Ordnance Survey Map (Surveyed 1899/1900, published 1901) [OSI licence ref. 0003322]

The Cassini edition OS map (1956) shows the property in the decades following its acquisition by the Sisters of the Sacred Hearts of Jesus and Mary in 1922 with a number of further alterations within the surrounds of the house depicted (**Figure 10.6)**. A dormitory was created, apparently by raising to three storeys the height of the range of buildings defining the eastern side of the yard behind the house. In 1931 a new chapel was constructed to the west of the main house: it is of red brick construction and is connected to the main house by a linking corridor. Also, around this time a detached, two-storey hospital building was constructed to the northwest of the main house.

10.2.2.3 Aerial, Satellite and LiDAR imagery

Aerial photographic coverage of the property produced for the Irish Air Corps in 1951 provides a very clear overview of the lands at that time (**Figure 10.7**). The aerial photograph shows the farm complex in good order and active use and surrounded by open fields of pasture to the north and east. No surface traces potential unrecorded archaeological sites are evident or visible within the open fields. On this aerial photograph, Bessborough Farm is separated from the parkland area to the west by an estate wall and a tree belt whilst the parkland area itself is remarkedly open and largely devoid of trees. The avenue leading from the principal entrance gate (in the north-west) to Bessborough House is not flanked by lines of trees and parkland on both sides of the avenue (to the east and the west) is being used for grazing. This aerial photograph clearly demonstrates that the majority of the trees currently within this area of the property represent late-20th century plantings most likely associated with the establishment of Cork Heritage Park in the 1980s/90s.

Figure 10.7: 1951 aerial image showing the subject site (Source: Military Archives, Vertical Aerial Photography, V190 #72; Cork-Douglas/Blackrock, 13 February 1951"

A review of online aerial and satellite images dating from the 1995 onward, shows extensive, single storey flat-roofed additions gave been added to the main building complex (**Figure 10.7)**. These include structures to the east of the main house and between the west wing and the hospital building. A review of the Excavations Database did not reveal any archaeological investigations associated with this developments. The details on two images from the mid-2000s (2005 OSI and 2006 Google Earth) shows ongoing ground works for the construction of the roadway that extends between The Meadows application area and the main building complex to the west. The visible road works continue to the south and curve around the outer east and southeast sections of the boundary the landscape feature around the folly structure and burial ground. Areas of disturbed ground within the Meadows area are also visible on these images and appear to comprise a works compound, haul routes and soil retention areas. A review of the Excavations Database did not reveal any archaeological investigations associated with the construction of this roadway. A review of a 2017 aerial image indicates that a footpath was created within the Meadows area in the previous decade and also that the ground surface within the area was reinstated after the completion of the construction of the roadway on the west side during that time.

A new convent building is also visible in the area immediately to the north of Bessborough Farm and no archaeological investigations associated with that development are included in the Excavations Database. In summary, the review of the aerial/satellite imagery demonstrated the extent of modern development within the environs of the historic core of the house and farm centre and no observable traces of potential unrecorded archaeological sites were noted within the surrounding areas of grassland.

The Bessorough property is located within the coverage area of LiDAR datasets published on the Open Topographic Viewer[8]. A review of hillshade models created from these datasets was carried out and no traces of potential unrecorded archaeological sites within undeveloped areas of the property were observed **Figure 10.8**).

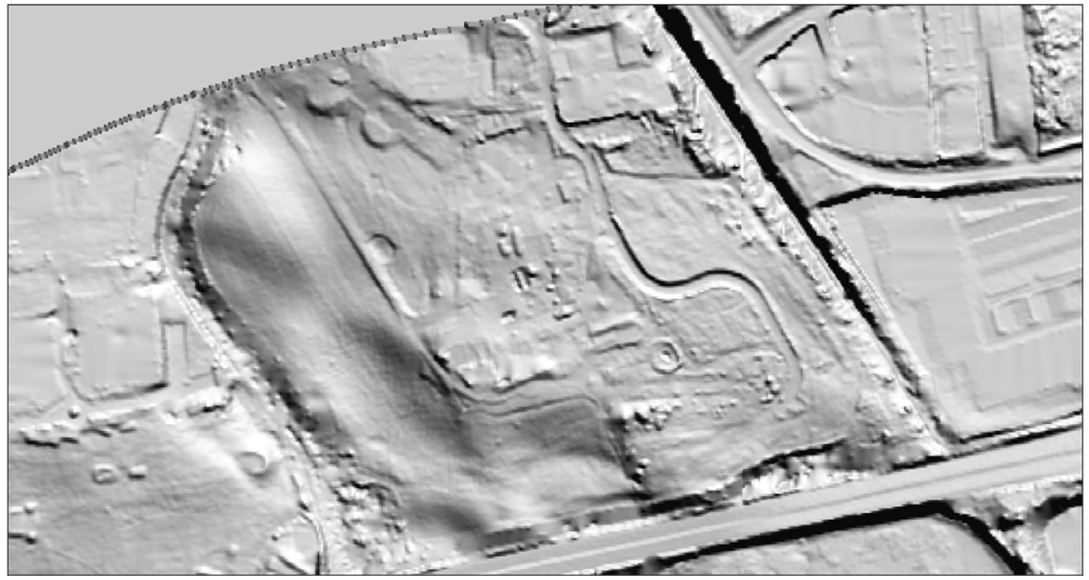


Figure 10.8: LiDAR imagery of the subject area (source from Geological Survey of Ireland)"

10.2.3 Field Surveys

10.2.3.1 Phase 1 'The Meadows'

The proposed main building construction area within the subject site was formerly part of vacant agricultural lands associated with Bessborough House which is located behind later buildings at a distance of c. 120m to the southwest. Bessborough Folly and its associated landscaped boundary feature, which also contains recorded burial activity, are located 80m to the south of the main construction area. The folly structure has been recorded by the NIAH (ref. 20872007) and appraised to be of regional significance (see **Table 10.7** above).

The location of the main area of building construction within the subject site currently consists of rough, vacant scrub lands with no potential unrecorded archaeological or designed landscape features visible. The west and southern sides of the main construction area are bound by an internal road constructed within the property in the mid-2000s while a cut section of the former railway line extends outside the east boundary. In a broader context, the subject site is situated in an area of Mahon with contrasting adjacent land uses ranging from historical demesne to the west, a modern building within a property to the north with widespread residential developments further to the north, an extensive commercial/retail centre to the east, residential to the north and waste ground and the N40 to the south with the Douglas River estuary further to the south of this road.

As noted in **Section 10.2.2.1**, a 2019 programme of archaeological test trenching (Licence 19E0003) was carried out across the footprint of the extent of the proposed building construction area within the subject lands and this revealed nothing of archaeological significance.

The subject site also entails services that will extend through the area in front (south of) Bessborough House and c.20m to the north of the west end of the landscaped feature which contains the folly structure at it eastern and then continue along two separate lines through the area of open grassland to the west. The service lines within this grassland area avoid the location of icehouse structure which is a recorded archaeological site (C0074-051----) and services are located at distances of c. 30m to the north and c. 60m to the south of this structure. In addition, a review of the historic OS maps did not reveal the presence of any demesne structures on the footprint of the services. A field inspection of the services footprint did not reveal any surface traces of potential unrecorded archaeological or architectural heritage features.

The subject development will also entail the construction of a new pedestrian/cycle bridge over the former railway line to the east, which now forms part of the Passage West Greenway, connecting into the existing down ramp from Mahon providing direct access to the greenway. An inspection of this area revealed that the slopes of the railway cut have been subject to recent vegetation clearance as part of ongoing upgrades to the green way. No potential structures associated with the 19th century railway, such as platforms or crossing features, are indicated at the location on historic OS maps and none were observed during the field inspection. There are also no retaining walls associated with the railway located on either side of the proposed bridge location.

10.2.3.2 The Farm

The subject area consists of an amalgam of former parkland, relict sections of former agricultural lands and a cluster of farm buildings. A tall estate wall divides the former parkland from the farmyard. The subject site includes one of two yards that were collectively known as "Bessboro Farm". This farmyard complex was built c. 1880 and contained a large variety of functions, including stables, dairy, barns, and accommodation for farm workers. The former farm complex has been recorded by the NIAH (ref. 20872006) which ranks it as being of regional significance (see **Table 10.7** above). The northern yard (within the subject site) is triangular-in-plan and incorporates a two-storey building, a L-shaped barn, an open corrugated-iron barn structure and a series of modern structures. The southern yard, located outside of the subject site, is roughly square-in-plan; this courtyard housed stables, workshops and a two-storey domestic building (possibly a farm manager's house). Generally, the buildings within the northern yard served more utilitarian functions and are, for the most part, much-altered. There is a greater degree of formality and design intent to the configuration, layout and design of the buildings that form the southern yard. The farm complex appears to have been in active use up until the 1980s.

The buildings within the northern portion of the farmyard complex, and within the subject site, are laid out in a triangular shape around a central courtyard with an entrance to the southeast. The 25-inch Ordnance Survey map of 1901 (**Figures 10.9** and **10.10**) shows the complex soon after its construction. The two-storey structure, (hereafter referred to as "Building A"), is depicted with a flight of external steps to the northeast elevation which were likely to be of stone construction. Building B and C are also depicted to the northeast corner. There are some structures adjacent to the southern elevation of Building C which are no longer extant. Building E is depicted as a central part of a northern range and connected to Building C, only Building C remains extant. The former barn, Building H, forms the western boundary of the complex and is sub-divided longitudinally. The stone wall of the southwestern elevation extends to the northwest as a boundary wall.

[8] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b7c4b0e763964070ad69bf8c1572c9f5

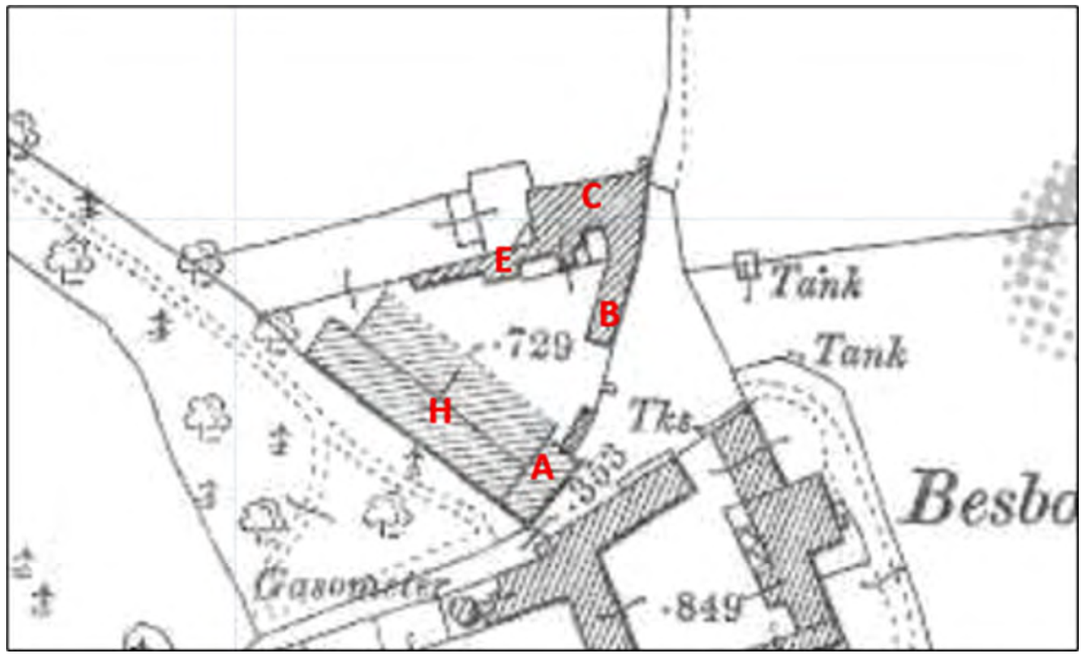


Figure 10.9: Extract from 25-inch OS map showing building labels within The Farm subject site [OSI licence ref. 0003322]

The former parkland area, located to the west of the farm complex, was, up to recent years, occupied by the Cork Heritage Park. A children's play area and small structures are located within this area. Some historic farm machines are displayed at intervals within this area. This portion of the lands is shown as parkland with occasional trees on the first-edition Ordnance Survey map and the later 25-inch map edition. Indeed, aerial photographic evidence from 1951 (**Figure 10.7**) demonstrates that much of the tree planting is of an entirely recent origin and is not in keeping with the more open and historic character evident on 19th and early 20th century mapping.

Finally, just to the north of the former farm complex are two parcels of ground that are remnants of former agricultural lands that were historically located outside of the Bessborough Demesne (they are separated from the parkland area by an original estate wall). The southern parcel is currently used as allotments whilst the northern parcel is currently unutilised and overgrown; the latter parcel is bound to the west by the modern Sacred Heart Convent and by a public road to the east.

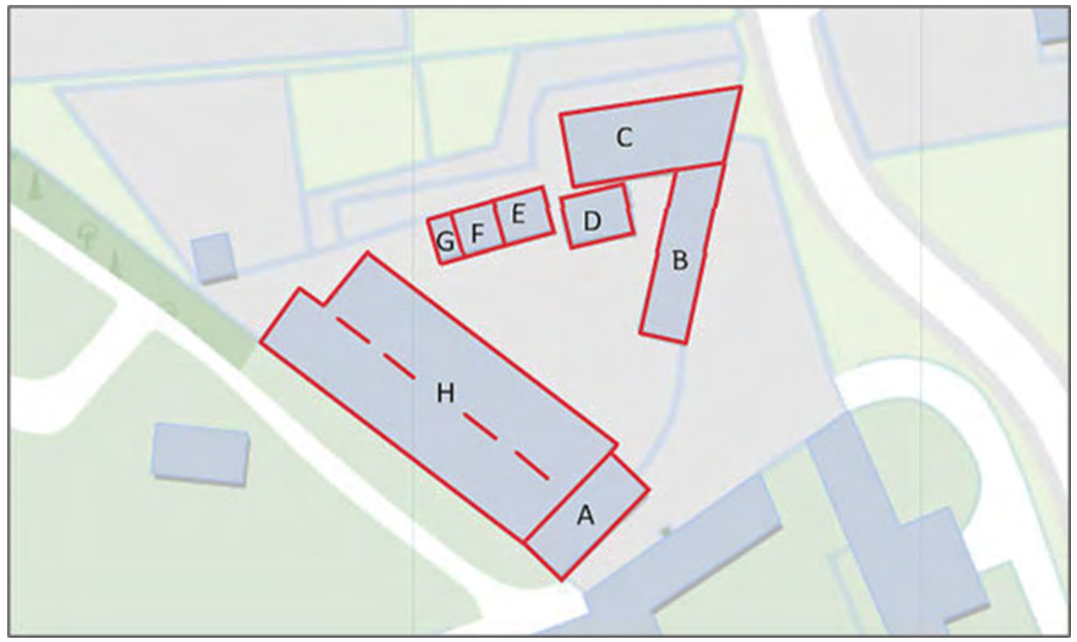


Figure 10.10: Map showing building labels within The Farm subject site"

The subject buildings form part of a complex of farm buildings located to the north of Bessborough House and consist of a cluster of buildings laid out around a central triangular courtyard with an entrance to the southeast (**Figures 10.9** and **10.10**). The buildings are currently unoccupied. Summary descriptions of the buildings follow and a detailed Historical Building Record, which includes a photographic record, for each of the buildings is provided in **Appendix 10.3**:

- Building A: A late nineteenth-century, two-storey stone-built building with brick detailing to windows which are replacement uPVC frames. Sections of render to first floor and a replacement pitched metal profile roof. External metal staircase on the north-eastern elevation accesses the first floor. The rear elevation is much altered with a number of blocked up original openings and later insertions. Interior much altered and modernised with modern joinery and plastered and painted walls and ceiling. Open plan rooms to ground and first floor, a modern internal stair leads to the first floor.
- Building B: A late nineteenth-century, double-height stone-built former store building with a replacement sheet metal barrel roof. The western elevation has been extensively rebuilt using a mixture of stone, brick and render.
- Building C: A late nineteenth-century, double-height random rubble stone-built former store building with a replacement sheet metal barrel roof.

- Building D: A detached, single-storey concrete block-built building with a modern metal roof of no architectural heritage significance.
- Building E: A late nineteenth-century, single-storey, three bay semi-coursed ashlar stone-built building with a pitched corrugated metal roof. Brick detailing to windows, probably originally camber-headed but later altered when replacement uPVC frames were inserted. Internally, the building is modernised and has no original features.
- Building F: A three-bay, single-storey modern concrete-built structure with stone facing and a pitched corrugated metal roof of no architectural heritage significance.
- Building G: A single-storey concrete-built structure with stone facing and a shallow pitched metal roof of no architectural heritage significance.
- Building H: A late nineteenth-century, double height stone-built former barn, open to eastern elevation. Replacement pitched metal profile roof to western section, badly damaged barrel corrugated roof to eastern section. Internally subdivided by random rubble stone walls and later concrete-built divisions.

The former farmyard within the subject site is one of two yards that formed part of Bessborough Farm which was established in the 1880s adjacent to but outside the eighteenth-century parkland of the Bessborough Estate. To the south (and outside the subject site) is a yard of former stables, workshops and domestic buildings that are of a high quality of construction and possess a greater degree of formality and design intent to the utilitarian and much-altered structures within the northern yard. The degree of difference between the two yards is most evident in the difference of the construction and materiality of the roofs of the buildings. The buildings within the south yard have double-pitched roofs with natural slate cladding while the buildings within the development area generally have long, low linear arrangements with barrel roofs clad with corrugated sheet metal. These latter buildings have no architectural pretensions and were purely utilitarian and built to house agricultural functions; functions that have been redundant for many decades. When the NIAH inventory description (see **Table 10.7** above) refers to "buildings of a high quality of construction" within the farm it is clear that they are referring to the buildings that make up the southern yard and the eastern flank of the northern yard (this is confirmed by the photographs used to illustrate the inventory NIAH record (NIAH Ref. 20872006))[9]. None of the buildings within subject site retain internal fabric or features of note (as clearly evident from the photographs within Appendix 10.4). All of the inspected buildings are heavily altered.

The former parkland area that makes up the bulk of the development site has been subject to a separate landscape assessment. It is, nonetheless, clear from a review of historical maps and cartographic sources that the dense tree planting evident within the subject site today appears to have been a modern creation (c.1980s) and while the area is now a pleasant environment, it is contrary to the original landscape intent of parkland as open land with grass and trees.

The subject development will also entail the construction of a new pedestrian/cycle bridge over the former railway line to the east, which now forms part of the Passage West Greenway, connecting into the existing down ramp from Mahon providing direct access to the greenway. An inspection of this area revealed that the slopes of the railway cut have been subject to recent vegetation clearance as part of ongoing upgrades to the green way. No potential structures associated with the 19th century railway, such as platforms or crossing features, are indicated at the location on historic OS maps and none were observed during the field inspection. There are also no retaining walls associated with the railway located on either side of the proposed bridge location.

[9] https://www.buildingsofireland.ie/buildings-search/building/20872006/Bessboro-ballinure-blackrock-cork

10.3 Impact Assessment

10.3.1 Do nothing Scenario

10.3.1.1 Phase 1 'The Meadows'

In the 'do nothing' scenario, the subject lands will remain undeveloped and there will be no additional impacts on the cultural heritage resource.

10.3.1.2 Phase 2 'The Farm'

In the 'do nothing' scenario, the subject lands will remain undeveloped and there will be no additional impacts on the cultural heritage resource.

10.3.1.3 Combined Phase 1 and Phase 2

In the 'do nothing' scenario, the subject lands will remain undeveloped and there will be no additional impacts on the cultural heritage resource.

10.3.2 Impacts on Cultural Heritage

10.3.2.1 10.3.2.1 Construction Phase

10.3.2.1.1 Phase 1 'The Meadows'

There are no recorded archaeological sites located within the boundary of the subject lands and no potential unrecorded, sub-surface archaeological sites or features were identified during a 2019 programme of archaeological test trenching across the footprint of the construction area for the proposed apartment development (see **Appendix 10.3**). The construction phase of the proposed Meadows development will, therefore, not result in any predicted direct impacts on the known archaeological resource. The potential for direct negative impacts on any unrecorded, sub-surface archaeological features that may exist within the subject lands cannot be discounted and will require mitigation.

There are no designated architectural heritage structures, or other structures of any date, located within the boundary of the subject lands. In addition, the review of historical cartographic sources carried out as part of the desktop study did not reveal any now removed structures or demesne features within the boundary of the subject lands. The construction phase of the proposed Meadows development will, therefore, not result in any predicted direct impacts on the known architectural heritage resource.

The proposed Meadows development will include the construction of a new pedestrian/cycle bridge over the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. There are no associated railway structures, such as platforms or bridges, at the location. This proposal will give rise to a direct, negative, low magnitude construction phase impact on this undesignated cultural heritage asset which is assessed as being of medium value. This direct negative impact is assessed as being slight in significance.

Table 10.8 provides an assessment of the predicted construction phase indirect impacts of the proposed Meadows development on the settings of the identified cultural heritage assets within the reviewed study area.

Class/Name	Designations	Indicative Value	Nature of Indirect Intervention	Quality of Impact	Duration	Magnitude	Significance of Indirect Impact
Bessborough House	RMP C0074-077---- PS 490 NIAH 20872005	High	Building construction 120m to northwest and upgrade of services 10m to south	Negative	Temporary	Low	Slight
Bessborough Farm	NIAH 20872006	Medium	Building construction 30m to east	Negative	Temporary	Low	Slight
Icehouse	RMP C0074-051----	High	Building construction 320m to east and new service trenches 30m to north and 60m to south	Negative	Temporary	Negligible	Slight
Folly (including boundary)	NIAH 20872007	Medium	Building construction 80m to north and upgrade of services 20m to north	Negative	Temporary	Low	Slight
Railway bridge	RMP C0074-121----	High	None (located 480m to north)	Neutral	N/A	None	None predicted
Midden	RMP C0074-063----	Medium	None (located 350m to west)	Neutral	N/A	None	None predicted
Excavated site	SMR C0074-130----	Low	None (located 320m to east and previously excavated)	Neutral	N/A	None	None predicted

Table 10.8: Summary of The Meadows Construction Phase Indirect Impacts

10.3.2.1.2 Phase 2 'The Farm'

There are no recorded archaeological sites located within the boundary of the subject lands and the ground levels within sections of the area have been disturbed by 19th century construction works. No potential unrecorded archaeological sites were identified within the subject lands during the desktop research and field surveys carried out as part of this assessment. The construction phase within the subject lands will, therefore, not result in any predicted direct impacts on the known archaeological resource. The potential for direct negative impacts on any unrecorded, sub-surface archaeological features that may exist within the subject lands cannot be discounted and will require mitigation.

The development will entail the demolition of selected farm buildings and the refurbishment and incorporation of existing buildings on site. The buildings to be demolished within the former farm complex are referred to in **Section 10.2.3.2** as Buildings D, E, F, G and H. Buildings A, B and C are to be retained, conserved and adapted to new uses (see **Appendix 10.3)**.

The heritage significance of the existing farmyard buildings within the subject area was assessed by the project architects (Shipsey Barry) and the architectural heritage consultant (John Cronin) as part of the design and assessment phases. This included consultations with Cork City Council's Conservation Officer and Archaeologist in relation to proposed interventions and design responses. It was determined that the removal of later buildings of poor quality to the north of the central core of Bessorough Farm (NIAH 20872006) would not result in any significant loss of cultural heritage value.

The demolition of Buildings D, E, F, G and H during the construction phase of the Farm development will result in a direct, negative, permanent, high magnitude impact on the architectural heritage resource. The buildings to be removed have been assessed as being of low quality and do not form part of the central core of the Bessboro Farm complex to the south which will be retained. The significance of this direct negative impact is, therefore, assessed as being moderate.

The proposed retention, conservation and adaption into new uses of the better quality historic buildings within the subject area (Buildings A, B and C) is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance.

It is proposed to create a pedestrian entrance in the original estate wall (a short distance to the east) of the main historic gateway. The intervention is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance.

The intervention is considered positive as it will increase the amenity value in terms of managed access. The resultant loss of rubble masonry as a result of the creation of an opening in the boundary is minor and ultimately reversible.

The proposed Farm development will also include the construction of a new pedestrian/cycle bridge over the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. There are no associated railway structures, such as platforms or bridges, at the location. This proposal will give rise to a direct, negative, low magnitude construction phase impact on this undesignated cultural heritage asset which is assessed as being of medium value. This direct negative impact is assessed as being slight in significance.

Table 10.9 provides an assessment of the predicted construction phase indirect impacts of the proposed Farm development on the settings of the identified cultural heritage assets within the reviewed study area.

Class/Name	Designations	Indicative Value	Nature of Indirect Intervention	Quality of Impact	Duration	Magnitude	Significance of Indirect Impact
Bessborough House	RMP C0074-077----PS 490 NIAH 20872005	High	Building construction 90m to northwest and service trenches 20m to west	Negative	Temporary	Low	Slight
Bessborough Farm	NIAH 20872006	Medium	Building construction adjacent	Negative	Temporary	Medium	Moderate
Icehouse	RMP C0074-051----	High	Building construction 210m to northeast and service trenches 30m to north and 60m to south	Negative	Temporary	Negligible	Slight
Folly (including boundary)	NIAH 20872007	Medium	Building construction 265m to northwest	Negative	Temporary	Low	Slight
Railway bridge	RMP C0074-121----	High	None (located 450m to north)	Neutral	N/A	None	None predicted
Midden	RMP C0074-063----	Medium	None (located 350m to west)	Neutral	N/A	None	None predicted
Excavated site	SMR C0074-130----	Low	None (located 320m to east and previously excavated)	Neutral	N/A	None	None predicted

Table 10.9: Summary of The Farm Construction Phase Indirect Impacts

10.3.2.1.3 Combined Phase 1 and Phase 2

Given the absence of any architectural heritage structures or known archaeological sites within the boundary of the Meadows subject lands and the levels of impacts predicted for both locations, it is concluded that Phase 1 and Phase 2 will not combine to result in any predicted significant impacts on the cultural heritage resource during the construction phase.

10.3.2.2 Operational Phase

10.3.2.2.1 Phase 1 'The Meadows'

Following the successful implementation of the mitigation measures presented in **Section 10.4**, the operational phase of The Meadows development will not result in any predicted direct impacts on the archaeological, architectural or cultural heritage resources.

The proposed development was designed to respond to the historic context of the area and, in particular, Bessborough House to the south-west and the former Cork, Blackrock and Passage Railway line to the east. The proposed Meadow apartment development is located over 150m from the original eighteenth-century Bessborough House. Views towards the subject lands from the house are fully screened by a later tall multi-bay block (to the east of the central block of Bessborough) and the proposed development will not give rise to negative impacts on the historic entrance avenue and traditional approach to the protected structure (from north-north-west). The location, layout and scale of the proposed development does not impinge on the visual primacy of the main south facing front façade of Bessborough House and its views of the parkland setting to the south. The proposed development will be accessed from an existing modern road which extends to its location from the north and will not give rise to negative impacts on the historic entrance avenue and traditional approach to the house in the lands to in the opposite side (west) of the existing built environment within the property.

The proposed development will have a slight, negative, indirect impact on the historic estate and some of its attendant features (including the former farm complex). This will occur as a result from slight visual changes to a few peripheral aspects of the historic landscape of former estate and the placement of new built form within 50m of the former farm complex. It is considered that the operation phase of the proposed development will have a slight negative impact on the setting of the folly which is located 80m to the south of the proposed development, and which is well-screened by mature trees (particularly to the north of the folly).

The creation of a new pedestrian/cycle bridge over the railway line to the east will result in a slight negative indirect impact on this undesignated cultural heritage feature.

Table 10.10 collates the predicted permanent operational phase indirect impacts on the identified cultural heritage receptors within the reviewed study area.

Class/Name	Designations	Indicative Value	Quality of Impact	Magnitude	Significance of Indirect Impact
Bessborough House	RMP C0074-077---- PS 490 NIAH 20872005	High	Negative	Low	Slight
Bessborough Farm	NIAH 20872006	Medium	Negative	Medium	Moderate
Icehouse	RMP C0074-051----	High	Negative	Negligible	Slight
Folly (including boundary)	NIAH 20872007	Medium	Negative	Low	Slight
Railway line	None	Medium	Negative	Low	Slight
Railway bridge	RMP C0074-121----	High	Neutral	None	None predicted
Midden	RMP C0074-063----	Medium	Neutral	None	None predicted
Excavated site	SMR C0074-130----	Low	Neutral	None	None predicted

Table 10.10: Summary of The Meadows Operation Phase Indirect Impacts

10.3.2.2.2 Phase 2 'The Farm'

The layout of the proposed development within the Farm subject lands has been designed to align with that set out in historic mapping and to reflect the distinctive geometry of the existing triangular farmyard. It also seeks to retain and enhance the landscape setting by opening large portions of parkland, which are currently unavailable, to public access as an amenity for the wider community. The proposal design was also formulated to recognise the value and role of historic open space area and to reinstate and support historic routes to the parkland area.

The location, layout and scale of the proposed development does not impinge on the visual primacy of the main south facing front façade of Bessborough House and its views of the parkland setting to the south. Views towards the new development from the original eighteenth-century house are largely screened and interrupted by intervening built form and mature trees. The proposed development will not give rise to negative impacts on the historic entrance avenue and traditional approach to the protected structure (from north-north-west). The operation phase of the proposed development will have a slight, negative, indirect impact on the historic estate and some of its attendant or associated features (including the former farm complex). This will occur as a result from slight visual changes within pockets of the historic landscape of the former estate and the placement of new buildings within the much-altered parkland. However, it is considered the development will not give rise to significant negative impacts on the historic estate which has the capacity to accommodate new development without a loss of architectural or landscape character.

In addition, a detailed landscape masterplan has been prepared by Ilsa Rutgers Landscape Architecture which has been fully informed by the historical evolution of the parkland area.

The creation of a new pedestrian/cycle bridge over the railway line to the east will result in a slight negative indirect impact on this undesignated cultural heritage feature.

Table 10.11 collates the predicted permanent operational phase indirect impacts on the identified cultural heritage receptors within the reviewed study area.

Class/Name	Designations	Indicative Value	Quality of Impact	Magnitude	Significance of Indirect Impact
Bessborough House	RMP C0074-077---- PS 490 NIAH 20872005	High	Negative	Low	Slight
Bessborough Farm	NIAH 20872006	Medium	Negative	Medium	Moderate
Icehouse	RMP C0074-051----	High	Negative	Negligible	Slight
Folly (including boundary)	NIAH 20872007	Medium	Negative	Negligible	Not significant
Railway line	None	Medium	Negative	Low	Slight
Railway bridge	RMP C0074-121----	High	Neutral	None	None predicted
Midden	RMP C0074-063----	Medium	Neutral	None	None predicted
Excavated site	SMR C0074-130----	Low	Neutral	None	None predicted

Table 10.11: Summary of The Farm Operation Phase Indirect Impacts

10.3.2.2.3 Combined Phase 1 and Phase 2

Given the absence of any architectural heritage structures or known archaeological sites within the boundary of the Meadows subject lands and the levels of impacts predicted for both locations, it is concluded that Phase 1 and Phase 2 will not combine to result in any predicted significant impacts on the cultural heritage resource during the operation phase.

10.4 Mitigation Measures, Monitoring and Residual Impacts

10.4.1 Mitigation & Monitoring

10.4.1.1 Construction Phase

10.4.1.1.1 Phase 1 'The Meadows'

It is recommended that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. In the unlikely event of archaeological discovery, the National Monuments Service and Cork City Council will be consulted to agree how the encountered archaeological remains are recorded and resolved.

To ensure that, in the unlikely event of previously-unrecorded burials being encountered during site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.5** by Aidan Harte, Forensic Archaeologist.

10.4.1.1.2 Phase 2 'The Farm'

It is recommended that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. In the unlikely event of archaeological discovery, the National Monuments Service and Cork City Council will be consulted to agree how the encountered archaeological remains are recorded and resolved.

The buildings to be removed (see **Appendix 10.4**) have been fully recorded. Prior to their demolition, a full building record, consisting of written description, photographic record, and scaled drawings (plans and elevations) shall be submitted to Cork City Council and the Irish Architectural Archive prior to commencement of development works.

To ensure that, in the unlikely event of previously-unrecorded burials being encountered during site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.5** by Aidan Harte, Forensic Archaeologist.

10.4.1.1.3 Combined Phase 1 and Phase 2

No combined cultural heritage mitigation measures for Phase 1 and Phase 2 are required.

10.4.1.2 Operational Phase

10.4.1.2.1 Phase 1 'The Meadows'

The operational phase of the proposed development will not give rise to any ongoing direct or indirect impacts on the cultural heritage resource which will require mitigation.

10.4.1.2.2 Phase 2 'The Farm'

The operational phase of the proposed development will not give rise to any ongoing direct or indirect impacts on the cultural heritage resource which will require mitigation.

10.4.1.2.3 Combined Phase 1 and Phase 2

No combined cultural mitigation measures for Phase 1 and Phase 2 are required.

10.4.2 Residual Impacts

10.4.2.1 Phase 1 'The Meadows'

All potential archaeological impacts will be addressed by mitigation during the construction phase of the proposed development which will provide for the recording and/or avoidance of any potential sub-surface archaeological features that may exist within the proposed development site. As a result, no residual impacts on the archaeological resource are predicted.

No significant residual impacts on the architectural heritage resource are predicted.

10.4.2.2 Phase 2 'The Farm'

All potential archaeological impacts will be addressed by mitigation during the construction phase of the proposed development which will provide for the recording and/or avoidance of any potential sub-surface archaeological features that may exist within the proposed development site. As a result, no residual impacts on the archaeological resource are predicted.

No significant residual impacts on the architectural heritage resource are predicted.

10.4.2.3 Combined Phase 1 and Phase 2

All potential combined archaeological impacts will be addressed by mitigation during the construction phase of the proposed development which will provide for the recording and/or avoidance of any potential sub-surface archaeological features that may exist within the proposed development site. As a result, no combined residual impacts on the archaeological resource are predicted.

No significant residual impacts on the architectural heritage resource are predicted.

10.5 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 7, Cultural Heritage as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *To protect and where appropriate, enhance the character, diversity and special qualities of the City's cultural, architectural and archaeological heritage.*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has an unclear interaction with the status of EPO 7 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in unclear impact, which may include positive and negative interactions for cultural heritage resources with EPO 7.

The projects within the study area which have been assessed in terms of construction and operational cumulative effects are outlined in **Table 10.12**. A review of the online planning field for each of these projects were carried out and none contain any cultural heritage assessment reports. While the location of the Phase 3 development area within the property will be subject to assessment as part of a future application, it is also considered below as cumulative impact.

Planning ref	Development Type	Cultural Heritage Context
Phase 3	Residential	Located within an area of open grassland in the western and southern areas of the Bessborough property. The area contains an icehouse (C0074-051---) as well as the recorded locations of former demesne features. The folly structure (NIAH 20872007) and associated enclosing landscaped feature to the southeast of the house are outside the Phase 3 boundary. It is noted that a preliminary outline of proposals for a residential development at the location include the proposed creation of an open public space within the visually sensitive area to the south of Bessborough House.
17/37565	Residential	Located outside the north end of the existing Bessborough property and there are no recorded cultural heritage receptors within the site
18/37820	Residential	Located outside the north end of the existing Bessborough property and there are no recorded cultural heritage receptors within the site
21/40481	Creche extension	Will entail the construction of a new single storey detached classroom adjacent to the existing modern Bessborough Creche to the east of Bessborough House. There are no recorded cultural heritage constraints within the location
21/40503	Change of use	Change of use of an existing building within the Bessborough Farm from office use to classrooms and associated educational use.
21/40453	Creche	Located within a developed area outside the north end of the existing Bessborough property. There are no recorded cultural heritage receptors within the site

Table 10.12: Projects reviewed for cumulative impacts and their cultural heritage context

Application Reference	Applicant(s)	Description	Outcome/Current Status
An Bord Pleanala Ref: ABP-308790-20	MWB Two Limited	Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork	Refused on the 25/05/2021 on basis of prematurity related to resolution of matters concerning a potential burial ground on the site.
Cork City Council Ref: 2039705/ABP-309560-1	MWB Two Limited	Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 15/07/2021 as would result in Haphazard form of Development. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential. At the time of writing this EIAR, the zoning in the operative CDP supports the principle of development on the ABP-308790-20 lands. It is included here on that basis.

Table 10.13: Additional Development Potential Considerations

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021

10.5.1 Construction Phase

10.5.1.1 Phase 1 'The Meadows'

Based on the assessment of cultural heritage impacts of The Meadow construction phase (**Section 10.3**) combined with a review of the locations and cultural heritage context of the projects listed in **Table 10.12**, it is concluded that the proposed Meadows development will not act in combination with those projects to result in likely significant construction phase cumulative impacts on the recorded archaeological sites and architectural heritage structures within the property.

10.5.1.2 Phase 2 'The Farm'

The project (21/40503) located within the southern area of Bessborough Farm will entail the retention and change of use of an existing building in this area. Based on the assessment of cultural heritage impacts of The Meadow construction phase (**Section 10.3**) combined with a review of the locations and cultural heritage context of the projects listed in **Table 10.12**, it is concluded that the proposed Farm development will not act in combination with those projects to result in likely significant construction phase cumulative impacts on the recorded archaeological sites and architectural heritage structures within the property.

10.5.1.3 Combined Phase 1 and Phase 2

Based on the combined assessment of cultural heritage impacts of The Meadows and Farm construction phase (**Section 10.3**) and the review of the locations and cultural heritage context of the projects listed in **Table 10.12**, it is concluded that these two phases developments will not act in combination with those projects to result in likely significant construction phase cumulative impacts on the recorded archaeological sites and architectural heritage structures within the property.

10.5.2 Operational Phase

10.5.2.1 Phase 1 'The Meadows'

It is noted that the location of the proposed Phase 3 residential project is within an area on the opposite (west) side of the property from the Meadows subject lands and the presence of existing buildings will likely screen views between the locations. Based on the assessment of cultural heritage impacts of The Meadow construction phase (**Section 10.3**) combined with a review of the locations and cultural heritage context of the projects listed in **Table 10.12**, it is concluded that the proposed Meadows development will not act in combination with those projects to result in likely significant operational phase cumulative impacts on the recorded archaeological sites and architectural heritage structures within the property.

10.5.2.2 Phase 2 'The Farm'

It is noted that the location of the proposed residential section of the Phase 3 project is within an area to the west of the Farm subject lands and the potential for combined negative cumulative impacts exist. Given the locations of these two areas, this may not result in a significant impact on the primary southern views from the protected structure or its wider setting which is screened by later buildings, but this will require assessment as part of a future Phase 3 application. Based on the assessment of cultural heritage impacts of The Farm operational phase (**Section 10.3**) combined with a review of the locations and cultural heritage context of the other projects listed in **Table 10.12**, it is concluded that the proposed Meadows development will not act in combination with those projects to result in likely significant operational phase cumulative impacts on the recorded archaeological sites and architectural heritage structures within the property.

10.5.2.3 Combined Phase 1 and Phase 2

It is noted that the combination of Phases 1 and 2 in conjunction with the proposed Phase 3 project will have the potential to result in negative cumulative impacts on the archaeological sites and architectural heritage structures within the property. Given the locations of these Phases, including an area of open park in the south end of the property, combined with the existing setting of the Bessborough House (protected structure) within an area surrounded by later buildings in all directions apart from to the south, the potential exists that this will not result in a likely significant impact. Based on the assessment of cultural heritage impacts of the combined Phase 1 and Phase 2 projects (**Section 10.3**) combined with a review of the locations and cultural heritage context of the other projects listed in **Table 10.12**, it is concluded that the proposed Meadows development will not act in combination with those projects to result in likely significant operational phase cumulative impacts on the recorded archaeological sites and architectural heritage structures within the property.

10.6 Difficulties in Compiling Information

No difficulties were encountered.

10.7 References

Consulted Publications

Atkinson, G.M. 1874. 'Kitchen middens in the estuary of Cork Harbour', *Journal of the Royal Society of Antiquaries of Ireland* **13**, 258-61.

Buxbaum, Tim (2002) *Icehouses (Shire Album 278)*. Buckinghamshire: Shire Publications.

Coleman, J.C. 1938. 'The kitchen middens of Cork Harbour', *Journal of the Cork Historical and Archaeological Society* **43,** 39-44.

Cork City Council (2015) Cork City Development Plan 2015-2021. Cork: Cork City Council.

Creedon, C. 1992. *The Cork Blackrock & Passage Railway 1850 -1932; An illustrated history*. Cork.

Department of Arts, Heritage, and the Gaeltacht (2011) *Architectural Heritage Protection: Guidelines for Planning Authorities*. Dublin: The Stationery Office.

Department of Arts, Heritage, Gaeltacht and the Islands (1999) *Framework and Principles for the Protection of the Archaeological Heritage*. Government of Ireland.

Jack Coughlan and Associates 2020. 'Blackrock Greenway: Initial historic fabric appraisal with recommendations for repair and retention'. Unpublished report compiled for Cork City Council.

Jenkins, Stanley C. and Newham, A. T. 1993. *The Cork Blackrock & Passage Railway*. The Oakwood Press

Lewis, S. 1837. *A Topographical Dictionary of Ireland.* London

Ó Drisceoil, D. 2018. *The Ring of Blackrock: A walking guide and history*. Odbooks.

Power, D. *et al* 1994. *Archaeological Inventory of County Cork Volume II: East and South Cork*. Dublin

http://gis.teagasc.ie/soils/map.php

http://map.geohive.ie/mapviewer.html

http://maps.osi.ie/publicviewer/#V2,591271,743300,1,10

http://downsurvey.tcd.ie/down-survey-maps.php

http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple

www.archaeology.ie

www.duchas.ie

www.excavations.ie

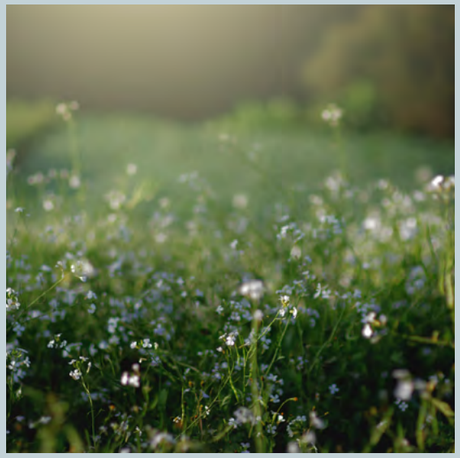
www.logainm.ie

www.heritagemaps.ie/WebApps/HeritageMaps/index.html

http://landedestates.nuigalway.ie/LandedEstates/jsp/property-show.jsp?id=2025

https://askaboutireland.ie/reading-room/history-heritage/big-houses-of-ireland/Bessboro-house-and-est/

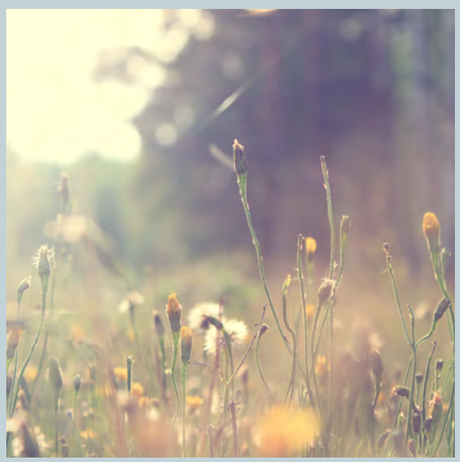
Open Topographic Data Viewer (arcgis.com)



BESSBOROUGH, CORK

CHAPTER 11

Noise & Vibration



BESSBOROUGH, CORK

CHAPTER 11

Noise & Vibration

CHAPTER 11

11 Noise & Vibration

11.1 Introduction

11.1.1 Chapter Context

This chapter of this Environmental Impact Assessment has been prepared by DKP Environmental (DKP_{EV}) and assesses noise and vibration impacts associated with the proposed development at Bessborough, Ballinure, Blackrock, Cork. The proposed development comprises two planning applications to An Bord Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in Chapter 2 - Project Description'.

This chapter will identify and assess the impact of the proposed development in terms of noise and vibration during the construction phase and operational use with particular attention to the nearby residential units. Increased traffic volumes associated with the subject site is likely to be the main impact source. Traffic volumes for the proposed scheme have been projected in Chapter 5 and therefore the noise impact assessment for the operational phase of the subject site will consider the cumulative impact of the existing and new predicted volumes. This assessment was prepared in accordance with the EIA Directive 2014/52/EC and current EPA guidelines. This section should be read in conjunction with any guidance documents for the site and project description sections of this EIAR.

11.2 Methodology

11.2.1 Construction Noise Criteria

The level of environmental noise generated during the construction phase of any development is determined primarily by the exact construction methods employed. The level of the noise impact of these methods will arise from the specific sound power levels generated by the plant and machinery used, the duration of each particular construction activity, as well as the time and location in which the equipment is used. The potential sources of environmental noise during the construction phase of the development will primarily arise from increased traffic on the surrounding roads (from construction workers and delivery of plant and materials) and actual on-site works where plant and machinery will be deployed.

As at this point of time we do not have an any actual specific construction plan to outline details of plant and machinery to be used, materials, construction phasing and working hours) it is not possible to accurately model construction noise levels using the recommended standard ISO 9613:1996 - Acoustics, Attenuation of sound during propagation outdoors however a basic analysis of worst case noise levels has been calculated. This basic calculation was based on the current construction methods applied on site to complete the works and assessed noise impacts for the anticipated construction equipment.

As we do not have any published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project however local authorities normally control construction activities by imposing limits on the hours of operation with certain noise limits at their discretion. For this report we applied the British Standard BS 5228-1:2009+A1: 2014 - Code of practice for noise and vibration control on construction and open sites.

BS 5228-1:2009+A1: 2014 sets out a method of calculating the propagation of sound towards a receiver from the use of certain construction plant and machinery on a construction site. The standard describes single octave sound power level data for a range of standardised plant and machinery as would be expected to be the norm on construction sites.

11.2.2 Construction Vibration Criteria

During the construction phase of a development certain aspects of the site work may result in increased levels of vibration in the vicinity of the site. BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites: - Part 2: Vibration, outlines a number of calculation methods for predicting peak particle velocity (PPV) resulting from construction works on open sites.

The prediction methods require specific information relating to the soil composition and compaction levels within the propagation path between the construction area and nearest receiver, as well as highly detailed information regarding the type and location of plant and machinery. As such specific data is not available a quantitative impact of vibration will not be undertaken as part of this assessment. Construction practices employed should have regard to best practice as recommended in the following standards and guidance:

- BS 7385-1 (1990) Evaluation and Measurement for Vibration in Buildings - Guide for Measurement of Vibration and evaluation of their effects on buildings.
- BS 7385-2 (1993) Evaluation and Measurement for Vibration in Buildings - Guide to damage levels from Ground borne Vibration.
- BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.
- BS 6472-1 (2008) Guide to evaluation of Human Exposure to Vibration in Buildings - Vibration sources other than Blasting.

The standards note that the risk of cosmetic damage to residential buildings starts at a Peak Particle Velocity (PPV) of 15mm/s at 4Hz. The standard also notes that below 12.5mm/s PPV the risk of damage tends to zero. Both standards note that important buildings that are difficult to repair might require special consideration on a case by case basis but building of historical importance should not (unless it is structurally unsound) be assumed to be more sensitive. If

a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance.

Category	PPV thresholds mm/s
Non protected / sound structure	12
Protected venerable structure	6

11.2.3 Operational Noise Criteria

As we do not have any statutory limits, it is therefore necessary to reference appropriate best practice guidance and standards in order to determine the impact of the subject site on the noise climate in the surrounding area during the operational phase. It is important to note that the primary potential source of noise arising during the operational phase is that of road traffic associated with the increased population of the area.

For the calculation and assessment of road it has generally been best practice to assess road traffic noise on the basis of the LA10 18-hour parameter as outlined in the CRTN document. Transport Infrastructure Ireland (formerly the National Roads Authority (NRA)) have produced guidelines for national road schemes however in this development we do not have any national primary road hence this standard would not apply. The World Health Organisation propose guideline values for the prevention of moderate and serious nuisance in outdoor areas as 50dB LAeq (16 hour) and 55dB LAeq (16 hour) respectively although a more appropriate criteria for assessing disturbance or annoyance from noise arising from the site would be related to the significance of changes in noise levels as perceptible to human beings. The information in the table below is taken from the 'Guidelines for Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA). This document replaces the draft guidelines published by the Institute of Acoustics (IOA) and IEMA in April 2002 and shows an appropriate impact.

Change in Noise Level	Subjective Reaction	Impact Guidelines for Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.1

The following tasks were carried out in order to assess the noise impacts of the subject site on identified receptors during the operational phase of the scheme:

- A survey has been conducted to establish baseline noise levels or back ground noise levels at the nearest noise sensitive receptor surrounding the site.
- A calculation of anticipated noise levels arising at the nearest noise sensitive receptors due to current and forecast increases in traffic arising from the subject site as per basis of the LA10 18hour parameter as outlined in the CRTN document.
- An assessment of the cumulative calculated anticipated noise levels and potential impact upon noise sensitive receptors was carried out with reference to best practice guidelines in the assessment of environmental noise.

11.2.4 Operational Vibration Assessment Criteria

There are generally accepted criteria for vibration levels that would be likely to lead to complaints and vibration levels that would be likely to lead to structural damage. These levels are outlined in the guidance documents BS6472: 1992 Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz), and BS7385: Part 2 1990: Evaluation and measurement for vibration in buildings - Guide to damage levels from ground-borne vibration. These standards differentiate between transient and continuous vibration. Surface construction activities are considered to be transient in nature as they occur for a limited period of time at a given location. Traffic is the most likely the only source of vibration during the operational phase of the scheme.

11.3 Description of Existing Baseline Environment

11.3.1 Back-ground Noise Survey

To assess the surrounding back ground noise levels, a daytime back ground noise survey was carried out on December 16th and 17th 2021 outside the covid lockdown period. During the survey the 2 attended stations were monitored and at each station three consecutive 15-minute measurements were recorded during the period from 08:00 to 13:00. The measurements taken are deemed to be representative of typical noise levels on the relevant roads. The measurements have been performed using a Bruel & Kjaer Type 2260 sound level meter and Bruel & Kjaer 4231 sound level calibrator. All measurements were carried out in accordance with ISO 1996: 'Acoustics-Description and measurement of environmental noise'. Weather conditions during the survey were in line with the conditions described within ISO 1996, Acoustics 'Description and Measurements of Environmental Noise'. Weather conditions were rainy and cool with a moderate wind. The following environmental noise parameters were measured which are defined below.

LAeq is the A-weighted equivalent continuous steady sound level during the measurement period and effectively represents an average ambient noise value.

LAmax is the maximum A-weighted sound level measured during the measurement period.

LAmin is the minimum A-weighted sound level measured during the measurement period.

LA10 is the A-weighted sound level that is exceeded for 10% of the sample period; this parameter is typically used to quantify traffic noise.

LA90 is the A-weighted sound level that is exceeded for 90% of the sample period; this parameter is typically used to quantify background noise.

Typical ranges of noise levels are presented in the table below comparing against thebaseline noise levels measured:

Sound level (dB (A))	Description of Activity
0	Absolute silence
25	Very Quiet
35	Rural night time
55	Suburban roadway 0.5km away
70	Busy Restaurant
85	Very busy pub, voice is raised to be heard
100	Rock concert
120	Uncomfortably loud, conversation impossible
140	Noise causes pain in ears

Table 11.2

11.3.2 Back-ground Noise Survey Data

The following 3 no. tables are the measured and calculated (average) back ground noise levels from the 2 no. monitoring locations.

Station 1 Skehard Road Junction						
Time	**LAeq**	**LAmax**	**LAmin**	**LA10**	**LA90**	**Comments**
8.00	61	87	55	67	51	Mainly general traffic noise with occasional lorry for construction site main artery road
9.00	61	88	53	68	52	
11.00	58	82	47	62	49	
13.00	60	84	47	59	49	
Avg	60			63.5	50	

Table 11.3

Station 2 Bessborough junction						
Time	**LAeq**	**LAmax**	**LAmin**	**LA10**	**LA90**	**Comments**
8.00	57	89	45	64	47	Mainly general traffic noise with occasional lorry for construction site main artery road
9.00	58	88	46	65	49	
11.00	57	86	45	60	47	
13.00	56	85	44	59	46	
Avg	56			62	47.5	

Table 11.4

Station 3 Sharman avenue junction						
Time	**LAeq**	**LAmax**	**LAmin**	**LA10**	**LA90**	**Comments**
8.00	52	82	45	62	45	Mainly general traffic noise with occasional lorry for construction sitelocal estate road
9.00	55	81	46	64	47	
11.00	55	78	45	60	46	
13.00	56	82	44	58	45	
Avg	55			62	46.5	

Table 11.5

Back ground noise survey locations Skehard Road junction, Bessborough Road juntion and Sharman Avenue junction

11.3.3 Baseline Noise Measurement Overview

During daytime periods average ambient noise levels were in the range 55 to 61dB LAeq Average background noise levels were in the range 45 to 52dB LA90 and average LA10 values, typically used to describe traffic noise were in the range 58 to 68dB, indicating that most of the measured noise levels would have arisen from traffic noise.

11.3.4 Baseline Vibration Survey

Only minor vibration was observed during the noise measurements and therefore it has not been considered necessary to undertake baseline vibration monitoring as there is no evidence to suggest that existing receptors are currently affected by appreciable environmental vibration.

11.4 Impact Assessment

11.4.1 Do-nothing scenario

11.4.1.1 Phase 1 - The Meadows

The Do-Nothing scenario includes retention of the current site area for phase 1 without the proposed residential development in place. The site will remain as per the baseline and will change in accordance with trends within the wider area.

11.4.1.2 Phase 2 - The Farm

The Do-Nothing scenario includes retention of the current site area for phase 2 without the proposed residential development in place. The site will remain as per the baseline and will change in accordance with trends within the wider area.

11.4.1.3 Combined Phase 1 and Phase 2

The Do-Nothing scenario includes retention of the current site areas without the proposed residential developments in place. The site will remain as per the baseline and will change in accordance with trends within the area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

11.4.2 Noise & vibration

11.4.2.1 Construction Phase Impacts

11.4.2.1.1 Phase 1 - The Meadows

General construction Phase

Short-term noise impacts are only to occur during the construction phase of the development due to the requirement to use plant and machinery on and to the construction site. In the absence of specific construction information regarding the construction stage, construction noise impacts cannot be fully quantified at this point, therefore sample calculations have been provided. Minor short-term vibration impacts may occur during the construction phase as a result of the use of heavy plant and machinery; however, these impacts will be unlikely to propagate beyond the construction site boundary.

Construction Noise

The project (phase) is to be constructed in a single pass hence the construction noise and vibration impact, given that the construction methodology and proposed buildings are of a relative short impact.

Using the method outlined in BS5228, a worst case LAeq value at potential NSRs at distances of 100m, 150m, 200m and 250m have been calculated for a range of construction plant. The following plant has been applied to give an example of the potential construction noise levels:

- Heavy delivery trucks.
- Ground works excavators.
- Noisy construction plant (mixers, vibrators).

We have used BS 5228-1:2009+A1: 2014 to anticipate/calculate the construction noise levels in the proposed development. This methodology relates to the method for construction vehicles/plant in a defined construction area. The prediction of the LAeq from construction plant operating over a small area or on site can be used for other activities when items of construction plant are operating in close proximity to the reception point, taking into account the adjustment of the predicted LAeq for standing and idling time of the plant. It is assumed that over a 1-hour period, all construction plant will be operational for 80% of the time. The results of these calculations are presented in the tables below.

Noise Source	Sound Power LWA dB
Heavy delivery truck	102
Ground works excavator	100
Noisy construction plant (mixers, vibrators)	106
General construction equipment	85-90

Table 11.6

Distance of Potential NSR from construction site	Predicted Noise levels at NSR L_{Aeq} dB	Maximum allowable BS5228	
		Monday-Friday (07.00–19.00)	Saturday (07.00–13.00)
50m	60	70	65
100m	58		
150m	55		
200m	52		
250m	49		

Table 11.7

As most of the construction sites will generally be within 100m of an occupied building the results of the indicative construction calculations shows that the resultant LAeq (1 hour) values of using such construction plant and vehicles would be in the region of 58db LAeq and below the maximum allowable day time ambient level of 70dB LAeq. BS5228-1 (2009) +A1: 2014 specifies that a daytime limit of 70dB LAeq shall apply on weekdays and a daytime limit of 65dB LAeq shall apply on Saturday.

The ambient noise levels at the nearest noise measurement location with construction noise (NSR2) are comfortably below the BS5228-1 limits and also will be short-term in duration. The construction phase generally has no noticeable change on the noise environment in the longer term.

Construction Vibration

We only anticipate minor temporary ground borne vibration events during the construction phase but the exact impact of these vibration impacts cannot accurately be quantified.

Noise Source	PPV mm/s	Duration / frequency s x/h	comment
Heavy truck	7-9	60 / 8 60 / 3	Ground works & deliveries during construction
Ground works excavator	9-11	3000 / 1	2 / 3 weeks per building
Piling (BORED)	8-10	1800 / 1	1 / 2 weeks per building

Table 11.8

Distance of Potential VR from construction site	Predicted PPV	Maximum allowable BS5228	
		Non protected buildings	Protected
50m	4.8	12	6
100m	2.3		
150m	1.1		
200m	0.6		
250m	0.2		

Table 11.9

With the nearest habitable existing building approximately 50m to 90m from the closest new proposed buildings we note from the tables above the predicted vibration levels at approx. 2.5 mm/s at worse cause very minor temporary ground borne vibration events during the construction phase but the impacts are far below the maximum levels stipulated under BS5228 and are therefore deemed not to have any impacts.

11.4.2.1.2 Phase 2 - The Farm

General construction Phase

Short-term noise impacts are only to occur during the construction phase of the development due to the requirement to use plant and machinery on and to the construction site. In the absence of specific construction information regarding the construction stage, construction noise impacts cannot be fully quantified at this point, therefore sample calculations have been provided. Minor short-term vibration impacts may occur during the construction phase as a result of the use of heavy plant and machinery; however, these impacts will be unlikely to propagate beyond the construction site boundary.

Construction Noise

The project (phase) is to be constructed in a single pass hence the construction noise and vibration impact, given that the construction methodology and proposed buildings are of a relative short impact.

Using the method outlined in BS5228, a worst case LAeq value at potential NSRs at distances of 100m, 150m, 200m and 250m have been calculated for a range of construction plant. The following plant has been applied to give an example of the potential construction noise levels:

- Heavy delivery trucks.
- Ground works excavators.
- Noisy construction plant (mixers, vibrators).

We have used BS 5228-1:2009+A1: 2014 to anticipate/calculate the construction noise levels in the proposed development. This methodology relates to the method for construction vehicles/plant in a defined construction area. The prediction of the LAeq from construction plant operating over a small area or on site can be used for other activities when items of construction plant are operating in close proximity to the reception point, taking into account the adjustment of the predicted LAeq for standing and idling time of the plant. It is assumed that over a 1-hour period, all construction plant will be operational for 80% of the time. The results of these calculations are presented in the tables below.

Noise Source	Sound Power LWA dB
Heavy delivery truck	102
Ground works excavator	100
Noisy construction plant (mixers, vibrators)	106
General construction equipment	85-90

Table 11.10

Distance of Potential NSR from construction site	Predicted Noise levels at NSR L_{Aeq} dB	Maximum allowable BS5228	
		Monday-Friday (07.00–19.00)	Saturday (07.00–13.00)
50m	60	70	65
100m	58		
150m	55		
200m	52		
250m	49		

Table 11.11

As most of the construction sites will generally be within 100m of an occupied building the results of the indicative construction calculations shows that the resultant LAeq (1 hour) values of using such construction plant and vehicles would be in the region of 58db LAeq and below the maximum allowable day time ambient level of 70dB LAeq. BS5228-1 (2009) +A1: 2014 specifies that a daytime limit of 70dB LAeq shall apply on weekdays and a daytime limit of 65dB LAeq shall apply on Saturday.

The ambient noise levels at the nearest noise measurement location with construction noise (NSR2) are comfortably below the BS5228-1 limits and also will be short-term in duration. The construction phase generally has no noticeable change on the noise environment in the longer term.

Construction Vibration

We only anticipate minor temporary ground borne vibration events during the construction phase but the exact impact of these vibration impacts cannot accurately be quantified.

Noise Source	PPV mm/s	Duration / frequency s x/h	comment
Heavy truck	7-9	60 / 8 60 / 3	Ground works & deliveries during construction
Ground works excavator	9-11	2500 / 1	2 / 3 weeks per building
Piling (BORED)	8-10	1800 / 1	1 / 2 weeks per building

Table 11.12

Distance of Potential VR from construction site	Predicted PPV mm/s	Maximum allowable BS5228	
		Non protected buildings	Protected
50m	4.8	12	6
100m	2.3		
150m	1.1		
200m	0.6		
250m	0.2		

Table 11.13

With the nearest habitable existing building approximately 50m to 90m from the closest new proposed buildings we note from the tables above the predicted vibration levels at approx. 4.5 mm/s at worse cause very minor temporary ground borne vibration events during the construction phase but the impacts are far below the maximum levels stipulated under BS5228 and are therefore deemed not to have any impacts.

11.4.2.1.3 Combined Phase 1 and Phase 2

General construction Phase

Short-term noise impacts are only to occur during the construction phase of the development due to the requirement to use plant and machinery on and to the construction site. In the absence of specific construction information regarding the construction stage, construction noise impacts cannot be fully quantified at this point, therefore sample calculations have been provided. Minor short-term vibration impacts may occur during the construction phase as a result of the use of heavy plant and machinery; however, these impacts will be unlikely to propagate beyond the construction site boundary.

Construction Noise

The project (phase) is to be constructed in sequential phases hence the construction noise and vibration impact, given that the construction methodology and proposed buildings are similar, giving the same relative short impacts.

Using the method outlined in BS5228, a worst case LAeq value at potential NSRs at distances of 100m, 150m, 200m and 250m have been calculated for a range of construction plant. The following plant has been applied to give an example of the potential construction noise levels:

- Heavy delivery trucks.
- Ground works excavators.
- Noisy construction plant (mixers, vibrators).

We have used BS 5228-1:2009+A1: 2014 to anticipate/calculate the construction noise levels in the proposed development. This methodology relates to the method for construction vehicles/plant in a defined construction area. The prediction of the LAeq from construction plant operating over a small area or on site can be used for other activities when items of construction plant are operating in close proximity to the reception point, taking into account the adjustment of the predicted LAeq for standing and idling time of the plant. It is assumed that over a 1-hour period, all construction plant will be operational for 80% of the time. The results of these calculations are presented in the tables below.

Noise Source	Sound Power LWA dB
Heavy delivery truck	102
Ground works excavator	100
Noisy construction plant (mixers, vibrators)	106
General construction equipment	85-90

Table 11.14

Distance of Potential NSR from construction site	Predicted Noise levels at NSR L_{Aeq} dB	Maximum allowable BS5228	
		Monday-Friday (07.00–19.00)	Saturday (07.00–13.00)
50m	60	70	65
100m	58		
150m	55		
200m	52		
250m	49		

Table 11.15

As most of the construction sites will generally be within 100m of an occupied building the results of the indicative construction calculations shows that the resultant LAeq (1 hour) values of using such construction plant and vehicles would be in the region of 58db LAeq and below the maximum allowable day time ambient level of 70dB LAeq. BS5228-1 (2009) +A1: 2014 specifies that a daytime limit of 70dB LAeq shall apply on weekdays and a daytime limit of 65dB LAeq shall apply on Saturday.

The ambient noise levels at the nearest noise measurement location with construction noise (NSR2) are comfortably below the BS5228-1 limits and also will be short-term in duration. The construction phase generally has no noticeable change on the noise environment in the longer term.

Construction Vibration

We only anticipate minor temporary ground borne vibration events during the construction phase but the exact impact of these vibration impacts cannot accurately be quantified.

Noise Source	PPV mm/s	Duration / frequency s x/h	comment
Heavy truck	7-9	60 / 8 60 / 3	Ground works & deliveries during construction
Ground works excavator	9-11	2500 / 1	2 / 3 weeks per building
Piling (BORED)	8-10	1800 / 1	1 / 2 weeks per building

Table 11.16

Distance of Potential VR from construction site	Predicted PPV mm/s	Maximum allowable BS5228	
		Non protected buildings	Protected buildings
50m	4.8	12	6
100m	2.3		
150m	1.1		
200m	0.6		
250m	0.2		

Table 11.17

With the nearest habitable existing building approximately 50m to 90m from the closest new proposed buildings we note from the tables above the predicted vibration levels at approx. 4.5 mm/s at worse cause very minor temporary ground borne vibration events during the construction phase but the impacts are far below the maximum levels stipulated under BS5228 and are therefore deemed not to have any impacts.

11.4.2.2 Operational Phase Impacts

11.4.2.2.1 Phase 1 - The Meadows

Operational Phase

As per measured noise level data the main potential noise source that would be evident during the operational phase of the development would be that of increased road traffic noise associated with the subject site. In general, this can be categorised as:

- Residents small vehicular traffic in and out of the development site.
- Delivery and service vehicles servicing the dwelling houses.
- General activities, landscape maintenance, cleaning, energy producing equipment etc.
- Vibration is not anticipated to be a contributing factor in the operational phase.

Operational Noise

The anticipated noise impacts from the phased and overall development during the relative operational phases will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Skehard Road and Bessborough Road traffic) will result in an increase in the baseline noise environment tabled below ;

Scenario	Phase	Skehard Road junction		Bessborough junction		Sharman Avenue junction	
		Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB
1	1	0.97	1.22	1.22	1.47	2.52	2.77

Table 11.18

The change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Change in Noise Level	Subjective Reaction	Impact Guidelines For Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.19

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as 'Slight' at the worst case. The increase in traffic associated with the proposed development scheme for all phases and scenarios is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

Operational Vibration

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. Currently no major sources of vibration exist on the site. It would therefore be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further assessment is deemed to be required. Operational vibration is deemed not to have any noticeable impacts on the existing environment.

11.4.2.2.2 Phase 2 - The Farm

Operational Phase

As per measured noise level data the main potential noise source that would be evident during the operational phase of the development would be that of increased road traffic noise associated with the subject site. In general, this can be categorised as:

- Residents small vehicular traffic in and out of the development site.
- Delivery and service vehicles servicing the dwelling houses.
- General activities, landscape maintenance, cleaning, energy producing equipment etc.
- Vibration is not anticipated to be a contributing factor in the operational phase.

Operational Noise

The anticipated noise impacts from the phased and overall development during the relative operational phases will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Skehard Road and Bessborough Road traffic) will result in an increase in the baseline noise environment tabled below ;

Scenario	Phase	Skehard Road junction		Bessborough junction		Bessborough junction	
		Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB
2	2	0.95	1.19	1.19	1.20	2.33	2.51

Table 11.20

The change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Change in Noise Level	Subjective Reaction	Impact Guidelines For Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.21

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as 'Slight' at the worst case. The increase in traffic associated with the proposed development scheme for all phases and scenarios is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

Operational Vibration

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. Currently no major sources of vibration exist on the site. It would therefore be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further assessment is deemed to be required. Operational vibration is deemed not to have any noticeable impacts on the existing environment.

11.4.2.2.3 Combined Phase 1 and Phase 2

Operational Noise

The anticipated noise impacts from the phased and overall development during the relative operational phases will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Skehard Road and Bessborough Road traffic) will result in an increase in the baseline noise environment tabled below ;

Scenario	Phase	Skehard Road junction		Bessborough junction		Sharman Avenue Junction	
		Baseline impact minimum dB	Baseline impactm maximum dB	Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB
1	1	0.97	1.22	1.22	1.47	2.52	2.77
2	2	0.95	1.19	1.19	1.20	2.33	2.51
3	1+2	1.03	1.25	1.25	1.50	2.69	3.01

Table 11.22

The change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Change in Noise Level	Subjective Reaction	Impact Guidelines For Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.23

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as 'Slight' at the worst case at the Skehard and Bessborough junctions and just the "moderate" for the Sharman avenue junction. The increase in traffic associated with the proposed development scheme for all phases and scenarios is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

Operational Vibration

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. Currently no major sources of vibration exist on the site. There may, in theory, a small increase in vibration levels as a result of increased traffic combining phase 1 and 2 however it would still be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further assessment is deemed to be required. Operational vibration is deemed not to have any noticeable impacts on the existing environment.

11.5 Mitigation Measures, Monitoring and Residual Impacts

11.5.1 Construction Phase

11.5.1.1 Phase 1 – The Meadows

DKP_{EV} do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites;

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Prepare a construction phase operational plan with regards to limiting noise nuisance.
- Ensure all construction vehicles and plant are regularly maintained including any noise
- control measures such as attenuators, filters etc.
- Limit any construction noise spreading to neighbouring site by erecting temporary noise barriers (site boundary hoarding).
- Schedule particular high-level noise activities for times when increased noise levels are less sensitive or notify neighbouring residents or any sensitive sites.
- Using a closed site perimeter screen.
- Piling is assumed to be bored. Driven piling is to be avoided.

Monitoring

No noise monitoring is deemed necessary for the operational phase however noise monitoring will most likely be a requirement as directed by the local authority for the construction phase based on the local authorities imposed limits on the hours of operation and noise limits. No vibration monitoring is deemed necessary for both the operational and construction phase.

11.5.1.2 Phase 2 - The Farm

DKP_{EV} do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites;

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Prepare a construction phase operational plan with regards to limiting noise nuisance.
- Ensure all construction vehicles and plant are regularly maintained including any noise
- control measures such as attenuators, filters etc.
- Limit any construction noise spreading to neighbouring site by erecting temporary noise barriers (site boundary hoarding).
- Schedule particular high-level noise activities for times when increased noise levels are less sensitive or notify neighbouring residents or any sensitive sites.
- Using a closed site perimeter screen.
- Piling is assumed to be bored. Driven piling is to be avoided.

Monitoring

No noise monitoring is deemed necessary for the operational phase however noise monitoring will most likely be a requirement as directed by the local authority for the construction phase based on the local authorities imposed limits on the hours of operation and noise limits. No vibration monitoring is deemed necessary for both the operational and construction phase.

11.5.1.3 Combined Phase 1 and Phase 2

DKP_{EV} do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites;

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Prepare a construction phase operational plan with regards to limiting noise nuisance.
- Ensure all construction vehicles and plant are regularly maintained including any noise

- control measures such as attenuators, filters etc.
- Limit any construction noise spreading to neighbouring site by erecting temporary noise barriers (site boundary hoarding).
- Schedule particular high-level noise activities for times when increased noise levels are less sensitive or notify neighbouring residents or any sensitive sites.
- Using a closed site perimeter screen.
- Piling is assumed to be bored. Driven piling is to be avoided.

Monitoring

No noise monitoring is deemed necessary for the operational phase however noise monitoring will most likely be a requirement as directed by the local authority for the construction phase based on the local authorities imposed limits on the hours of operation and noise limits. No vibration monitoring is deemed necessary for both the operational and construction phase.

11.5.2 Operational Phase

11.5.2.1 Phase 1 – The Meadows

Given the residential environment DKP_{EV} do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites;

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Maintain any acoustic/sound control measures applied post construction.
- Ensure that the commercial outlets adhere local authority guidelines or other directives to noise levels and operational times.

11.5.2.2 Phase 2 - The Farm

Given the residential environment DKP_{EV} do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites;

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Maintain any acoustic/sound control measures applied post construction.
- Ensure that the commercial outlets adhere local authority guidelines or other directives to noise levels and operational times.

11.5.2.3 Combined Phase 1 and Phase 2

Given the residential environment DKP_{EV} do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites;

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Maintain any acoustic/sound control measures applied post construction.
- Ensure that the commercial outlets adhere local authority guidelines or other directives to noise levels and operational times.

11.5.3 Residual Impacts

11.5.3.1 Phase 1 – The Meadows

It is not anticipated that there will be any noise & vibration residual impacts in the construction phase other then a possibly occasional breach of the given local authority time limits when a particular works is required to be completed within a specified time. It is not anticipated that there will be any noise & vibration residual impacts in the operational phase.

11.5.3.2 Phase 2 - The Farm

It is not anticipated that there will be any noise & vibration residual impacts in the construction phase other then a possibly occasional breach of the given local authority time limits when a particular works is required to be completed within a specified time. It is not anticipated that there will be any noise & vibration residual impacts in the operational phase.

11.5.3.3 Combined Phase 1 and Phase 2

It is not anticipated that there will be any noise & vibration residual impacts in the construction phase other then a possibly occasional breach of the given local authority time limits when a particular works is required to be completed within a specified time. It is not anticipated that there will be any noise & vibration residual impacts in the operational phase.

11.6 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 5, Climate & Air as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *Contribute to the mitigation of and adaptation to climate change such as flooding risk management, air quality and noise issues.*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 5 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in the most positive interaction for noise issues with EPO 5.

The projects in the area which have been assessed in terms of cumulative effects are outlined in chapter 1 of this EIAR. Assessing the cumulative impacts of the construction and operational phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These include.

- Cork City Council Ref: 17/37565: Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas. Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction.
- Cork City Council Ref: 18/37820: The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three storey apartment block (comprising 20 no. apartments) and a four storey apartment block (comprising 27 no. apartments) and 1 no. creche Granted by way of Material Contravention of City Development Plan on 28/02/2019.
- Cork City Council Ref: 21/40481: Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works. Conditionally granted on the 13/12/2021.
- Cork City Council Ref: 2140503: Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure. Conditionally granted on the 22/12/2021.
- Cork City Council Ref: 2140453: Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works. Conditionally granted on the 22/12/2021. Decision pending

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021:

- Cork City Council Ref: 2039705/ABP-309560-1: Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.
- • An Bord Pleanala Ref: ABP-308790-20 : Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork.

The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential.

11.6.1 Construction Phase

11.6.1.1 Phase 1 – The Meadows

The construction noise assessment in the previous sections phase 1 (the Meadows) represents the worse case scenario's and it is very unlikely that the same noise / vibration event would happen to coincide at exactly the same time in one of the other permitted developments giving rise to a theoretical increase in predicted noise levels. However the impact of any predicted cumulative noise or vibration levels is assumed not to exceed the worse case scenario and is temporary, negative and not deemed significant.

11.6.1.2 Phase 2 – The Farm

The construction noise assessment in the previous sections phase 1 (the farm) represents the worse case scenario's and it is very unlikely that the same noise / vibration event would happen to coincide at exactly the same time in one of the other permitted developments giving rise to a theoretical increase in predicted noise levels. However the impact of any predicted cumulative noise or vibration levels is assumed not to exceed the worse case scenario and is temporary, negative and not deemed significant.

11.6.1.3 Combined Phase 1 and Phase 2

Phase 1 and phase 2 of this development are to be constructed sequential as established previously and fact that he construction noise assessment in the previous sections for phase 1 (the Meadows) and phase 2 (the Farm) represent the worse case scenario's and it is very unlikely that the same noise / vibration event would happen to coincide at exactly the same time in one of the other permitted developments giving rise to a theoretical increase in predicted noise levels. However the impact of any predicted cumulative noise or vibration levels is assumed not to exceed the worse case scenario and is temporary, negative and not deemed significant.

11.6.1.4 Combined Masterplan Area (including Phases 1 - 3)

Phase 1, phase 2 and phase 3 of this development are to be constructed sequential as established previously and fact that the construction noise assessment in the previous sections for phase 1 (the Meadows), phase 2 (the Farm) and similarly for phase 3 represent the worse case scenario's and it is very unlikely that the same noise / vibration event would happen to coincide at exactly the same time in one of the other permitted developments giving rise to a theoretical increase in predicted noise levels. However the impact of any predicted cumulative noise or vibration levels is assumed not to exceed the worse case scenario and is temporary, negative and not deemed significant.

11.6.2 Operational Phase

Assessing the cumulative impacts of the operational phase of the development is similarly contingent on other permitted developments in the area as listed in 12.6.1.

11.6.2.1 Phase 1 – The Meadows

The anticipated noise impacts from the phased and overall development during the relative operational phases will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Skehard Road and Bessborough Road traffic and the other permitted developments) will result in an increase in the baseline noise environment tabled below;

Scenario	Phase	Skehard Road junction		Bessborough junction		Sharman Avenue Junction	
		Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB
1	1	0.97	1.22	1.22	1.47	2.52	2.77
4	"others"	0.96	1.20	1.21	1.32	2.41	2.53
5	1 + others	1.03	1.26	1.26	1.52	2.74	3.03

Table 11.24

We note that "others" represent the data from the other permitted developments as listed in section 11.6. The combined change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Change in Noise Level	Subjective Reaction	Impact Guidelines For Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.25

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as 'Slight' at the worst case at the Skehard and Bessborough junctions and just the "moderate" for the Sharman avenue junction. The increase in traffic associated with the proposed development scheme for all phases and scenarios is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

Operational Vibration

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. There may, in theory, a small increase (+/-10%) in vibration levels as a result of increased traffic combining phase 1 and the predicted traffic from the other permitted developments however it would still be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further assessment is deemed to be required. Operational vibration is deemed not to have any noticeable impacts on the existing environment.

11.6.2.2 Phase 2 – The Farm

The anticipated noise impacts from the phased and overall development during the relative operational phases will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Skehard Road and Bessborough Road traffic and the other permitted developments) will result in an increase in the baseline noise environment tabled below ;

Scenario	Phase	Skehard Road junction		Bessborough junction		Sharman AvenueJunction	
		Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB
2	2	0.95	1.19	1.19	1.20	2.33	2.51
4	"others"	0.96	1.20	1.21	1.32	2.41	2.53
6	2 + others	1.02	1.23	1.24	1.42	2.55	2.92

Table 11.26

We note that "others" represent the data from the other permitted developments as listed in section 11.6. The combined change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Change in Noise Level	Subjective Reaction	Impact Guidelines For Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.27

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as 'Slight' at the worst case at the Skehard, Bessborough and Sharman junctions. The increase in traffic associated with the proposed development scheme for all phases and scenarios is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

Operational Vibration

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV

and may become disturbing or annoying at higher magnitudes. There may, in theory, a small increase (+/-10%) in vibration levels as a result of increased traffic combining phase 1 and the predicted traffic from the other permitted developments however it would still be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further

11.6.2.3 Combined Phase 1 and Phase 2

The anticipated noise impacts from the phased and overall development during the relative operational phases will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Skehard Road and Bessborough Road traffic and the other permitted developments) will result in an increase in the baseline noise environment tabled below ;

Scenario	Phase	Skehard Road junction		Bessborough junction		Sharman AvenueJunction	
		Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB
1	1	0.97	1.22	1.22	1.47	2.52	2.77
2	2	0.95	1.19	1.19	1.20	2.33	2.51
3	1+2	1.03	1.25	1.25	1.50	2.69	3.01
4	“others”	0.96	1.20	1.21	1.32	2.41	2.53
7	1+2 + others	1.06	1.28	1.27	1.57	2.75	3.11

Table 11.28

We note that “others” represent the data from the other permitted developments as listed in section 11.6. The combined change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Change in Noise Level	Subjective Reaction	Impact Guidelines For Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR’s (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.29

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as ‘Slight’ at the worst case at the Skehard and Bessborough junctions and just the “moderate” for the Sharman avenue junction. The increase in traffic associated with the proposed development scheme for all phases and scenarios is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

Operational Vibration

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. There may, in theory, a small increase (+/-15%) in vibration levels as a result of increased traffic combining phase 1 and the predicted traffic from the other permitted developments however it would still be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further

11.6.2.4 Combined Masterplan Area (including Phases 1 – 3)

Phase 3 is to represent approximately an additional 200 residential units and related traffic resulting in the following . We note phase 3 to be serviced using the road going due South from the bessborough junction.

The anticipated noise impacts from the phased and overall development during the relative operational phases will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Skehard Road and Bessborough Road traffic and the other permitted developments) will result in an increase in the baseline noise environment tabled below ;

Scenario	Phase	Skehard Road junction		Bessborough junction		Sharman Avenue Junction	
		Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB	Baseline impact minimum dB	Baseline impact maximum dB
2	2	0.95	1.19	1.19	1.20	2.33	2.51
2	2	0.95	1.19	1.19	1.20	2.33	2.51
3	1+2	1.03	1.25	1.25	1.50	2.69	3.01
4	“others”	0.96	1.20	1.21	1.32	2.41	2.53
7	1+2 + others	1.06	1.28	1.27	1.57	2.75	3.11
8	3	0.95	1.18	1.18	1.20	X	X
9	1,2,3+others	1.08	1.33	1.29	1.61	2.75	3.11

Table 11.30

We note that “others” represent the data from the other permitted developments as listed in section 11.6. The combined change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Change in Noise Level	Subjective Reaction	Impact Guidelines For Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Table 11.31

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as 'Slight' at the worst case at the Skehard and Bessborough junctions and just the "moderate" for the Sharman avenue junction. We note that phase 3 should not have any impact on the Sharman Avenue junction or any receptors in this area or road. The increase in traffic associated with the proposed development scheme for all phases and scenarios is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

Operational Vibration

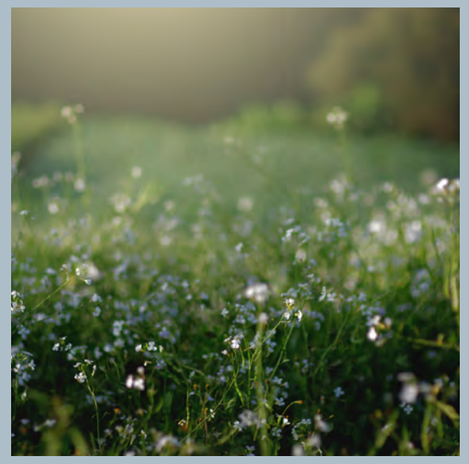
Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. There may, in theory, a small increase (+/-18%) in vibration levels as a result of increased traffic combining phase 1 and the predicted traffic from the other permitted developments however it would still be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further.

11.7 Difficulties in Compiling Information

There were no difficulties met when conducting this assessment.

11.7.1 References

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 - Noise.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 -Vibration.
- BS 6841 (1987): Measurement and evaluation of human exposure to whole-body mechanical vibration and repeated shock
- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.
- ISO 1996: 2017: Acoustics - Description, measurement and assessment of environmental noise.
- The Transport Infrastructure Ireland (TII, formerly NRA) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (TII, 2014), the Guidelines for the Treatment of Noise and Vibration in National Road Schemes (TII, 2004) was also considered in the preparation of the assessment.
- The Professional Guidance on Planning & Noise (ProPG), May 2017



BESSBOROUGH, CORK

CHAPTER 12

Air Quality

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BESSBOROUGH, CORK

CHAPTER 12

Air Quality

CHAPTER 12

12 Air quality

12.1 Introduction

12.1.1 Chapter Context

Chapter 12 of this Environmental Impact Assessment has been prepared by DKP Environmental (DKP) and assesses the air quality impacts associated with the proposed development Bessborough, Ballinure, Blackrock Co. Cork. The proposed development comprises two planning applications to An Bord Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in Chapter 2 - Project Description'.

This chapter examines the existing air quality in the vicinity of the development site and the potential impact of the proposed development during the construction phase and operational phase. The assessment includes recommended mitigation measures to control and minimise the impact that the development may have on local air quality. This section should be read in conjunction with the site layout plans and project description sections of this EIAR.

12.2 Methodology

Research for this section included a review of the Air Quality Standards Regulations (S.I. 180 of 2011) and the EPA annual reports on air quality in Ireland. Predicted air quality emissions for the main traffic-derived pollutants have been modelled using the screening air quality assessment from the U.K Highway Agency Design Manual for Roads and Bridges (DMRB) and data from the transport Assessment undertaken for the residential development at Bessborough. Analysis for this chapter included a review of the following guidelines and recommendations:

- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports Draft (EPA, 2017)
- Advice Note on Preparing Environmental Impact Statements – Draft (EPA, 2015)
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment 2013.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018
- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (Institute of Air Quality Management (IAQM), 2014)

12.2.1 Legislation and Guidelines

12.2.1.1 Ambient air quality standards

To reduce the risk of poor air quality impacts, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. EU directives set baseline standards for monitoring air quality and reducing emissions. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC, which has set limit values for a number of pollutants. These limits are for the protection of human health and are presented in Table 12.1. Air quality significance criteria are assessed on the basis of compliance with the standards.

Pollutant	Limit value objective	Averaging period	Value limit (µg/m3)
Nitrogen Dioxide (NO_2)	Protection of human health	calendar year	40
		1 hour	200
Benzene	Protection of human health	calendar year	5
Carbon Monoxide (CO)	Protection of human health	calendar year	10,000
Lead	Protection of human health	calendar year	0.5
Sulphur Dioxide (SO2)	Protection of human health	1 hour	350
		24 hours	125
Particulate Matter (PM10)	Protection of human health	24 hours	50
		calendar year	40
Particulate Matter (PM2.5)	Protection of human health	calendar year	25

Table 12.1: Air quality standards regulations (S.I.180)

12.2.1.2 National air quality network

The EPA is the authority with responsibility for ambient air quality monitoring in Ireland and measures the levels of a number of atmospheric pollutants. Ambient air quality monitoring is carried out in accordance with the requirements of the CAFE Directive which has been transposed into Irish national legislation by the Air Quality Standards Regulations 2011. For the purposes of detailing ambient air quality in Ireland, it is divided into 4 zones: Zone A: Dublin, Zone B: Cork, Zone C: Other cities and large towns, Zone D: Rural Ireland. In Ireland, the network is managed by the EPA in partnership with Local Authorities and other public/semi-state bodies. A series of monitoring stations are located across the country, these stations collect air quality data for public information. The proposed development site is located within Zone B, Cork. The EPA monitor at local sites and national sites. The nearest local EPA air quality monitoring station from the development site is South Link Road, Cork. These local monitoring stations give people a rapid and up-to-date indication only, of air quality in their locality.

12.2.1.3 Dust deposition guidelines

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) and the EU ambient air quality standards outlined in Table 9.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$. With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust. With regard to dust deposition, there are currently no national or European Union air quality standards with which levels of dust deposition can be compared. To measure dust deposition a figure of 350 mg/m2/day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI 2129) can be applied to ensure that no nuisance effects will result. The Institute of Air Quality Management in the UK (IAQM) guidelines outline an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts.

12.3 Description of Existing Baseline Environment

12.3.1 Description of Existing Meteorological Environment

The meteorological station closest to Bessborough collecting detailed weather records is Cork Airport, which is located approximately 10km south-west of the site. The meteorological data has been examined to identify the prevailing wind direction, average wind speeds and average rainfall. Long-term measurements for this location are representative of prevailing conditions experienced at the development site.

Rainfall: Precipitation data from the Cork airport meteorological station for the period 1981-2010 (table 12.2) indicates a mean monthly total of ~102 mm.

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean monthly total	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1
Greatest daily total	45.7	49.9	55.2	34.2	34.9	59.7	73.2	60.9	58.9	52.1	47.9	41.9
Mean no of days with>= 0.2mm	20	17	19	16	15	14	15	15	16	19	19	19
Mean no of days with>= 1.0mm	16	13	14	11	12	10	10	11	11	15	14	15
Mean no of days with>= 5.0mm	9	6	5	5	5	5	5	5	5	8	7	8

Table 12.2: Rainfall data at Cork airport 1981-2010, 30-year averages

Temperature: The annual mean temperature at Cork Airport (1981-2010) is 9.9ºC with a mean maximum of 12.9ºC and a mean minimum of 6.9ºC. Given the close proximity of this meteorological station to the proposed development site, similar conditions would be observed. Table 12.3 details 30-year averages of meteorological data for Cork Airport.

Temperature ºC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean temperature	5.6	5.7	6.9	8.4	10.9	13.5	15.3	15.2	13.3	10.5	7.8	6.1
Mean daily max	8.2	8.3	9.9	11.8	14.4	17.0	18.7	18.5	16.5	13.2	10.3	8.5
Mean daily min	3.0	3.1	4.0	4.9	7.4	10.0	11.8	11.8	10.2	7.7	5.2	3.7

Table 12.3: Temperature data at Cork airport 1981-2010, 30-year averages

Wind: Cork airport data has been examined to identify the prevailing wind direction and average wind speeds. Table 12.4 shows the averages over a 30-year period and Image 12.1 illustrates the prevailing wind direction data for the period 1967-2021. The prevailing winds are from a south south-westerly direction with an average wind speed of 19km/h. The site of the proposed development can be characterised as a site which experiences average wind speeds of Beaufort scale 3, which is described as a 'gentle breeze' on the Beaufort scale.

Wind (knots)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean monthly speed	12.1	12.0	11.6	10.3	10.1	9.4	9.0	9.0	9.4	10.7	10.9	11.6
Max gust	78	83	70	62	59	49	57	54	58	75	66	80
Max mean 10-minute speed	52	54	43	40	40	33	40	38	39	48	46	56
Mean no. of days with gales	2.3	1.8	1.3	0.3	0.3	0.0	0.1	0.2	0.3	1.0	1.2	1.9
Mean monthly total (mm)	131	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1
Mean no of days with>= 0.2mm	20	17	19	16	15	14	15	15	16	19	19	19
Mean no of days with>= 5.0mm	9	6	5	5	5	5	5	5	5	8	7	8

Table 12.4: Wind data at Cork airport 1981-2010, 30-year averages

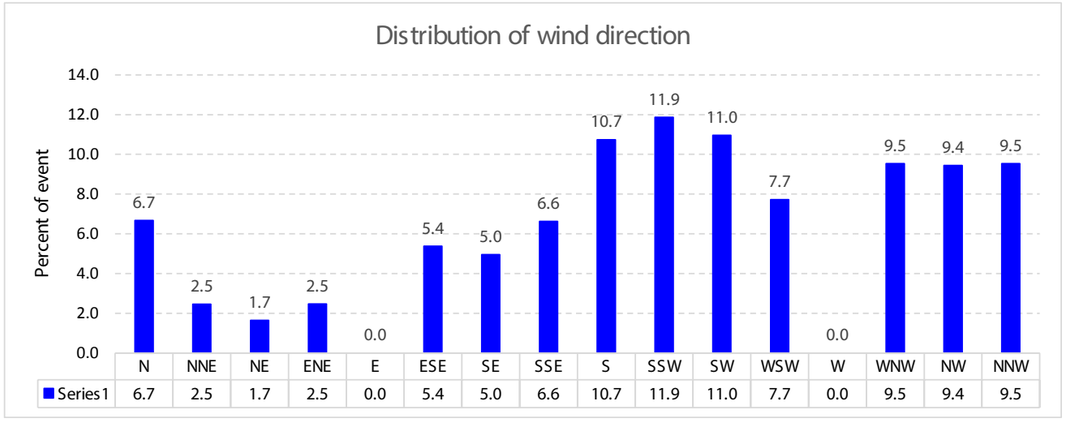


Image 12.1: Wind direction data at Cork airport – 54-year period (year 1967-2021)

12.3.2 Description of Existing Air Quality

The existing ambient air quality in the vicinity of the site has been characterised with information obtained from the EPA's Annual Air Quality in Ireland Reports. The existing ambient air quality at and in the vicinity of the site is typical of an urban location. Domestic heating sources and road traffic are identified as the main contributors to emissions to ambient air quality.

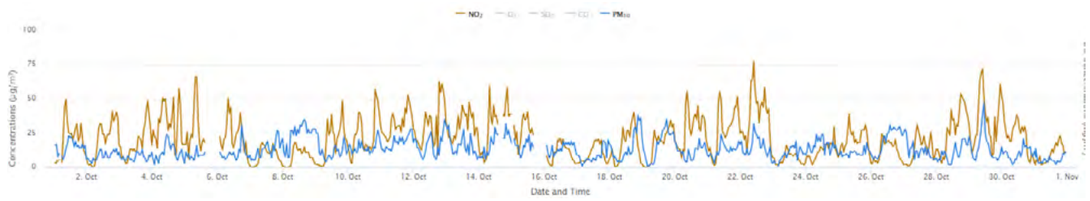
Current air quality trends in Ireland

Ireland's air quality is currently good relative to other EU States. The ambient air quality pollutants of most concern on an EU-wide level are nitrogen dioxide and particulate matter.

- Nitrogen Oxides (NO_2 and NO): Nitrogen oxides are gaseous pollutants associated with traffic exhaust emissions. Nitrogen oxides include the gases nitrogen oxide (NO) and nitrogen dioxide (NO_2). Both pollutants are emitted to ambient air when petrol/diesel is burned. NO_2 is more important than NO from the EPA's point of view as its impact on health is higher. In terms of ambient air quality, the main source of nitrogen oxides in Ireland is road transport, with diesel vehicles producing more nitrogen oxides than petrol vehicles.
- Particulate Matter (PM_{10} and $PM_{2.5}$): PM consists of small particles that are suspended in the air. There are two main types, PM_{10} (diameter less than 10µm) and $PM_{2.5}$ (diameter less than 2.5µm). There are many sources of PM, in Ireland the dominant sources of PM from human activities are solid fuels used in home heating in winter and the transport sector.

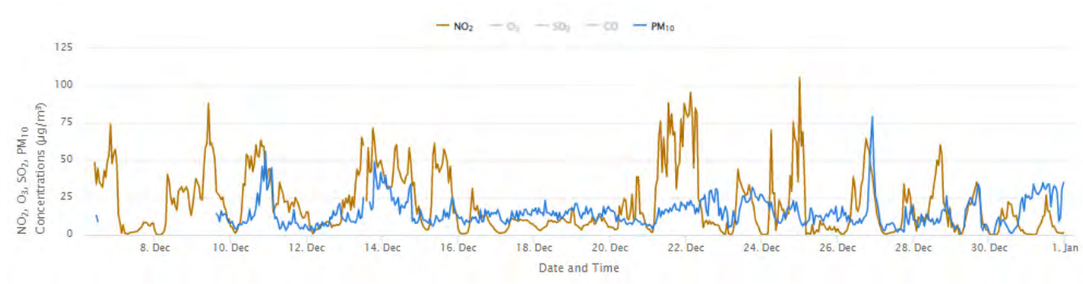
Review of available background data

The nearest local and national EPA air quality monitoring station from the development site is South Link Road, Cork approximately 5km away. The South Link Road site is located on the south side of Cork City, at the Cork City Council landfill. The site is operated by Cork City Council. Monitoring is done using continuous monitors for sulphur dioxide, nitrogen oxides, carbon monoxide and ozone. Continuous samples are also taken for particulates (PM_{10}), and benzene. Local monitoring stations give people a rapid and up-to-date indication only, of air quality in their locality. Monitoring data for PM and NO_2 can only be obtained up to a couple of months previous. The previous 4 months graphs for NO_2 and PM_{10} local emissions are illustrated below:



1st Oct – 31st Oct 2021 monitoring data. Copyright EPA

1st Nov – 30th Nov 2021 monitoring data. Copyright EPA



1st Dec – 31st Dec 2021 monitoring data. Copyright EPA

1st Jan – 31st Jan 2022 monitoring data. Copyright EPA

The national EPA air quality annual mean value concentrations measured at this monitoring site for 2020, 2019, 2018 and 2017 are shown in Table 12.5.

Pollutant	2020 Annual Mean Concentration (µg/m3)	2019 Annual Mean Concentration (µg/m3)	2018 Annual Mean Concentration (µg/m3)	2017 Annual Mean Concentration (µg/m3)	4-year Average	Annual Limit for Protection of Human Health (µg/m3)
Sulphur Dioxide (SO2)	3.4	2.5	2.3	5.9	3.5	20
Particulate Matter (PM10) (diameter <10 microns)	15	18	17	17.2	16.8	40
Particulate Matter (PM2.5) (diameter <2.5 microns)	7.5*	8*	8.5*	5.7*	7.4	20
Nitrogen Dioxide (NO_2)	14	21	25	26.6	21.6	40
Carbon Monoxide (CO) (mg/m3)	0.6	0.3	0.4	0.34	0.4	10
Benzene	0.5*	0.3*	0.3*	0.4*	0.4	5
Ozone (03)	20	48	40	34.7	35.7	120

Table 12.5: Data from the EPA ambient air monitoring report 2020-2017

* South Link Road monitoring station does not record all ambient air quality parameters outlined in the Directive. Therefore, air quality in the receiving environment was assessed using the average annual mean value concentrations from all measured monitoring stations in Zone B for that year.

Significance of EPA results

The EPA data of 2020 (and pre lockdown levels in 2019) pollutants show air quality parameters are all below the air quality limit values. It can be seen that the existing baseline air quality at the site locality can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values of individual pollutants. The quality of existing air quality at the subject site must be maintained and/or improved where possible.

12.4 Impact Assessment

When considering a development of this nature, the potential impact must be considered for each distinct stage:

- the short term impact of the construction phase and
- the longer term impact of the operational phase

During the construction stage the main source of air quality impacts will be as a result of fugitive dust emissions from site activities. The primary sources of air emissions in the operational phase are considered long term and will involve the change in traffic flows or congestion in the local areas which are associated with the development.

12.4.1 Do-nothing scenario

12.4.1.1 Phase 1 - The Meadows

The Do-Nothing scenario includes retention of the current site area for phase 1 without the proposed residential development in place. Ambient air quality as a result of this scenario only will remain as per the baseline.

12.4.1.2 Phase 2 - The Farm

The Do-Nothing scenario includes retention of the current site area for phase 2 without the proposed residential development in place. . Ambient air quality as a result of this scenario only will remain as per the baseline.

12.4.1.3 Combined Phase 1 and Phase 2

The Do-Nothing scenario includes retention of the current site areas without the proposed residential developments in place. . Ambient air quality as a result of this scenario only will remain as per the baseline..

12.4.2 Construction Phase Impacts

12.4.2.1 Phase 1 - The Meadows

The construction phase of the development has the potential to generate short term dust emissions and may have the potential to impact air quality. Dust emissions can lead to elevated PM_{10} and $PM_{2.5}$ concentrations and may also cause dust soiling. The potential for dust to be emitted depends on the type of construction activity being conducted in conjunction with ambient conditions, including rainfall, wind speed and the distance to potentially sensitive locations. The majority of any dust produced during the construction phase may be deposited close therefore any potential impacts from dust deposition will typically be close to the source. There is a risk that dust can cause an impact at sensitive receptors that are in close proximity to the source of the generated dust. It is not easy to accurately quantify dust emissions arising from construction activities. A semi-quantitative approach is recommended by the National Roads Authority (NRA) Guidelines 2011 to determine the likelihood of a significant impact. The construction assessment guidelines reproduced from the NRA guidance, are set out in Table 12.6

Source	Potential Distance for Significant Effects (distance from source)			
Scale	Description	Soiling	PM_{10}	Vegetation Effects
Major	Large Construction sites, with high use of haul routes.	100m	25m	25m
Moderate	Moderate Construction sites, with moderate use of haul routes.	50m	15m	15m
Minor	Minor Construction sites, with minor use of haul routes.	25m	10m	10m

Table 12.6: Assessment criteria for the impact of dust from construction activities with standard mitigation in place (NRA 2011)

While dust from construction activities tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. The Bessborough day care centre north of the proposed phase 1, is located 70m from block A (closest point of receptor). The Bessborough Heritage centre north-west of the proposed phase 1, is

located 30m from block A. The Bessborough Centre south-west of the proposed phase 1, is located 50m from block D. Where dust impacts are likely, avoidance and mitigation measures will be put in place to reduce the impact levels such as wind breaks, barriers and frequent cleaning and watering of the construction site roads, further detailed mitigation measures discussed in section 12.6. Provided the dust minimisation measures outlined in the plan are adhered to, the air quality impacts during the construction phase will not be significant.

The significance of impacts due to vehicle emissions during the construction phase will be dependent on the number of additional vehicle movements, HGVs and the closeness of sensitive receptors to the site. Increases in levels to PM and pollutants related to increased traffic can be predicted however relative to baseline levels, the impact of the proposed development during construction will not have an adverse impact in concentrations over the limit of regulation values.

12.4.2.2 Phase 2 - The Farm

The construction phase of the development has the potential to generate short term dust emissions. Dust emissions can lead to elevated PM_{10} and $PM_{2.5}$ concentrations and may also cause dust soiling. The majority of any dust produced during the construction phase may be deposited close therefore any potential impacts from dust deposition will typically be close to the source. There is a risk that dust can cause an impact at sensitive receptors that are in close proximity to the source of the generated dust. A semi-quantitative approach is recommended by the NRA. The construction assessment guidelines reproduced from the NRA guidance, are set out in Table 12.6**.** The Sacred heart Convent north of the proposed phase 2, is located 20m from block D (closest point of receptor). The Bessborough day care centre and Hostel, east of the proposed phase 2, is located 35m from block E. The Bessborough Heritage south-east of the proposed phase 2, is located 15m from block D. The Bessborough Centre north of the proposed phase 2, is located 20m from block C (closest point of receptor). Where dust impacts are likely, avoidance and mitigation measures will be put in place to reduce the impact levels such as wind breaks, barriers and frequent cleaning and watering of the construction site roads, further detailed mitigation measures discussed in section 12.6. Provided the dust minimisation measures outlined in the plan are adhered to, the air quality impacts during the construction phase will not be significant.

The significance of impacts due to vehicle emissions during the construction phase will be dependent on the number of additional vehicle movements, HGVs and the closeness of sensitive receptors to the site. Increases in levels to PM and pollutants related to increased traffic can be predicted however relative to baseline levels, the impact of the proposed development during construction will not have an adverse impact in concentrations over the limit of regulation values.

12.4.2.3 Combined Phase 1 and Phase 2

The majority of any dust produced during the construction phase is deposited close therefore any potential impacts from dust deposition will typically be close to the source. There is a risk that dust can cause an impact at sensitive receptors that are in close proximity to the source of the generated dust.

Outlined previously the Sacred heart Convent north of the proposed phase 2, is located 20m from block D, the Bessborough Heritage south-east of the proposed phase 2, is located 15m from block D and the Bessborough Heritage centre north-west of the proposed phase 1, is located 30m from block A. These receptors are treated as sensitive receptors and in order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a dust management plan. Provided the dust minimisation measures outlined in the plan (Appendix 12.1) are adhered to, the air quality impacts during the construction phase will not be significant. The mitigation measures are summarised in Section 12.5

12.4.3 Operational Phase Impacts

12.4.3.1 Phase 1 - The Meadows

The operational phase has the potential to result in an impact on local air quality primarily as a result of the increased traffic movements associated with phase 1 of the development. The traffic-related air emissions may generate quantities of air pollutants such as NO_2, CO, and PM_{10}. The DMRB screening air quality spreadsheet from the U.K Highway Agency Design Manual for Roads and Bridges, was used to assess the impact of increased traffic associated with the new development. Annual Average Daily Traffic Flow (AADT) information was obtained from MHL & Associates on this project and has been used to model pollutant levels under various traffic scenarios to assess whether any significant air quality impact on sensitive receptors may occur. Projected transport figures were used to predict the concentrations of traffic-derived pollutants in future years. The model then combined background concentrations of pollutants, sourced from the EPA reports (4-year average values were used). Results were generated using an average speed of 40 km/h assuming congested traffic conditions. Using the DMRB screening air quality spreadsheet, pollutant concentrations were predicted. See receptor A on image 12.2 for the location. The receptor was chosen due to the close proximity to the road link impacted by the proposed development.

Image 12.2: Phase 1: receptor A

In order to quantify the magnitude of change in pollutant concentrations, the descriptors in table 12.7 were used. To describe the significance of the impact, table 12.8 was then used. These descriptor tables are from the Transport Infrastructure Ireland Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes which detail a methodology for determining air quality impact significance criteria for road schemes and has been adopted for this assessment. 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.

Magnitude of Change	Annual Mean NO_2 (µg/m3)	No. of Days with PM10 concentration greater than 50 µg/m3	Annual Mean PM (µg/m3)
Large	Increase/decrease ≥4	Increase/decrease >4 days	Increase/decrease ≥2.5
Medium	Increase/decrease 2 - <4	Increase/decrease 3 or 4 days	Increase/decrease 1.25 - <2.5
Small	Increase/decrease 0.4 - <2	Increase/decrease 1 or 2 days	Increase/decrease 0.25 - <1.25
Imperceptible	Increase/decrease <0.4	Increase/decrease <1 day	Increase/decrease <0.25

Table 12.7: Definition of impact magnitude for changes in ambient air pollutant concentrations.

Absolute Concentration in Relation to Objective /Limit Value	Changes in Concentration		
	Small	Medium	Large
Increase with Scheme			
Above Limit Value with Scheme (≥40µg/m3 of NO_2or PM10) (≥25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Limit Value with Scheme (36-<40µg/m3 of NO_2 or PM10) (22.5-<25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Limit Value with Scheme (30-<36µg/m3 of NO_2 or PM10) (18.75-<22.5µg/m3 of PM2.5)	Negligible	Slight Adverse	Slight Adverse
Well Below Limit Value with Scheme (<30µg/m3 of NO_2 or PM10) (<18.75µg/m3 of PM2.5)	Negligible	Negligible	Slight Adverse

Table 12.8: Air quality impact descriptors for changes in annual mean NO2, PM10 and PM2.5 concentrations at a receptor.

The results of the impact assessment arising from increased transport are presented in Table 12.9. The results predict the future air quality relative to the existing baseline.

Receptor A	Annual Average NO_2 (µg/m3)	Annual Average PM10 (µg/m3)	Annual Average (µg/m3)Benzene	Annual Average CO (µg/m3)
Background (2021)	21.6	16.8	0.4	0.4
Limits	40	40	5	10
Do Nothing (2030)	22.168	17.356	0.431	0.412
Increase	0.568	0.556	0.031	0.012
Magnitude	Small	Small	Small	Small
Description	Negligible	Negligible	Negligible	Negligible
Do Something (2030)	22.589	17.767	0.451	0.431
Increase	0.989	0.967	0.051	0.031
Magnitude	Small	Medium	Small	Small
Description	Negligible	Negligible	Negligible	Negligible

Table 12.9: Phase 1: Modelled results for receptor A

12.4.3.2 Phase 2 - The Farm

The operational phase has the potential to result in an impact on local air quality primarily as a result of the increased traffic movements associated with the development. the traffic-related air emissions may generate quantities of air pollutants such as NO_2, CO, and PM_{10}. The DMRB screening air quality spreadsheet from the U.K Highway Agency Design Manual for Roads and Bridges, was used to assess the impact of increased traffic associated with the new development. AADT information was obtained from MHL & Associates on this project (phase 2) and has been used to model pollutant levels under various traffic. Using the DMRB screening air quality spreadsheet, pollutant concentrations were predicted. See receptor B on image 12.3 for the location. The receptor was chosen due to the close proximity to the road link impacted by the proposed development.

Image 12.3: Phase 2: receptor B

The results of the impact assessment arising from increased transport are presented in Table 12.10. The results predict the future air quality relative to the existing baseline.

Receptor B	Annual Average NO_2 (µg/m3)	Annual Average PM10 (µg/m3)	Annual Average (µg/m3)Benzene	Annual Average CO (µg/m3)
Background (2021)	21.6	16.8	0.4	0.4
Limits	40	40	5	10
Do Nothing (2030)	22.077	17.285	0.429	0.410
Increase	0.477	0.485	0.029	0.010
Magnitude	Small	Small	Small	Small
Description	Negligible	Negligible	Negligible	Negligible
Do Something (2030)	22.497	17.695	0.449	0.429
Increase	0.897	0.895	0.049	0.029
Magnitude	Small	Medium	Small	Small
Description	Negligible	Negligible	Negligible	Negligible

Table 12.10: Phase 2: Modelled results for receptor B

12.4.3.3 Combined Phase 1 and Phase 2

Using the DMRB screening air quality spreadsheet, pollutant concentrations were predicted for the combined phase 1 and 2. The results of the impact assessment arising from increased transport are presented in Table 12.11. The results predict the future air quality relative to the existing baseline. Receptor C is located at the main entrance to the sites at the Bessborough Road.

Receptor C	Annual Average NO_2 (µg/m3)	Annual Average PM10 (µg/m3)	Annual Average (µg/m3)Benzene	Annual Average CO (µg/m3)
Background (2021)	21.6	16.8	0.4	0.4
Limits	40	40	5	10
Do Nothing (2030)	22.620	17.710	0.440	0.420
Increase	1.020	0.910	0.040	0.020
Magnitude	Small	Small	Small	Small
Description	Negligible	Negligible	Negligible	Negligible
Do Something (2030)	23.050	18.130	0.460	0.440
Increase	1.450	1.330	0.060	0.040
Magnitude	Small	Medium	Small	Small
Description	Negligible	Negligible	Negligible	Negligible

Table 12.11: Phase 1 and 2: Modelled results for receptor C

12.4.3.3.1 Combined Masterplan Phase 1, 2 and 3.

Using the DMRB screening air quality spreadsheet, pollutant concentrations were predicted for the combined masterplan phase 1, 2 and 3. The results of the impact assessment arising from increased transport are presented in Table 12.12. The results predict the future air quality relative to the existing baseline. Receptor D is located at the main entrance to the sites at the Bessborough Road.

Receptor D	Annual Average NO_2 (µg/m3)	Annual Average PM10 (µg/m3)	Annual Average (µg/m3)Benzene	Annual Average CO (µg/m3)
Background (2021)	21.6	16.8	0.4	0.4
Limits	40	40	5	10
Do Nothing (2030)	22.846	17.887	0.444	0.424
Increase	1.246	1.087	0.044	0.024
Magnitude	Small	Small	Small	Small
Description	Negligible	Negligible	Negligible	Negligible
Do Something (2030)	23.281	18.311	0.465	0.444
Increase	1.681	1.511	0.065	0.044
Magnitude	Small	Medium	Small	Small
Description	Negligible	Negligible	Negligible	Negligible

Table 12.12: Phase 1 and 2 and 3: Modelled results for receptor D

12.4.3.4 Summary of modelling assessment

Levels of traffic-derived air pollutants for phase 1, phase 2 and the combined phase 1 & 2 results show an expected increase in annual NO_2, PM_{10}, benzene and CO but each parameter remain well below the limit values for EU regulations and will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in Table 12.7-8, the impact of the development in terms of PM_{10}, CO, NO_2 and benzene is negligible and would not result in a perceptible change in the existing local air quality environment.

12.5 Mitigation Measures, Monitoring and Residual Impacts

12.5.1 Construction Phase

12.5.1.1 Phase 1 – The Meadows

Full details of the dust management plan can be found in Appendix 12.1. At all times, the procedures within the plan will be monitored and assessed. Summary of mitigation measures include:

- Avoid unnecessary vehicle movements and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- Site roads shall be regularly cleaned and maintained as appropriate, especially during dry and/or windy conditions. Any unsurfaced roads shall be restricted to essential site traffic only.
- A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site.
- The overloading of tipper trucks exiting the site shall not be permitted and aggregates will be transported to and from the site in covered trucks.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind, stockpiles holding fine or dusty elements including top soils shall be covered with tarpaulins. Water misting or sprays will be used as needed if particularly dusty activities are necessary during dry or windy periods.
- Where drilling or pavement cutting operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers.
- All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

12.5.1.2 Phase 2 - The Farm

Phase 2 construction methodology and proposed buildings are of a similar manner to phase 1, hence the construction phase mitigation measures as outlined in Appendix 12.1 should be implemented.

12.5.1.3 Combined Phase 1 and Phase 2

Coordination and implementation of the dust management plan shall be executed during the construction phase. Full details of the dust management plan can be found in Appendix 12.1.

12.5.2 Operational Phase

12.5.2.1 Phase 1 – The Meadows

No additional mitigation measures are required as the operational phase of the proposed development as it is predicted the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality. The operational phase includes mitigation by design measures to minimise the impact of the development on air quality are as follows:

- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity of public transport (Bus Eireann) through the proposed bridge structure will reduce private vehicle use.

12.5.2.2 Phase 2 - The Farm

As outlined in the DMRB assessment, it is predicted the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality. This is the same predicted outcome as Phase 1, therefore no additional mitigation measures are required. The operational phase includes mitigation by design measures to minimise the impact of the development on air quality are the same as outlined above.

12.5.2.3 Combined Phase 1 and Phase 2

As outlined in the DMRB assessment, Levels of traffic-derived air pollutants for the combined phase 1 & 2 results show the impact of the combined development in terms of PM_{10}, CO, NO_2 and benzene is negligible and would not result in a perceptible change in the existing local air quality environment. No additional mitigation measures are required as the operational phase of the proposed developments.

12.5.3 Residual Impacts

12.5.3.1 Phase 1 – The Meadows

Construction Phase: Once the dust minimisation measures outlined in Section 12.5.1 and Appendix 12.1 are implemented, the impact of the proposed development in terms of dust soiling will be short-term and imperceptible at nearby receptors.

Operational Phase: Air pollution 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 including NO_2, PM_{10} and CO at nearby sensitive receptors will be imperceptible. Current trends suggest that vehicle manufacturers are ceasing the manufacture of large diesel engines for private cars and instead adopting hybrid engine and all electric technologies which will contribute to the reduction of engine exhaust emissions. Also the proposed bridge structure increases the proximity to public transport which will reduce private vehicle use. The predicted operational phase residual impact to air quality is long-term and not significant.

12.5.3.2 Phase 2 - The Farm

Residual impacts for phase 2 are the same as outlined for Phase 1 above in 12.5.3.1.

12.5.3.3 Combined Phase 1 and Phase 2

Construction Phase: Once the dust minimisation measures outlined in Section 12.5.1 and Appendix 12.1 are implemented for the combined phase 1 and 2, the impact in terms of dust soiling will be short-term and imperceptible.

Operational Phase: Air pollution modelling of operational traffic emissions associated with the combined phase 1 and 2, was carried out. The modelling assessment determined that the change in emissions including NO_2, PM_{10} and CO will be imperceptible. Current trends suggest that vehicle manufacturers are ceasing the manufacture of large diesel engines for private cars and instead adopting hybrid engine and all electric technologies which will contribute to the reduction of engine exhaust emissions. Also the proposed bridge structure increases the proximity to public transport which will reduce private vehicle use. The predicted operational phase residual impact to air quality is long-term and not significant.

12.5.4 Monitoring

Construction phase: If the construction contractor adheres to good working practices and the mitigation measures are in place, there is no monitoring recommended.

Operational phase: There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be negligible.

12.6 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 5, Climate & Air as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *Contribute to the mitigation of and adaptation to climate change such as flooding risk management, air quality and noise issues.*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 5 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in the most positive interaction for air quality with EPO 5.

12.6.1 Construction Phase

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These include.

- Cork City Council Ref: 17/37565: Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas. Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction.
- Cork City Council Ref: 18/37820: The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three storey apartment block (comprising 20 no. apartments) and a four storey apartment block (comprising 27 no. apartments) and 1 no. creche Granted by way of Material Contravention of City Development Plan on 28/02/2019.
- Cork City Council Ref: 21/40481: Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works. Conditionally granted on the 13/12/2021.
- Cork City Council Ref: 2140503: Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure. Conditionally granted on the 22/12/2021.
- Cork City Council Ref: 2140453: Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works. Conditionally granted on the 22/12/2021. Decision pending

The assessment also has regard to the development opportunity that remains in the nearby site where the following

planning application was refused in 2021:

- Cork City Council Ref: 2039705/ABP-309560-1: Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.
- An Bord Pleanala Ref: ABP-308790-20 : Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork

The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential.

12.6.1.1 Phase 1 – The Meadows

Should the construction phase of the proposed phase 1 development coincide with the construction of any other permitted developments of the site in the future then there is the potential for cumulative dust emissions to impact the nearby sensitive receptors. The dust mitigation measures outlined already should be applied throughout the construction phase of the proposed development, with similar best practice mitigation measures applied for other potential / permitted developments 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 and not significant.

12.6.1.2 Phase 2 – The Farm

Cumulative impacts for phase 2 are the same as outlined for Phase 1 above in 12.6.1.1.

12.6.1.3 Combined Phase 1 and Phase 2

Cumulative impacts for combined phase 1 and 2 are the same as outlined above in 12.6.1.1.

12.6.1.4 Combined Masterplan Area (including Phases 1 - 3)

Cumulative impacts for combined phase masterplan area are the same as outlined above in 12.6.1.1.

12.6.2 Operational Phase

Assessing the cumulative impacts of the operational phase of the development is similarly contingent on other permitted developments in the area as listed in 12.6.1.

12.6.2.1 Phase 1 – The Meadows

If additional residential / commercial developments are built in the vicinity of the proposed development site in the future, this has the potential to add further additional vehicles to the local road network. However, as the traffic impact for the proposed development is predicted to be negligible and would not result in a perceptible change in the existing local air quality environment, it is unlikely that other future developments of similar scale would give rise to a dissimilar impact on air quality.

12.6.2.2 Phase 2 – The Farm

Cumulative impacts for phase 2 are the same as outlined for Phase 1 above in 12.6.2.1

12.6.2.3 Combined Phase 1 and Phase 2

Cumulative impacts for combined phase 1 and 2 are the same as outlined above in 12.6.2.1.

12.6.2.4 Combined Masterplan Area (including Phases 1 – 3)

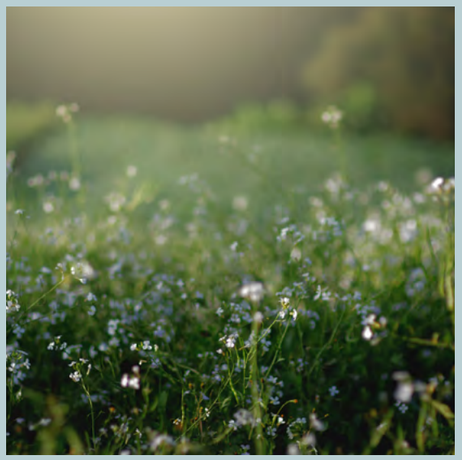
If the combined masterplan area (phase 1-3) would be developed in the future, this has the potential to add further additional vehicles to the local road network. The traffic impact for the proposed combined masterplan development was predicted (see table 12.12 for results). The impact of the masterplan development during the operational phase on air quality is in line with what would be expected from a modern residential development. Results showed an expected small increase in annual parameters but each remain well below the limit values for EU regulations. This predicted increase above the existing situation results in a negligible impact and would not result in a perceptible change in the existing local air quality environment. Furthermore, the government aims to promote sustainability by enhancing public transport with regular and ongoing increases in the public transport capacity, both road and rail and to reduce dependency on the use of the private car. These alternatives as well as the increasing use of electric vehicles could potentially improve the air quality emission impact in the future.

12.7 Difficulties in Compiling Information

There were no difficulties met when conducting this assessment.

12.7.1 References

- EPA. Air Quality Monitoring Report 2019 (and previous annual reports)
- EPA. Ireland's Provisional Greenhouse Gas Emissions 1990 – 2019
- EPA Air Quality Index for health. AirQuality.ie
- Met Eireann (2021). Met Eireann website: www.met.ie
- TII (2011). Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
- 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
- Transport Infrastructure Ireland (TII) 2011 Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes Revision 1.
- The Irish Building Regulations Technical Guidance Document L 'Conservation of Fuel & Energy Dwellings'



BESSBOROUGH, CORK

CHAPTER 13

Climate

BESSBOROUGH, CORK

CHAPTER 13

Climate

CHAPTER 13

13 Climate

13.1 Introduction

13.1.1 Chapter Context

Chapter 13 of this Environmental Impact Assessment has been prepared by DKP Environmental (DKP_{EV}) and assesses the effects of the proposed development on Carbon Dioxide (CO_2) emissions effecting the current climatic conditions. The proposed development comprises two planning applications to An Bord Pleanála and includes two distinct phases, namely Phase 1 'The Meadows' and Phase 2 'The Farm' comprising 420 residential units in a combined area of 6.82 hectares (excluding duplicate areas). An overall masterplan has been prepared for the EIAR area equating to 16.61 hectares which provides for a further 200 no. apartments in the proposed 'North Fields' follow-on phase of development. A detailed description of the proposed development is presented in Chapter 2 - Project Description'.

This section will identify and assess the impact of the proposed development in terms of CO_2 emissions during the construction phase and when in full operational use. We note that although the construction phase contributes to CO_2 emissions through the type of construction methods, choice of materials, transport / traffic requirements etc its impact compared with the operational use is minimal. This assessment was prepared in accordance with the EIA Directive 2014/52/EC and current EPA guidelines.

13.2 Methodology

CO_2 is the largest and most important contributor to climate change. Methane, nitrous oxide, other gases and ozone are also important greenhouse gases. CO_2 is particularly important owing to its role in the global carbon cycle, which is central to life on Earth. This cycle is being significantly disrupted by the combustion of fossil fuels. As a consequence, CO_2 is accumulating in the atmosphere, where it is the key driver of global climate change. It is difficult to accurately apportion any increase in CO_2 emissions as a result of the proposed development at Bessborough to any specific climate impacts other than noting that any increase large or small will more than likely also effect the climate or climate change. We have therefore concentrated the report on the proposed development's CO_2 emission impact and methods to reduce this to a minimum on both the construction and operational stages in line with Ireland's National Policy Position on 'Climate Action and Low Carbon Development'.

13.2.1 Climate Policy

The National Policy Position on Climate Action and Low Carbon Development was published on in April 2014 but was updated with the government's latest plan in January 2021. The policy sets a fundamental national objective to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050. The National Policy Position envisages that development of National Mitigation Plans will be guided by a long-term vision of low carbon transition based on aggregate reduction in CO_2 emissions of at least 80% compared to 1990 levels by 2050 across the construction and transport section relative to this planning application.

13.3 Description of Existing Baseline Environment

13.3.1 Main contributors to CO_2

Transport / road transport is currently the second largest contributor of greenhouse gas emissions (after agriculture) at +/- 20%. Between 1990 and 2015, the transport sector showed the greatest overall increase of +/- 130% and increases are linked to economic prosperity with year-on-year increases observed up to 2007 followed by six years of year-on-year decrease during the economic downturn. The latest EPA projections from 'An Integrated Assessment 2020' state greenhouse gas emissions from transport accounted for 20.3% of Ireland's total national emissions in 2019. EPA projections indicate that transport emissions are projected to decrease by 38.6% over the period 2021-2030 from 12.4 to 7.6 Mt CO_2 eq under the 'with additional measures' scenario, which assumes that 936,000 electric vehicles, including approximately 840,000 passenger cars, will be on the road by 2030.

When expressing the base line single residential unit (apartment) transport CO_2 emissions we applied the current standard CO_2 emission data from lorries, cranes and other vehicular units and/or equipment as per Irish Construction Industry available information.

Transport emissions from the residential sector have fluctuated in the period 1990 to 2015 but overall the 2015 emissions are +/- 20% lower than their 1990 level. Initially there was a sharp reduction in emissions in the early 1990's from residential fuel switching to cleaner fuels. The increase in housing stock drove a gradual upward trend in the emissions from the residential sector after 1998 to reach a peak in 2010. For the residential sector under the various (energy reduction) schemes the CO_2 emissions are targeted to be reduced by 60% for new dwellings mainly through the implementation of the new Nearly Zero Energy Building (NZEB) regulations (Part L 2017 for non-residential units and Part L 2019 for residential units) and increased use of renewable energy.

The latest EPA projections from 'An Integrated Assessment 2020' state emissions are projected to decrease by 52.4% between 2021 and 2030 to 2.9 Mt CO_2 eq under the 'with additional measures' scenario. This scenario assumes full implementation of the measures in Ireland's Climate Action Plan, including upgrades to homes and significant supports for heat pumps.

The construction of a building apart from the obvious emissions from the vehicles, equipment etc also emits carbon dioxide as part of the building material applied in the construction. Each material carries an element of CO_2 known as embodied carbon dioxide which represents the total amount of CO_2 attributed to a material over the lifetime (60 years) of a building. Embodied CO2 represents the CO2 attributed to the material including the exploration, manufacturing, transportation to site, the use during the life cycle of the dwelling and finally the removal or recycling. Local materials like wood or stone have relative low CO2 factors, manufactured materials like portland cement, steel, aluminium have

very high CO2 factors and their use should be minimised where possible. The university of Bath have an elaborate list of building material with their embodied carbon dioxide factor listed for each material. The embodied CO2 is normally generated using the bill of quantities for a building however in this chapter we have applied the data from a typical 80m² apartment.

13.3.2 The construction phase base line

The construction transport is based on an average 4,500km of vehicular movement of HGV's (50%) , LGV's (35%) and private cars (15%) with a combined average carbon output of 255 gr/km/CO_2 taken from the Irish Construction Federation statistics resulting in emission totalling +/- 1100 kg CO2 for the construction period. Embodied carbon dioxide is taken from the data available from the university of Bath CO_2 embodied carbon dioxide tables with a typical average apartment (80m2) to embody +/- 23,000 kg CO_2 using typical traditional building materials. The life cycle impact is the rate calculated over the buildings life cycle of 60 years.

Construction phase base line CO_2 emissions	Life cycle impact emission rate kgCO_2/m2	Single unit emission ton-CO_2
	baseline	baseline
Construction transport	0.23	1.1
Construction embodied CO_2	4.8	23.0
Total impact	5.0	24.1

Table 13.1: Construction phase base line CO2 emissions

13.3.3 Reduction measures applied to the construction phase base line

Construction phase: Transport element

The following is a list of measures incorporated into the base line analysis. These measures shall be included in the proposed development at design stage.

- Implementation of a Traffic Management Plan to minimise congestion and queuing, reduce distances of deliveries and eliminate unnecessary loads.
- Reducing the idle times by providing an efficient material handling plan that minimises the waiting time for loads and unloads. Reducing idle times could save up to 10% of total emissions during construction phase.
- To turn off engines when machinery is not required to operate in the relative short term unless this is an issue for security or functionality reasons.
- Periodic maintenance of plant and equipment.
- Technical inspection of vehicles to ensure they will perform the most efficiently.
- Possible use of electric construction equipment / vehicles
- Construction phase: Building construction element

The following is a list of measures incorporated into the base line analysis. These measures shall be included in the proposed development at design stage.

- The use of locally available recycled materials, where practical.
- Increase the use of "green" concrete, for example Granulated Blast Furnace Slag to replace Portland cements as the latter has significant embodied CO_2.
- Reduce the use of metals, where possible i.e. steel, aluminium, lead, zinc. Metals generally contain the highest embodied CO2 element of all materials mainly due to their exploration and manufacturing processes.
- Recycle material from excavations for reuse on site.

The table below details the effects of the measures applied.

Construction phase base line CO_2 emissions and effects of reductions	Life cycle impact emission rate kgCO_2/m2		Single unit emission ton-CO_2	
	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0
Construction embodied CO2	4.8	4.0	23	19.0
Total impact	5.0	4.2	24.1	19.9

Table 13.2: Construction phase base line CO2 emissions and effects of reductions

By applying the suggested reduction measures the construction phase CO_2 emissions has been reduced by approximately 10% to 15% (12.5% applied) for the transport element and 15% to 20% (17.5% applied) for the embodied (construction method & materials) element. The overall emission rate (kgCO_2/m_2) is reduced from 5.0 kgCO_2/m² to 4.2 kgCO_2/m² or a reduction of 17.3%.

13.3.4 The operational phase base line

The operational phase is assessed over the life cycle of the dwelling covering a period of 60 years hence any reduction to any element will have a significant impact. 15% of the operational phase CO_2 emissions are from general transport from private cars and LGV's. The base line residential vehicular movement CO_2 emissions are based on an average of 10,000km/yr with a current vehicular output of 175 gr/km to represent private and LGV's manufactured between 2005 and 2022 resulting in a yearly emission of 1750 kg/CO_2.

85% of the operational phase CO_2 emissions are from space and hot-water heating in the apartment units hence when assessing the CO_2 emissions for a prolonged period (life cycle = 60years) any reduction to this would have a significant impact. The heating / hot water energy base line carbon output has been established using a basic standard thermal & construction specification 80m2 dwelling applying the national DEAP software resulting in yearly CO_2 emissions of 5150 kg/CO_2 which represents 309,000kg CO_2 over the life cycle period of the dwelling.

Operational phase base line CO_2 emissions.	Life cycle impact emission rate kgCO_2/ m2	Single unit 1 year ton-CO_2	Single unit 60 year life cycle ton-CO_2
	baseline	baseline	baseline
Transport	21.9	1.75	105
Energy (heat & hot water)	64.4	5.15	309
Total impact	86.3	6.90	414

Table 13.3: Operational phase base line CO2 emissions.

Transport emissions personal and delivery vehicles are being reduced through EU and national initiatives and regulation on a continuous basis. CO_2 emissions from cars are regulated through EU legislation which sets statutory maximum emission targets for new vehicles currently set to achieve an average of 95 grams of CO_2 per km in 2022 compared to the current average vehicular emission rate of 175 gr/km.

13.3.5 Reduction measures applied to the operational phase base line

The following is a list of measures incorporated into the base line analysis to lower CO_2 emissions with regards to transport: These measures shall be included in the proposed development at design stage.

- Encourage the use of electric cars.
- Encourage the use of new low CO_2 petrol & diesel cars.
- Any petrol and diesel cars to be encouraged to utilise automatic start / stop facilities in ICE engines.
- Utilise available fiscal measures for the use of electric vehicles or renewable fuels.
- Design and plan the overall project in such manner as to encourage walking and cycling.
- Design and plan certain required facilities like schools, medical centres, shopping areas recreational spaces, within the development to lower the need to use motorised vehicles.
- Design and plan public transport access routes to encourage the use of public transport.

The following is a list of measures incorporated into the base line analysis to lower CO_2 emissions with regards to residential units. These measures shall be included in the proposed development at design stage.:

- Ground floors: Lower the thermal resistance to at least U <= 0.110 W/m2K
- External walls: Lower the thermal resistance to at least U <= 0.150 W/m2K
- Party walls: Lower the thermal resistance to at least U= 0.0 W/m2K (solid party wall)
- Roofs: Lower the thermal resistance to at least U <= 0.125 W/m2K
- Window & frame: Lower the thermal resistance to at least U <=1.20 W/m2/K,
- External (unglazed) door & frame: U <= 1.2 W/m2K
- Cold bridging: Lower the thermal resistance to at least U <=0.08 W/m2K .
- Air tightness: Design assumption <= 1.5 m3/m2*h (requires membrane)
- Ventilation: Humidity controlled central extract or full mechanical ventilation with heat recovery.
- Renewable energy: Air source heat pump / exhaust air heat pump and/or photovoltaic.
- Lighting: 100% LED fittings.
- Controls: Time clock/ thermostatic control for each separate heating/hot-water zone
- Circulation pumps: Class A variable speed pump
- Heating / hot-water system: Air source heat pump / exhaust air heat pump
- If natural gas are to be classified by the EU and “green” energy the gas and photovoltaic combination would also be a good option.

The table below details the effects of the measures applied.

Operational phase base line CO_2 emissions and effects of reductions.	Life cycle impact emission rate $kgCO_2/m2$		Single unit 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.53	105	92
Energy (heat & hot water)	64.4	19.3	5.15	1.80	309	108
Total impact	86.3	38.5	6.90	3.33	414	200

Table 13.4: Operational phase base line CO2 emissions and effects of reductions.

We note from the table above that the operational phase has by far the most significant CO_2 output and reduction to this element is particularly effective due to the long life cycle of a dwelling (60 years).

Energy reductions on transport have been calculated at 13.0% mainly achieved by the use of cleaner transport methods (electric vehicles in combination with a reduced carbon factor of grid electricity). The main reductions however have been achieved in the heating / hot water energy CO2 emissions with reductions of +/- 72% on dwellings as a direct result of targeting Nearly Zero Energy Buildings by implementing the reduction measure noted above. The overall emission rate ($kgCO_2/m_2$) is reduced from 86.3 $kgCO_2/m^2$ to 37.1 $kgCO_2/m^2$ or a reduction of 57.0%.

13.4 Impact Assessment

The CO_2 impact in this development is affected by the construction phase and operational residential phase with the latter dominating the emissions by far. To give guidance on the impact of the reduction measures the following have been applied ;

There are currently no minimum or maximum CO_2 emission targets in the EU or Ireland for the construction phase as they are deemed imperceptible and short term. Therefore the “do nothing and/or “Do something” scenario’s do not apply as such. The achieved reductions as a result of the implementation of the suggested design stage measures however reduce the projects CO_2 emissions and lower the emission rate over the life time of the building hence a benefit to the global environment.

For the operational phase we have applied the following thresholds for the “do nothing” and “Do something” scenario’s ; For the transport section we have applied the current average minimum vehicular emissions at 175 gr/km representing a mixture of existing older vehicles (40%) combustion engine emissions, current vehicles combustion engine emissions (40%) and future combustion engine emission target and electric vehicles (20%). For the energy section a rate of 25 $kgCO_2$/m2 as the current DEAP / Part L maximum allowable emission rate for the average 80m2 dwelling unit.

Operational phase base line CO_2 emissions and effects of reductions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2	
	transport	energy	transport	energy	transport	energy
Do nothing <=	19.1	19.3	1.75	5.15	105	309
Do something >	19.1	19.3	1.75	5.15	105	309

Table 13.5: Operational phase base line CO2 emissions and effects of reductions.

We note that the "Do nothing" scenario in real terms means to be in compliance with the building regulations and standards and that the "Do something" scenario is not a likely scenario as this would leave the project non compliant and cannot be certified for completion.

13.4.1 Do-nothing Scenario

13.4.1.1 Phase 1 – The Meadows

In the 'do nothing' scenario, if the project is not to proceed, the subject lands will remain undeveloped and there will be no additional carbon dioxide emissions or negative effects to the global environment as a result of the proposed project. If the project is to proceed the "do nothing" scenario is the targeted minimum statutory project CO_2 emission rate applied at design stage to achieve compliance to the relevant regulations and standards. The "do something" scenario is assumed unlikely as it would leave a building non compliant without final compliance certification.

13.4.1.2 Phase 2 – The Farm

In the 'do nothing' scenario, if the project is not to proceed the subject lands will remain undeveloped and there will be no additional carbon dioxide emissions or negative effects to the global environment as a result of the proposed project. If the project is to proceed the "do nothing" scenario is the targeted minimum statutory project CO_2 emission rates to achieve compliance to the relevant regulations and standards. The "do something" scenario is assumed unlikely as it would leave a building non compliant without final compliance certification.

13.4.1.3 Combined Phase 1 and Phase 2

In the 'do nothing' scenario, if the project is not to proceed, the subject lands will remain undeveloped and there will be no additional carbon dioxide emissions or negative effects to the global environment as a result of the proposed project. If the project is to proceed the "do nothing" scenario is the targeted minimum statutory project CO_2 emission rate applied at design stage to achieve compliance to the relevant regulations and standards. The "do something" scenario is assumed unlikely as it would leave a building non compliant without final compliance certification.

13.4.2 Construction Phase

13.4.2.1 Phase 1 – The Meadows

The construction phase of the scheme only emits CO_2 and other possible greenhouse gasses in the relative short term. Emissions are from construction activities and from embodied carbon in construction materials. The principal sources and reduction measure are listed in sections 13.3.3 and 13.3.5. It is anticipated that by applying the suggested design measures that the construction phase CO_2 emissions can be reduced by approximately 10% to 15% (12.5% applied) for the vehicular element and 15% to 20% (17.5% applied) for the embodied (construction method & materials) element resulting in the following reductions:

Construction phase CO_2 emissions	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		280 units 1 year ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	308	270
Construction embodied CO_2	4.8	4.0	23.0	19.0	6440	5313
Total impact	5.0	4.2	24.1	19.9	6748	5583

Table 13.6: Construction phase CO2 emissions

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 1,166 tonCO2 for the proposed 280no. units. The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%.

National impact;

The impact of this 280 unit construction phase @ 0.0056 MtCO2 on Ireland's current (2022) emissions @ 60 MtCO2/ year represents an increase of 0.00930%. The impact in 2030 (0.0056 tCO2 / 8 years = 0.00070 tCO2 on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.00145%. Construction transport and embodied carbon dioxide of construction materials have been reduced to a reasonable minimum and are short term and given the extremely low impacts on our national emissions both in 2022 and 2030 are considered to be imperceptible and short term.

13.4.2.2 Phase 2 – The Farm

The construction phase of the scheme only emits CO_2 and other possible greenhouse gasses in the relative short term. Emissions are from construction activities and from embodied carbon in construction materials. The principal sources and reduction measure are listed in sections 13.3.3 and 13.3.5. It is anticipated that by applying the suggested reduction measures that the construction phase CO_2 emissions can be reduced by approximately 10% to 15% (12.5% applied) for the vehicular element and 15% to 20% (17.5% applied) for the embodied (construction method & materials) element resulting in the following reductions;

Construction phase CO_2 emissions	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		140 units 1 year ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	154	135
Construction embodied CO_2	4.8	4.0	23.0	19.0	3220	2657
Total impact	5.0	4.2	24.1	19.9	3374	2791

Table 13.7: Construction phase CO2 emissions

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 583 tonCO2 for the 140 units. The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%

The national impact;

The impact of this 140 unit construction phase @ 0.0028 MtCO2 on Ireland's current (2022) emissions @ 60 MtCO2/ year represents an increase of 0.00465%. The impact in 2030 (0.0028 tCO2 / 8 years = 0.00035 tCO2 on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.00073%.

Construction transport and embodied carbon dioxide of construction materials have been reduced to a reasonable minimum and are short term and given the extremely low impacts on our national emissions both in 2022 and 2030 are considered to be imperceptible and short term.

13.4.2.3 Combined Phase 1 and Phase 2

The construction phase of the scheme only emits CO_2 and other possible greenhouse gasses in the relative short term. Emissions are from construction activities and from embodied carbon in construction materials. The principal sources and reduction measure are listed in sections 13.3.3 and 13.3.5. It is anticipated that by applying the suggested reduction measures that the construction phase CO_2 emissions can be reduced by approximately 10% to 15% (12.5% applied) for the vehicular element and 15% to 20% (17.5% applied) for the embodied (construction method & materials) element resulting in the following reductions;

Construction phase CO_2 emissions	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		420 units 1 year ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	462	404
Construction embodied CO_2	4.8	4.0	23.0	19.0	9660	7970
Total impact	5.0	4.2	24.1	19.9	10122	8374

Table 13.8: Construction phase CO2 emissions

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 1,748 tonCO2 for the 420 units. The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%

The national impact;

The impact of this 420 unit construction phase @ 0.0084 MtCO2 on Ireland's current (2022) emissions @ 60 MtCO2/ year represents an increase of 0.01396%. The impact in 2030 (0.0084 tCO2 / 8 years =0.00105 tCO2 on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.00218%. Construction transport and embodied carbon dioxide of construction materials have been reduced to a reasonable minimum and are short term and given the extremely low impacts on our national emissions both in 2022 and 2030 are considered to be imperceptible and short term.

13.4.3 Operational Phase

13.4.3.1 Phase 1 – The Meadows

During the operational phase a mixed-use residential development emits CO_2 through vehicular traffic into and out of the development and energy usage within the buildings. Vehicular impact is addressed using a predicted traffic count based on a traffic study for the development taking in account any proposed central locations for creches, social / recreational spaces and the inclusion of options for pedestrian and bicycle movement with a view to encouraging public transport. We note that the Governments Climate Change policy sets out to phase out petrol and diesel cars by 2030 hence this will result in a significant CO_2 reduction it is envisaged at least ca 900,000 electric vehicles, both passenger and commercial, will be on the road by 2030 with additional charging infrastructure to cater for planned growth. Energy reduction measures from buildings also form a significant part of the overall operational development contribution with the impact being curtailed by the new NZEB building regulations enforcing energy reductions of 70% and CO_2 reduction of 60% within the statutory instrument.

Operational phase CO_2 emissions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		280 units 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2		280 units 60 year life cycleton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	490	426	105	91	29400	25578
Energy	64.4	18.0	5.15	1.44	1442	404	309	87	86520	24226
Total impact	86.3	37.1	6.90	2.96	1932	830	414	178	115920	49804

Table 13.9: Operational phase CO2 emissions.

We note the reduction of 13.0% on transport and 72.0% on energy CO2 reductions to result in a reduction of 3.9 tonCO2 per year for the average single unit totalling 551 tonCO2 / year for 140 units. Over the 60 year life cycle of the building this represents a reduction of 236.1 tonCO2 for a single unit and a total of 33,058 tonCO2 for the 140 units. The emission rate for the construction phase was reduced from 86.3 kgCO2/m2 to 37.1 kgCO2/m2 or an overall reduction of 57.0%

National impact;

The impact of this 280 unit operational phase @ 0.050 MtCO2/y on Ireland's current (2022) emissions at 60 MtCO2/y represents an increase of 0.083%. The impact in 2030 of the 0.050 tCO2/y on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.104%.

Any new development in essence will increase CO2 emissions to the global environment however by introducing the reduction measures at design stage the increase has been kept to an reasonable minimum and given the very low impacts on our national emissions both in 2022 and 2030 are considered to be *very minor and long term.*

13.4.3.2 Phase 2 – The Farm

During the operational phase a mixed-use residential development emits CO_2 through vehicular traffic into and out of the development and energy usage within the buildings. Vehicular impact is addressed using a predicted traffic count based on a traffic study for the development taking in account any proposed central locations for creches, social / recreational spaces and the inclusion of options for pedestrian and bicycle movement with a view to encouraging public transport. We note that the Governments Climate Change policy sets out to phase out petrol and diesel cars by 2030 hence this will result in a significant CO_2 reduction it is envisaged at least ca 900,000 electric vehicles, both passenger

and commercial, will be on the road by 2030 with additional charging infrastructure to cater for planned growth. Energy reduction measures from buildings also form a significant part of the overall operational development contribution with the impact being curtailed by the new NZEB building regulations enforcing energy reductions of 70% and CO_2 reduction of 60% within the statutory instrument.

Operational phase CO_2 emissions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		140 units 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2		140 units 60 year life cycle ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	245	213	105	91	14700	12789
Energy	64.4	18.0	5.15	1.44	721	202	309	87	43260	12113
Total impact	86.3	37.1	6.90	2.96	966	415	414	178	57960	24902

Table 13.10: Operational phase CO2 emissions.

We note the reduction of 13.0% on transport and 72.0% on energy CO2 reductions to result in a reduction of 3.9 tonCO2 per year for the average single unit totalling 551 tonCO2 / year for 140 units. Over the 60 year life cycle of the building this represents a reduction of 236.1 tonCO2 for a single unit and a total of 33,058 tonCO2 for the 140 units.

The emission rate for the operational phase was reduced from 86.3 kgCO2/m2 to 37.1 kgCO2/m2 or an overall reduction of 57.0%.

National impacts;

The impact of this 140 unit operational phase @ 0.025 MtCO2/y on Ireland's current (2022) emissions at 60 MtCO2/y represents an increase of 0.042%. The impact in 2030 of the 0.025 tCO2/y on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.052%.

Any new development in essence will increase CO2 emissions to the global environment however by introducing the reduction measures at design stage the increase has been kept to an reasonable minimum and given the very low impacts on our national emissions both in 2022 and 2030 are considered to be *very minor and long term*.

13.4.3.3 Combined Phase 1 and Phase 2

During the operational phase a mixed-use residential development emits CO_2 through vehicular traffic into and out of the development and energy usage within the buildings. Vehicular impact is addressed using a predicted traffic count based on a traffic study for the development taking in account any proposed central locations for creches, social / recreational spaces and the inclusion of options for pedestrian and bicycle movement with a view to encouraging public transport. We note that the Governments Climate Change policy sets out to phase out petrol and diesel cars by 2030 hence this will result in a significant CO_2 reduction it is envisaged at least ca 900,000 electric vehicles, both passenger and commercial, will be on the road by 2030 with additional charging infrastructure to cater for planned growth. Energy reduction measures from buildings also form a significant part of the overall operational development contribution with the impact being curtailed by the new NZEB building regulations enforcing energy reductions of 70% and CO_2 reduction of 60% within the statutory instrument.

Operational phase CO_2 emissions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		420 units 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2		420 units 60 year life cycle ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	735	639	105	91	44100	38367
Energy	64.4	18.0	5.15	1.44	2163	606	309	87	129780	36338
Total impact	86.3	37.1	6.90	2.96	2898	1245	414	178	173880	74705

Table 13.11: Operational phase CO2 emissions.

We note the reduction of 13.0% on transport and 72.0% on energy CO2 reductions to result in a reduction of 3.9 tonCO2 per year for the average single unit totalling 1,653 tonCO2 / year for 420 units. Over the 60 year life cycle of the building this represents a reduction of 236.1 tonCO2 for a single unit and a total of 99,175 tonCO2 for the 420 units.

The emission rate for the construction phase was reduced from 86.3 kgCO2/m2 to 37.1 kgCO2/m2 or an overall reduction of 57.0%

National impacts;

The impact of this 420 unit operational phase @ 0.075 MtCO2/y on Ireland's current (2022) emissions at 60 MtCO2/y represents an increase of 0.125%. The impact in 2030 of the 0.075 tCO2/y on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.156%.

Any new development in essence will increase CO2 emissions to the global environment however by introducing the reduction measures at design stage the increase has been kept to an reasonable minimum and given the very low impacts on our national emissions both in 2022 and 2030 are considered to be *very minor and long term.*

13.5 Mitigation Measures, Monitoring and Residual Impacts

13.5.1 Construction Phase

13.5.2 Phase 1 – The Meadows

Mitigation measures

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO_2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that non compliance i.e. mitigation occurs.

Monitoring

No CO_2 monitoring is deemed necessary for the construction phase as the CO2 output / emission is relatively small and the duration of the construction phase is short-term.

13.5.2.1 Phase 2 - The Farm

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO_2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that non compliance i.e. mitigation occurs. .

Monitoring

No CO_2 monitoring is deemed necessary for the construction phase as the CO2 output / emission is relatively small and the duration of the construction phase is short-term.

13.5.2.2 Combined Phase 1 and Phase 2

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO_2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that non compliance i.e. mitigation occurs. .

Monitoring

No CO_2 monitoring is deemed necessary for the construction phase as the CO2 output / emission is relatively small and the duration of the construction phase is short-term.

13.5.3 Operational Phase

13.5.3.1 Phase 1 – The Meadows

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO_2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that non compliance i.e. mitigation occurs. .

Monitoring

No CO_2 monitoring is deemed necessary for the operational phase as the current and future mandatory CO2 reduction requirement (BER) are a secure process to ensure compliance.

13.5.3.2 Phase 2 - The Farm

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO_2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that non compliance i.e. mitigation occurs. .

Monitoring

No CO2 monitoring is deemed necessary for the operational phase as the current and future mandatory CO2 reduction requirement (BER) are a secure process to ensure compliance.

13.5.3.3 Combined Phase 1 and Phase 2

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO_2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that non compliance i.e. mitigation occurs. .

Monitoring

No CO2 monitoring is deemed necessary for the operational phase as the current and future mandatory CO2 reduction requirement (BER) are a secure process to ensure compliance.

13.5.4 Residual Impacts

13.5.4.1 Phase 1 – The Meadows

It is not anticipated that there will be any CO2 emission residual impacts as a result of the construction or operational phase as for no construction can be started / completed / operated without the certification of the design team members under the BCaR system ensuring the CO2 requirements of the national authority (SEIA) or the European union.

13.5.4.2 Phase 2 - The Farm

It is not anticipated that there will be any CO2 emission residual impacts as a result of the construction or operational phase as for no construction can be started / completed / operated without the certification of the design team members under the BCaR system ensuring the CO2 requirements of the national authority (SEIA) or the European union.

13.5.4.3 Combined Phase 1 and Phase 2

It is not anticipated that there will be any CO2 emission residual impacts as a result of the construction or operational phase as for no construction can be started / completed / operated without the certification of the design team members under the BCaR system ensuring the CO2 requirements of the national authority (SEIA) or the European union.

13.6 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 5, Climate & Air as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *Contribute to the mitigation of and adaptation to climate change such as flooding risk management, air quality and noise issues.*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 5 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in the most positive interaction for climate with EPO 5.

The projects in the area which have been assessed in terms of cumulative effects are outlined in chapter 1 of this EIAR.

13.6.1 Construction Phase

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These include.

Cork City Council Ref: 17/37565: Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas. Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction.

Cork City Council Ref: 18/37820: The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three storey apartment block (comprising 20 no. apartments) and a four storey apartment block (comprising 27 no. apartments) and 1 no. creche Granted by way of Material Contravention of City Development Plan on 28/02/2019.

Cork City Council Ref: 21/40481: Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works. Conditionally granted on the 13/12/2021.

Cork City Council Ref: 2140503: Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure. Conditionally granted on the 22/12/2021.

Cork City Council Ref: 2140453: Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/ Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works. Conditionally granted on the 22/12/2021. Decision pending

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021:

Cork City Council Ref: 2039705/ABP-309560-1: Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.

An Bord Pleanala Ref: ABP-308790-20 : Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork

The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential.

13.6.1.1 Phase 1 – The Meadows + Neighbouring permitted and possible development

For the cumulative impact the other permitted development have been assessed as a total of 460 units. i.e. the total Phase 1 has 280 plus 460 permitted/possible is a total of 740 units.

Construction phase CO_2 emissions	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		740 units 1 year ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	814	712
Construction embodied CO_2	4.8	4.0	23.0	19.0	17020	14042
Total impact	5.0	4.2	24.1	19.9	17834	14754

Table 13.12: Construction phase CO2 emissions

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 3,080 tonCO2 for the 740 units

The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%.

The national impact;

The impact of this 740 unit construction phase @ 0.0148 MtCO2 on Ireland's current (2022) emissions @ 60 MtCO2/ year represents an increase of 0.02459%. The impact in 2030 (0.0148 tCO2 / 8 years = 0.00184 tCO2 on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.00384%.

Construction transport and embodied carbon dioxide of construction materials have been reduced to a reasonable minimum and are short term and given the extremely low impacts on our national emissions both in 2022 and 2030 are considered to be imperceptible and short term.

13.6.1.2 Phase 2 – The Farm + Neighbouring permitted development

For the cumulative impact the other permitted development have been assessed as a total of 460 units Phase 2 has 140 plus 460 permitted/possible is a total of 600 units.

Construction phase CO_2 emissions	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		600 units 1 year ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	660	578
Construction embodied CO_2	4.8	4.0	23.0	19.0	13800	11385
Total impact	5.0	4.2	24.1	19.9	14460	11963

Table 13.13: Construction phase CO2 emissions

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 2,498 tonCO2 for the 600 units The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%.

The national impact;

The impact of this 600 unit construction phase @ 0.0120 MtCO2 on Ireland's current (2022) emissions @ 60 MtCO2/ year represents an increase of 0.01994%. The impact in 2030 (0.0120 tCO2 / 8 years = 0.00150 tCO2 on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.00312%.

Construction transport and embodied carbon dioxide of construction materials have been reduced to a reasonable minimum and are short term and given the extremely low impacts on our national emissions both in 2022 and 2030 are considered to be imperceptible and short term.

13.6.1.3 Combined Phase 1 and Phase 2

Neighbouring permitted development For the cumulative impact the other permitted development have been assessed as a total of 460 units Phase 1 has 280, phase 2 has 140 plus 460 permitted/possible is a total of 880 units.

Construction phase CO_2 emissions	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		880 units 1 year ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	968	847
Construction embodied CO_2	4.8	4.0	23.0	19.0	20240	16698
Total impact	5.0	4.2	24.1	19.9	21208	17545

Table 13.14: Construction phase CO2 emissions

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 3,663 tonCO2 for the 880 units The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%.

The national impact;

The impact of this 880 unit construction phase @ 0.0175 MtCO2 on Ireland's current (2022) emissions @ 60 MtCO2/ year represents an increase of 0.02924%. The impact in 2030 (0.0175 tCO2 / 8 years = 0.00219 tCO2 on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.00457%.

Construction transport and embodied carbon dioxide of construction materials have been reduced to a reasonable minimum and are short term and given the extremely low impacts on our national emissions both in 2022 and 2030 are considered to be imperceptible and short term.

13.6.1.4 Masterplan Area (Phases 1, 2, 3 + Neighbouring permitted development)

Phase 3 has an assumed total residential units totalling 200 which brings the overall combined master plan total to 880 + 200 = 1080 units.

Construction phase CO_2 emissions	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		1080 units 1 year ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	1188	1040
Construction embodied CO_2	4.8	4.0	23.0	19.0	24840	20493
Total impact	5.0	4.2	24.1	19.9	26028	21533

Table 13.15: Construction phase CO2 emissions

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 4,496 tonCO2 for the 1080 units The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%

The national impact;

The impact of this 1080 unit construction phase @ 0.0215 MtCO2 on Ireland's current (2022) emissions @ 60 MtCO2/ year represents an increase of 0.03589%. The impact in 2030 (0.0215 tCO2 / 8 years = 0.00269 tCO2 on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.00561%.

Construction transport and embodied carbon dioxide of construction materials have been reduced to a reasonable minimum and are short term and given the extremely low impacts on our national emissions both in 2022 and 2030 are considered to be imperceptible and short term.

13.6.2 Operational Phase

Assessing the cumulative impacts of the operational phase of the development is similarly contingent on other permitted developments in the area as listed in 13.6.1.

13.6.2.1 Phase 1 – The Meadows

For the cumulative impact the other permitted development have been assessed as a total of 460 units. i.e. the total Phase 1 has 280 plus 460 permitted/possible is a total of 740 units.

Operational phase CO_2 emissions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		740 units 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2		740 units 60 year life cycle ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	1295	1127	105	91	77700	67599
Energy	64.4	18.0	5.15	1.44	3811	1067	309	87	228660	64025
Total impact	86.3	37.1	6.90	2.96	5106	2194	414	178	306360	131624

Table 13.16: Operational phase CO2 emissions.

We note the reduction of 12.5% on transport and 65.0% on energy CO2 reductions to result in a reduction of 3.6 tonCO2 per year for the average single unit totalling 1,783 tonCO2 / year for 500 units. Over the 60 year life cycle of the building this represents a reduction of 214.0 tonCO2 for a single unit and a total of 106,988 tonCO2 for the 500 units.

The National impact;

The impact of this 740 unit operational phase @ 0.132 MtCO2/y on Ireland's current (2022) emissions at 60 MtCO2/y represents an increase of 0.219%. The impact in 2030 of the 0.132 tCO2/y on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.274%.

Any new development in essence will increase CO2 emissions to the global environment however by introducing the reduction measures at design stage the increase has been kept to an reasonable minimum and given the very low impacts on our national emissions both in 2022 and 2030 are considered to be very minor and long term.

13.6.2.2 Phase 2 – The Farm

For the cumulative impact the other permitted development have been assessed as a total of 460 units Phase 2 has 140 plus 460 permitted/possible is a total of 600 units.

Operational phase CO_2 emissions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		600 units 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2		600 units 60 year life cycle ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	1050	914	105	91	63000	54810
Energy	64.4	18.0	5.15	1.44	3090	865	309	87	185400	51912
Total impact	86.3	37.1	6.90	2.96	4140	1779	414	178	248400	106722

Table 13.17: Operational phase CO2 emissions

We note the reduction of 13.0% on transport and 72.0% on energy CO2 reductions to result in a reduction of 3.9 tonCO2 per year for the average single unit totalling 2,361 tonCO2 / year for 600 units. Over the 60 year life cycle of the building this represents a reduction of 236.1 tonCO2 for a single unit and a total of 141,678 tonCO2 for the 600 units. The emission rate for the construction phase was reduced from 86.3 kgCO2/m2 to 37.1 kgCO2/m2 or an overall reduction of 57.0%.

The National impact;

The impact of this 600 unit operational phase @ 0.107 MtCO2/y on Ireland's current (2022) emissions at 60 MtCO2/y represents an increase of 0.178%. The impact in 2030 of the 0.107 tCO2/y on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.222%.

Any new development in essence will increase CO2 emissions to the global environment however by introducing the reduction measures at design stage the increase has been kept to an reasonable minimum and given the very low impacts on our national emissions both in 2022 and 2030 are considered to be very minor and long term.

13.6.2.3 Combined Phase 1 and Phase 2

For the cumulative impact the other permitted development have been assessed as a total of 460 units Phase 1 has 280, phase 2 has 140 plus 460 permitted/possible is a total of 880 units.

Operational phase CO_2 emissions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		880 units 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2		880 units 60 year life cycle ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	1540	1340	105	91	92400	80388
Energy	64.4	18.0	5.15	1.44	4532	1269	309	87	271920	76138
Total impact	86.3	37.1	6.90	2.96	6072	2609	414	178	364320	156526

Table 13.18: Operational phase CO2 emissions

We note the reduction of 13.0% on transport and 72.0% on energy CO2 reductions to result in a reduction of 3.9 tonCO2 per year for the average single unit totalling 3,463 tonCO2 / year for 880 units. Over the 60 year life cycle of the building this represents a reduction of 236.1 tonCO2 for a single unit and a total of 207,794 tonCO2 for the 880 units

The emission rate for the construction phase was reduced from 86.3 kgCO2/m2 to 37.1 kgCO2/m2 or an overall reduction of 57.0%.

The National impact;

The impact of this 880 unit operational phase @ 0.157 MtCO2/y on Ireland's current (2022) emissions at 60 MtCO2/y represents an increase of 0.261%. The impact in 2030 of the 0.157 tCO2/y on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.326%.

Any new development in essence will increase CO2 emissions to the global environment however by introducing the reduction measures at design stage the increase has been kept to an reasonable minimum and given the very low impacts on our national emissions both in 2022 and 2030 are considered to be very minor and long term.

13.6.2.4 Combined Masterplan Area (including Phases 1, 2, 3)

Phase 3 has an assumed total residential units totalling 200 which brings the overall combined master plan total to 880 + 200 = 1080 units.

Operational phase CO_2 emissions.	Unit life cycle emissions kg CO_2 / m2		Single unit 1 year ton-CO_2		1080 units 1 year ton-CO_2		Single unit 60 year life cycle ton-CO_2		1080 units 60 year life cycle ton-CO_2	
	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	1890	1644	105	91	113400	98658
Energy	64.4	18.0	5.15	1.44	5562	1557	309	87	333720	93442
Total impact	86.3	37.1	6.90	2.96	7452	3202	414	178	447120	192100

Table 13.19: Operational phase CO2 emissions

We note the reduction of 13.0% on transport and 72.0% on energy CO2 reductions to result in a reduction of 3.9 tonCO2 per year for the average single unit totalling 4,250 tonCO2 / year for 1080 units. Over the 60 year life cycle of the building this represents a reduction of 236.1 tonCO2 for a single unit and a total of 255,020 tonCO2 for the 1080 units. The emission rate for the construction phase was reduced from 86.3 kgCO2/m2 to 37.1 kgCO2/m2 or an overall reduction of 57.0%

The National impact;

The impact of this 1080 unit operational phase @ 0.192 MtCO2/y on Ireland's current (2022) emissions at 60 MtCO2/y represents an increase of 0.320%. The impact in 2030 of the 0.192 tCO2/y on the reduced EPA targeted national emissions of 48 MtCO2 represents an increase of 0.400%.

Any new development in essence will increase CO2 emissions to the global environment however by introducing the reduction measures at design stage the increase has been kept to an reasonable minimum and given the very low impacts on our national emissions both in 2022 and 2030 are considered to be very minor and long term.

13.7 Difficulties in Compiling Information

There were no difficulties met when conducting this assessment.

13.7.1 References

Environmental Protection Agency (EPA) (2019). GHG Emissions Projections Report – Ireland's Greenhouse Gas Emissions Projections 2018 – 2040

EPA (2020b). Ireland's Provisional Greenhouse Gas Emissions 1990 – 2019

Government of Ireland (2015). Climate Action and Low Carbon Development Act

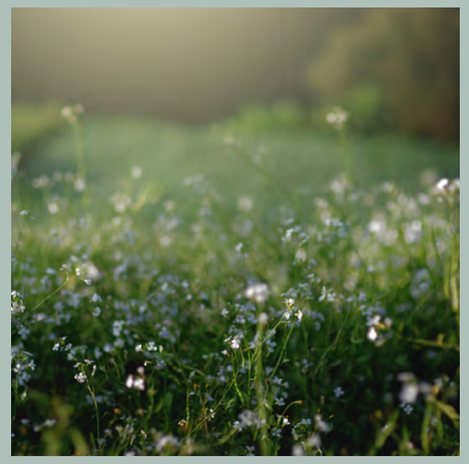
Government of Ireland (2019). Climate Action Plan 2019

Government of Ireland (2020a). Draft General Scheme of the Climate Action (Amendment) Bill 2019

Government of Ireland (2020b). Climate Action and Low Carbon Development (Amendment) Bill 2020

DEAP national software for calculating dwelling (building) CO_2 emission and DKP energy report.

University of Bath for their embodied carbon dioxide factor listing of building materials.



BESSBOROUGH, CORK

CHAPTER 14

Population & Human Health

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CHAPTER 14

Population & Human Health

CHAPTER 14

14 Population and Human Health

14.1 Introduction

14.1.1 Chapter Context

The 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' 2017 specifies the following in relation to the assessment of population and human health:

> *human health 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.*

As noted in Figure 14.1 below, there are several inter-related environmental topics such as the potential impacts of the proposed development on air quality and climate, noise and vibration, water, traffic and access, construction and waste management, which are of intrinsic direct and indirect consequence to human health. While the baseline scenario for these environmental topics is not duplicated in this section, in line with the EPA guidance, the assessment of impacts on population and human health refers to those environmental topics under which human health effects might occur.

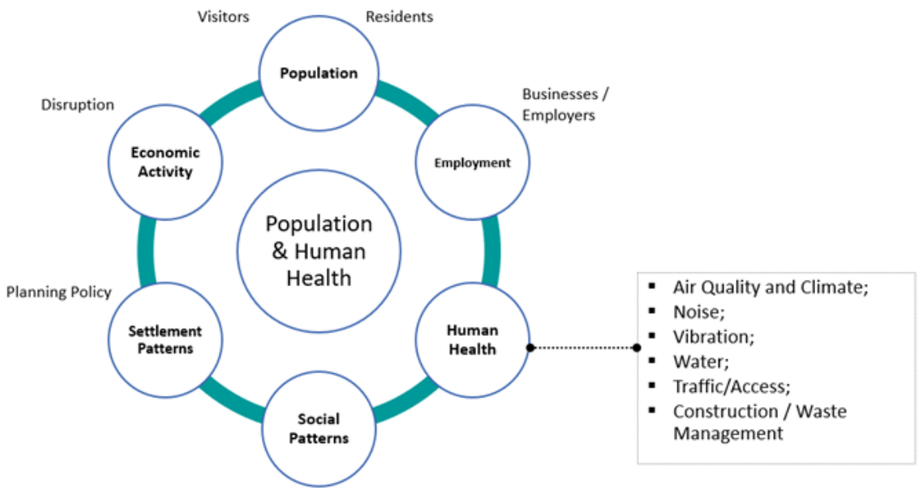


Figure 14.1 Potential Impacts on Population and Human Health

14.1.2 Methodology

This chapter of the EIAR document has been prepared with reference to the Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 2017, as well as European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' 2017. A desktop study of the following published policy documents and data was undertaken to appraise the location and likely significant potential impact upon population and human health receptors and to assess population trends in the subject site an in the wider hinterland:

- Central Statistics Office (CSO) Census 2011 & 2016 data;
- Cork City Development Plan 2015;
- Mahon Local Area Plan 2014 (now lapsed);
- Draft Cork City Development Plan 2021.

This assessment is a study of the potential indirect and direct socio-economic impacts of the construction phase and the operational phases of the development. Effects on receptors were assessed in terms of magnitude, quality, significance and duration.

14.2 Description of Existing Baseline Environment

14.2.1 Demographics

14.2.1.1 Settlement Context

In assessing the demographic trends in the vicinity of the masterplan area a focused assessment of the relevant Central Statistics Office (CSO) boundaries has been conducted. This initially considered the masterplan area in relation to Electoral Divisions (EDs), the smallest legally defined administrative areas in the State. The area falls within the boundary of the Mahon B ED, which is characterised by a mix of uses, incorporating a number of key strategic employment areas to the north, east and west, including the Mahon District Centre (Mahon Point Shopping Centre), Mahon Retail Park, a number of technology and business parks (City Gate, Loughmahon Technology, Mahon Industrial Estate, Blackrock Business Park, Heritage Business Park and Riverview Business Park). The ED also includes established residential areas to the south and north in Jacobs Island and Ballinure/Mahon which are supported by a range of amenities in the form of the Passage West Greenway, Mahon Golf Club, Ballinure and Saint Michael's Gaelic Football Clubs, Skehard

Road Park and Lough Mahon Park. The ED is relatively discrete, bounded and delineated by an inlet of Cork Harbour and the N40 to the south and east and by Skehard Road and Ringmahon Road to the north. However, the residential element of the area extends slightly northwards into the smaller, predominantly residential ED of Mahon A where the Mahon and Blackrock neighbourhoods meet.

It was considered that while it would not be appropriate to include the entire Mahon A ED within the study area, the small south-western portion which includes residential areas off Ferney Road, Beechwood Road and Dunlocha Cottages, readily accessed from Ringmahon Road, should naturally be included within the study area to represent more realistically the population of the Mahon neighbourhood area. Therefore, five Census Small Areas (SAs), were included to the north. Small Areas are areas of population generally comprising between 80 and 120 dwellings, designed as the lowest level of geography for the compilation of statistics and which nest within ED boundaries. These SAs are listed below:

- 048042002,
- 048042011,
- 048042012,
- 048042013,
- 048042016.

We note that the resulting study area corresponds to the Mahon Neighbourhood Area as defined in the Cork City Neighbourhood Profile prepared by AIRO to support the Cork City Draft Development Plan 2022 - 2028.

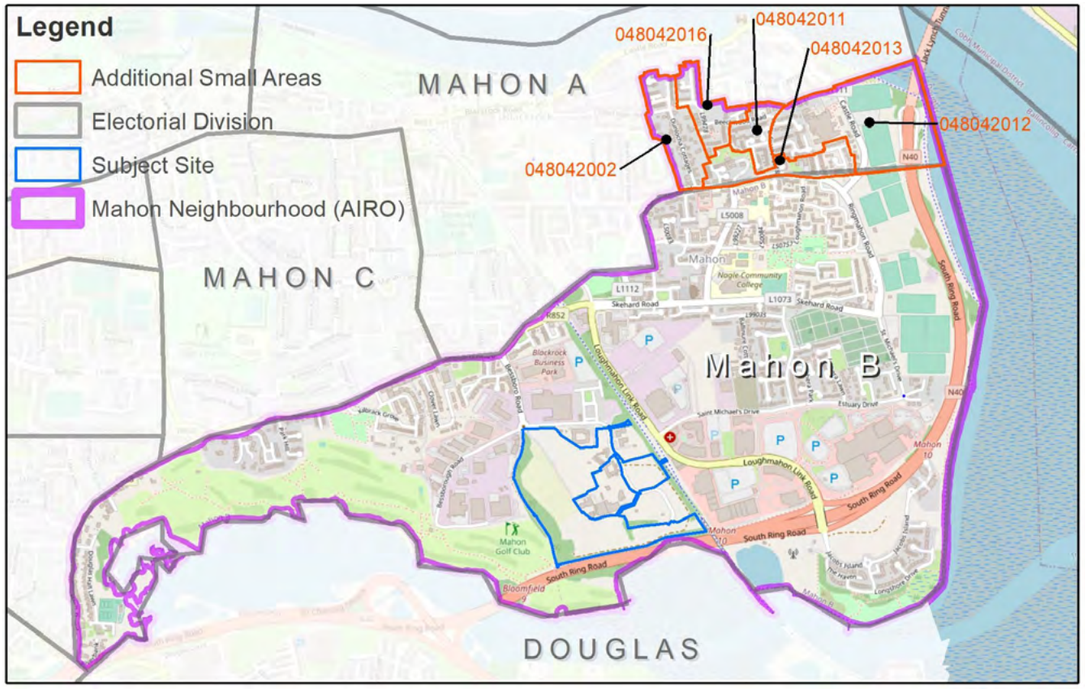


Figure 14.2 Study Area

14.2.1.2 Population

Mahon is amongst Cork's strongest performing areas in terms of population and employment growth during the last two intercensal periods 2006-2016, presenting sustainable and viable employment opportunities for existing and future residents of the area. The most recent nationwide Census took place in 2016. The Mahon Neighbourhood Study Area accounted for 3% or 6,421 persons of the extended Cork City population of 210,853 persons.

Small Area Statistics have only been captured by the CSO since 2011 so it is not possible to determine a long-term trend in the Study Area population. However, the trend for the two ED areas that include the study area indicates that between 1996 and 2016 the population in both Mahon A and Mahon B EDs increased by 22%. This is in stark contrast to the wider city whose population declined by -1.2% in this period. Continued growth was experienced within the study area, with the population increasing by 2.7% in the last intercensal period. This recent growth rate, while lower than that experienced by the city as a whole, masks the fact that exceptionally high growth was still being experienced within areas of the subject site, namely the Small Areas 048042002 (15.9%) and 048042016 (7.7%) where rates in excess of the city, county and state population increases of 5% and 4% were recorded in the same period. By contrast the Small Areas 048042013 experienced a -1.3% population decline.

Area	1996	2002	2006	2011	2016	% Change 1996 - 2016	% Change 2011 - 2016
Mahon B ED	4042	4275	4241	4843	4,937	22.1%	1.9%
048042002,				244	290		15.9%
048042011,				245	248		1.2%
048042012,				358	367		2.5%
048042013,				232	229		-1.3%
048042016				323	350		7.7%
Study Area Total				6245	6421		2.7%
Mahon A ED	4150	4168	4206	4931	5,066	22.1%	2.7%
Cork City Boundary *	127,187	123,062	119,418	119,230	125,657	-1.2%	5.1%
Cork County	420,510	447,829	481,295	519032	542868	29.1%	4.4%
State	3,626,087	3,917,203	4,239,848	4588252	4761865	31.3%	3.6%

** pre-2019 City Boundary*

Table 14.1 Population Trends in the Study Area

Figure 14.3 indicates that the population density of the majority of the study area is relatively low with fewer than 2000 persons/km^2, this reflects the presence of the former Bessborough Estate, the Mahon Golf Course and numerous employment hubs in the area. The population density increases in the more residential areas of Mahon/Ballinure and towards Blackrock to the north, with pockets of high population density, between 3000 to 4,500 persons/km^2 in evidence. Similarly pockets of higher population density are evident in Jacobs Island.

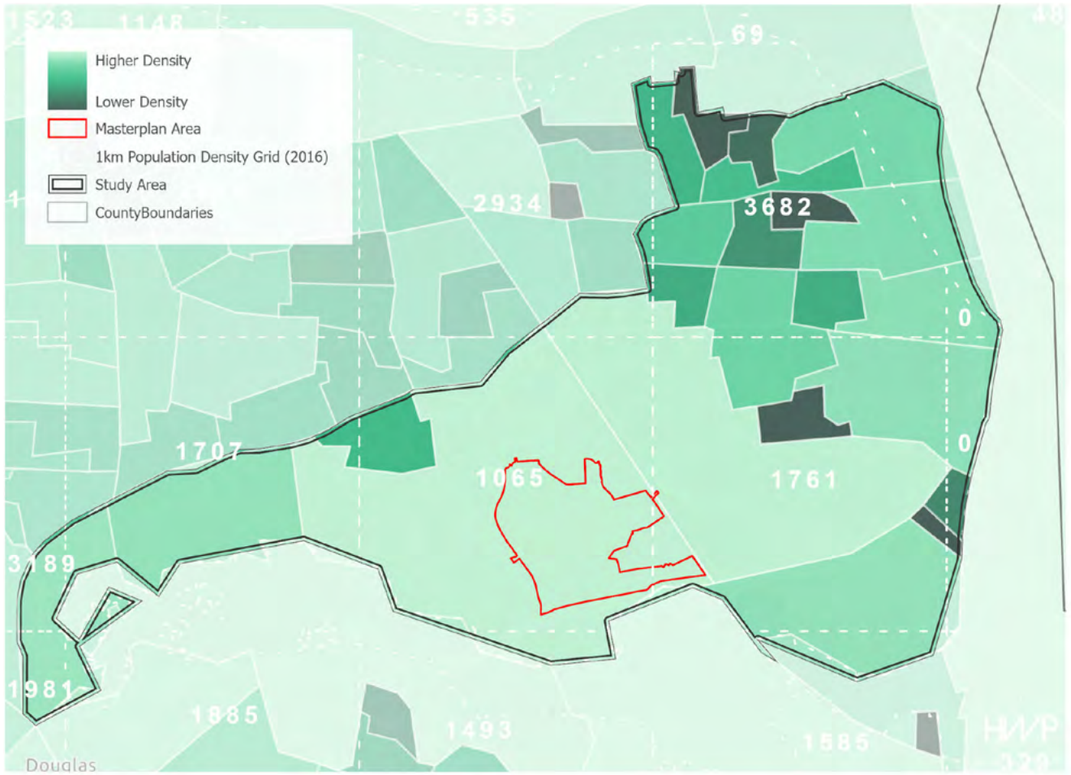


Figure 14.3 2016 Population by Census Small Area

14.2.1.3 Households

The average household size in the study area, at 2.82, is higher than the state and city averages, and more in line with suburban areas in Cork County. The average household size is less in general in the more mature and long-established communities of Mahon A ED to the north. However, Small Area 048042016, containing Nutley Road and Avenue, Beechwood Court, Coach House Avenue and Hunters Green, is an outlier of this pattern, located in Mahon A ED but having an average household sizes of 3.15, significantly in excess of city, county and state averages.

Area	Average Household Size
Mahon B ED	2.84
048042002,	2.87
048042011,	2.65
048042012,	2.88
048042013,	2.21
048042016	3.15
Study Area	2.82
Mahon A ED	2.66
Cork City *	2.45
Cork County	2.83
State	2.75

** pre-2019 City Boundary*

Table 14.2 Average Household Size in the Study Area

This is accounted for by the relatively high percentage of families in the area comprising with children between pre-school and adolescent family cycle stages. The city average for family members which are in this cohort is 44% whereas in the study area overall it is 52%. This is more in line with the with County and State population profile. There is a clear correlation between the date of the housing stock developments and the family lifecycle of the residents. Overall, there are more adolescent and adult families in this area, with retirees notably under-represented compared to the wider city. In particular this trend is visible in Small Area 048042016, where 45% of the family members are pre-adolescent or adolescent and only 1% retirees. There is a large divergence across the study area however, with Small Area 048042013 conversely having 8.3% of the family members retired and only 22% pre-adolescent or adolescent. This Small Area is notable for including a wider housing mix, ranging from the mature residential area of Eden Court and Eden Grove, Ferney Close, the Orchard to the more recent Ringmahon Court.

Family Cycle	Pre-school	Early school	Pre-adolescent	Adolescent	Adult	Retired
Study Area Total	9%	12%	15%	16%	32%	3%
Cork City *	9%	11%	11%	13%	32%	8%
Cork County	10%	15%	15%	16%	27%	6%
State	10%	14%	15%	16%	27%	6%

** pre-2019 City Boundary*

Table 14.3 % of Family Member Population by Family Cycle Stage the Study Area

14.2.1.4 Travel Patterns

Table 14.4 outlines the travel mode statistics for commuting trips to school, college and work. It is evident that there is a significantly higher number of commuters using private motor vehicles in the area than the City average, with a correspondingly low number of pedestrian and cyclists. However, the use of public transport is in line with the City figure. The pattern overall corresponds more closely with the state average figures and use of sustainable modes of transport is in excess of that in the County or rural areas.

Commute Mode	On-foot or Bicycle	Public Transport	Car, Motorbike or Van
Study Area Total	20%	11%	64%
Cork City *	33%	11%	49%
Cork County	9%	8%	75%
Rural Areas	4.40%	2%	85.50%
State	17%	13%	63%

** pre-2019 City Boundary*

Table 14.4 Commuting Modes for persons aged 5 and over in the Study Area

Underlying these figures is that fact that although Mahon is a major employment hub with 8,308 local jobs recorded in the 2016 census, only 6.8% of these positions are filled by workers who live in the Mahon neighbourhood. Fewer than a quarter of the 2,522 resident workers have jobs in the neighbourhood with 47% commuting to other areas within the city and a further 13% working outside of the city. This predominantly outward commuting flow of the resident workers has resulted in this pattern of higher use of private transport than the city average[1].

The commuting pattern of workers travelling into the neighbourhood indicates that 54.2% of Mahon workers come from elsewhere in the City and 38.9% commute from outside the city. The use of private transport amongst this group at 80% is higher than the resident population (64%) and significantly higher than the city average (49%).

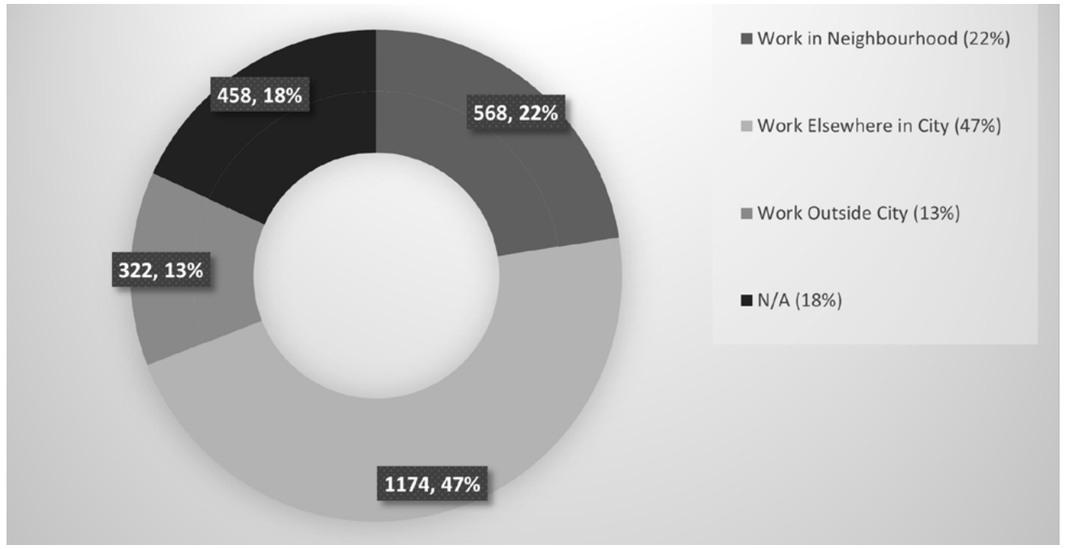


Figure 14.4 Resident Workers Commuting Pattern

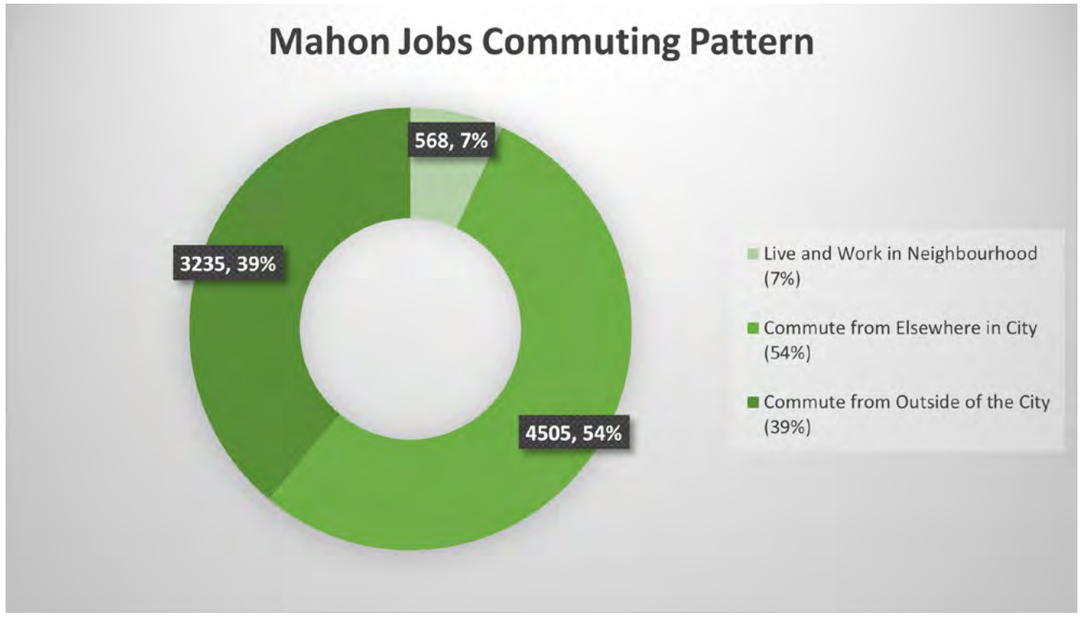


Figure 14.5 M14.5 Mahon Jobs Commuting Patterns (2016 CSO)

14.2.1.5 Affluence and Deprivation

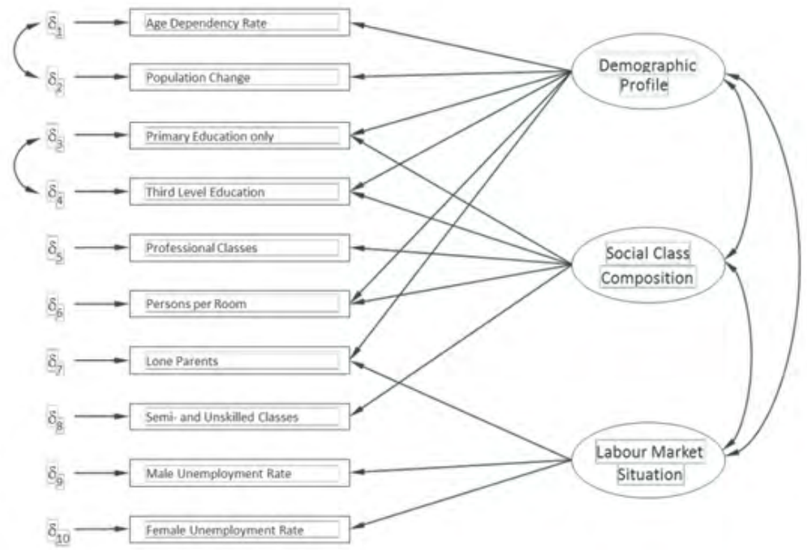


Figure 14.6 Pobal Deprivation Index Indicators

[1] Based on CSO POWSCAR Data as outlined in the AIRO Neighbourhood Profile Document – part of the Draft Cork City Development plan 2021

The Pobal Deprivation Index shows the level of overall affluence and deprivation at the scale of CSO Small Areas in 2016 based on a number of census indicators, as set out in Figure 14.6. As highlighted in Figure 14.7 the study area is classified overall as 'Marginally Below Average' in terms of affluence, with a score of -5 in the Pobal HP Deprivation Relative Score. This is in contrast to the overall city scope of +3.01, which classifies it as 'Marginally Above Average'. However, there is a distinct dichotomy within the study area, with areas to the west of the Link Road all of above average affluence and areas to the east predominantly below average affluence. The Deprivation Relative Score values ranging from + 18 categorised as 'Affluent' in Brickfields and Park Hill to -19.91 categorised as 'Disadvantaged' in Small Area 048042011. Overall, the percentage of the Study Area population living in disadvantaged areas equates to 56.5% or 3,629 persons. This picture of a community grappling with deprivation is also reflected in the percentage of households in Local Authority and Voluntary Body housing, which at 36% across the Study Area, is double the City area average of 17.7%[2]. Social housing represents the housing tenure of over half the households in several Small Areas in the Study Area, with it representing the tenure of 68% of the households in Small Area 048042012. These relatively high levels of deprivation can also be correlated with the fact that the percentage of the workforce within the Study Area on disability is 19.6%, which is 4.1% higher than the city average.

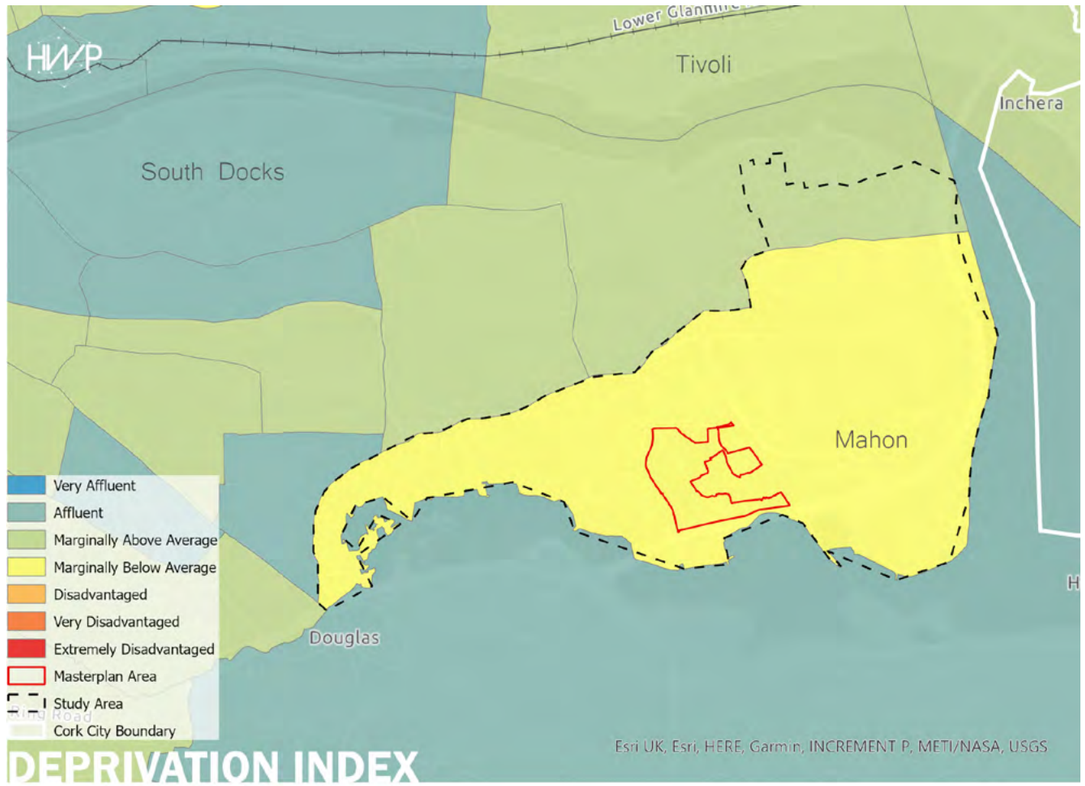


Figure 14.7 Pobal Deprivation Index by 2016 CSO Small Area

[2] Based on 2016 Census figures for the pre-2019 City Area

14.2.1.6 Employment

The strategic importance of Mahon as an employment hub is highlighted in the 2016 census POWSCAR data which indicates that while there were 2,522 resident workers, there are 8,308 local jobs in the study area (8.27% of the total jobs in the City). This equates to a worker:job ratio of 3.294, which compares very favourably with the ratios of Cork City and Suburbs at 1.169 and the Southern Regional Assembly at 1.06.

However, as noted previously only 6.8% of these jobs are held by local workers. Indeed, the unemployment rate amongst the local workforce at 17.2% in 2016, was significantly higher than the City average of 12.0%. The large outward and inward commuting flows seem to indicate that there is a mismatch between the local jobs available in Mahon and the skills of the resident workforce. The 2016 census identified that 27.3% of the population aged over 15 years had completed a third level qualification. This is less than the city average of 37.2%. It is also significantly lower than the 69.5% of the workers who fill the 8,308 local jobs in Mahon, the majority of which (51.5%) are in the areas of ICT, Financial, Real Estate, Professional, Admin and Support Service Activities.

14.2.2 Land Use

The masterplan area is situated within South Mahon, identified in the Cork City Development Plan 2015 (CDP) as a 'Key Development Area'. The lands are located adjacent to Mahon District Centre, within the Southeastern Suburbs of Cork City. The site is strategically located beside the Passage West Greenway and benefits from excellent walking and cycling links to the adjacent Mahon District Centre, and key strategic employment areas to the north, east and west. It is an area earmarked for considerable growth and investment in the coming years. The Cork Metropolitan Area Transport Strategy (CMATS) makes provision for new BusConnects routes next to the subject lands, and longer term, provision of a high frequency light rail network

The lands are within the grounds of Bessborough House, originally constructed as a private house in 1760. In 1922, the role of the estate changed to institutional use run by the Sisters of the Sacred Heart of Jesus and Mary, with Bessborough House functioning as a mother and baby home for much of the 20th Century and lands to the north operating as a farm. There are sensitivities associated with these former uses, which have population and human health implications. A national Mother and Baby Homes Commission of Investigation was established by the Irish Government in 2015, which was followed by the publication of 'An Action Plan for Survivors and Former Residents of Mother and Baby and County Home Institutions' in 2021 and Government approval of 'The Institutional Burials Bill' in February 2022. Legacy issues relating to the mother and baby home use are discussed in detail in Chapter 10. Since 1990 many of the farm buildings were renovated for use as a heritage centre (now defunct). The Bessborough Centre continues to operate a child and family service and early years' service from these premises.

The proposed new Bessboro Neighbourhood and Park were identified as key developments in the 2014 Mahon Local Area Plan. The CDP zoning objective for the lands to the north and east of the Bessborough Estate is 'ZO4 Residential, Local Services & Institutions', with a specific zoning objective to protect and provide for residential uses, local services, institutional uses, and civic uses. The site is also designated as an Area of High Landscape Value, which requires developments to be landscaped and to safeguard the value and sensitivity of the particular landscape. The remainder of the subject lands are zoned 'Bessboro House Landscape Preservation Zone SE4'. The City Council's objectives in relation to '*Landscape Preservation Zones*' state that development will be considered where it safeguards the value and sensitivity of the particular landscape and achieves the respective site-specific objectives which are:

- To reinstate historic landscape.
- To seek use of grounds as a Neighbourhood Park in context of local area plan.
- To allow development within the immediate environs to the north of Bessboro House consistent with the landscape and protected structure significance of the site.

14.2.3 Community and Social Infrastructure

The existing community and social infrastructure assets in the local area have been identified in accordance with the categories outlined in the Table 14.5 below.

Category	Description
Amenity, Open Space and Sports	Parks, Playgrounds, Amenity Walks/Greenways, Pitches, Green Areas, Golf Courses, Sports Pitches, Sports Centres, Swimming Pools, Gyms
Childcare and Education	Childcare, Primary Schools, Post Primary Schools, Special Schools, Third Level Universities, Other Educational Institutions
Community facilities	Community Centres, Religious Facilities, Post Offices, Libraries.
Retail services	Supermarkets, Convenient Shops, Specialty Services, Restaurants/Take-aways, ATM, Petrol Station
Health	Hospitals, Health Centres, Clinics, Pharmacies, Addiction Services, GPs, Mental Health Services
Emergency	Fire Station, Garda Station
Public Transport	Bus and Train Routes

Table 14.5 Community and Social Infrastructure Categories

14.2.3.1 Amenity, Open Space and Sports

The Mahon neighbourhood is well served by a mix of open spaces, recreational and sporting amenities. The Passage West Greenway runs centrally through the area, while also looping around the Loughmahon peninsula to the east, providing the neighbourhood with direct access to Cork City Centre and Passage West to the southeast. Within the study area alone, there is c. 4km of high-quality fully accessible greenway. Several public parks are distributed evenly throughout the neighbourhood, namely Skehard Road Park, Cork Heritage Park, Sean Cronin Park, Lough Mahon Park and Playground, and Joe McHugh Park. Due to the location of these amenities, residents of the Mahon neighbourhood are generally within a 5-to-10-minute walk of a local park or greenway. The planned Marina Park and Marina Walk are readily (c. 15 minutes) accessible from the site via the Passage West Greenway.

Figure 14.8 Extract of Cork Passage Railway Greenway Improvement Scheme in Mahon

Several sporting pitches are located along the eastern boundary of the study area, which are in use by local GAA, rugby, and soccer clubs (St. Michael's GAA Club, Ballinure GAA pitch, Mahon Rugby Grounds, and Ringmahon Rangers AFC). Oakgrove Leisure Centre is also situated to the northeast of the Mahon neighbourhood, in proximity to the sporting pitches.

Further adding to Mahon's sports offering, Mahon Golf Club, and Douglas Lawn Tennis Club are situated west of the greenway. A Gym Plus Cork is located alongside the Mahon District Centre, which lies at the core of the neighbourhood.

Significant investment in walking and cycling infrastructure is planned within the Mahon neighbourhood, namely via the c. €30 million funding announced by the National Transport Authority for improving sustainable transport in Cork City.[3] This funding will further add to existing amenity in the area, and will further improve the quality of life for the local population.

[3] City Council welcomes NTA sustainable transport funding announcement

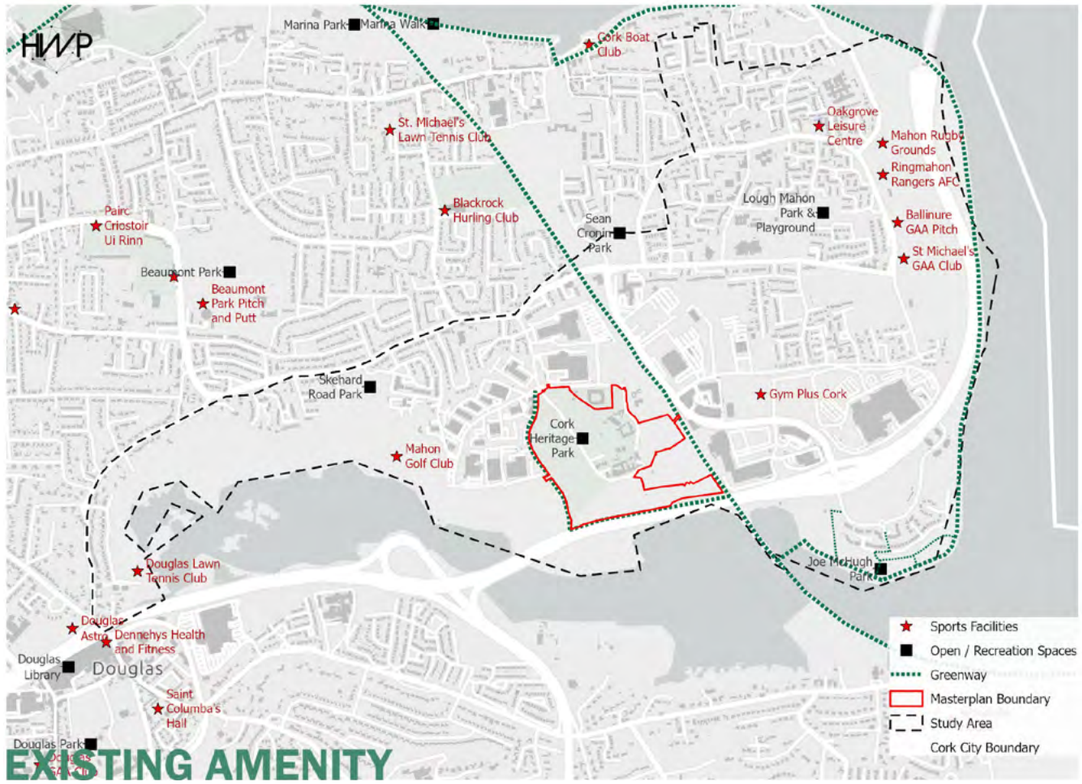


Figure 14.9 Details of Existing Amenity, Open Space and Sports outlets in study area

14.2.3.2 Childcare

The study area contains 7 no. existing creches/childcare facilities, 2 no. primary schools and 1 no. secondary school. Details of existing childcare facilities are shown in Table 14.7.

Childcare Provider	Capacity	Theoretical Capacity[4]
Nurture Childcare Blackrock	135	70
Bessborough Centre Creche	124	46
The Village Montessori AMI	88	7
Beginnings Creche Mahon	31	18
Mahon CDP	22	6
Mason Community Preschool	40	16
Naíonra Cró na nÓg	22	0
Total	**462 places**	**163 vacancies**

Table 14.7 Childcare Facilities

[4] The most recent TUSLA Reports were consulted for each facility to determine the theoretical capacity for same. Attendance figures were compared with maximum capacity figures for each facility to determine same.

The Cork City Childcare Committee were engaged at an early stage of the EIAR process, providing valuable information on childcare provision in the Mahon area. This information has directly informed this study.

Figure 14.10 Details of Existing Childcare facilities in study area

14.2.3.3 Schools and Education

The study area is served by 2 no. primary schools, namely Scoil na Croise Naofa and Gaelscoil Mhacan. An overview of the primary schools within the study area is provided in table 14.8 as shown. The information in table 14.7 was obtained from a review of the preliminary '*Data on Individual Schools*' 2021/2022 database of the Department of Education [5].

Settlement	Primary School	Type	Capacity
	Scoil na Croise Naofa	Mixed	168
	Gaelscoil Mhacan	Mixed	172

Table 14.8 Summary of Existing Primary Schools in Study Area

In total there are 341 no. primary school places in the 2 no. primary schools within the study area.

[5] https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/

Existing Post-Primary/Secondary Schools

Post-primary schools by their nature are generally of a larger scale and catchment area. Due to Mahon's location within Cork City, and the high level of public transport provision that exists within the area, it is reasonable to consider that the local population will have sustainable access to schools outside of the study area.

For the purposes of this assessment, we have included post primary schools within a 20-minute cycle of the subject area.

There are currently six post primary schools with a 20-minute cycle of the subject lands, with a combined enrolment of 2,907 students. 1,069 of these places (37%) are located within a 10-minute cycle of the subject lands. An overview of the post-primary schools within the study area is provided in Table 14.9 as shown. The information in Table 14.9 was obtained from a review of the '*Data on Individual Schools'* 2021/2022 database of the Department of Education [6].

Catchment	Secondary School	Type	Capacity
	Nagle Community College	Mixed	228
Within 10 min cycle	Regina Mundy College	Girls	570
Within 10 min cycle	Ursuline Secondary School	Girls	271
Within 15 min cycle	Ashton School	Mixed	514
Within 15 min cycle	Douglas Community School	Boys	529
Within 15 min cycle	St Francis Capuchin College	Boys	795

Table 14.9 Summary of Existing Secondary Schools in Study Area

Third Level Institutions

There are no third level institutions such as colleges or universities with the study area. Mahon's location within Cork City, and access to frequent bus routes, provides the area with ready access to the third level institutions in Cork City and further afield.

Special Schools

According to the Data on Individual Schools' 2021/2022 database the closest special school to Mahon is the School of Divine Child, Ballintemple, Cork which is approximately 2.5km northwest of Mahon. There are several other special schools in Cork City that are served by public transport links with Mahon.

The National Council for Special Education information map also records that there are dedicated special classes for students with Autism/Autistic Spectrum Disorders in both primary and post primary schools within the study area.

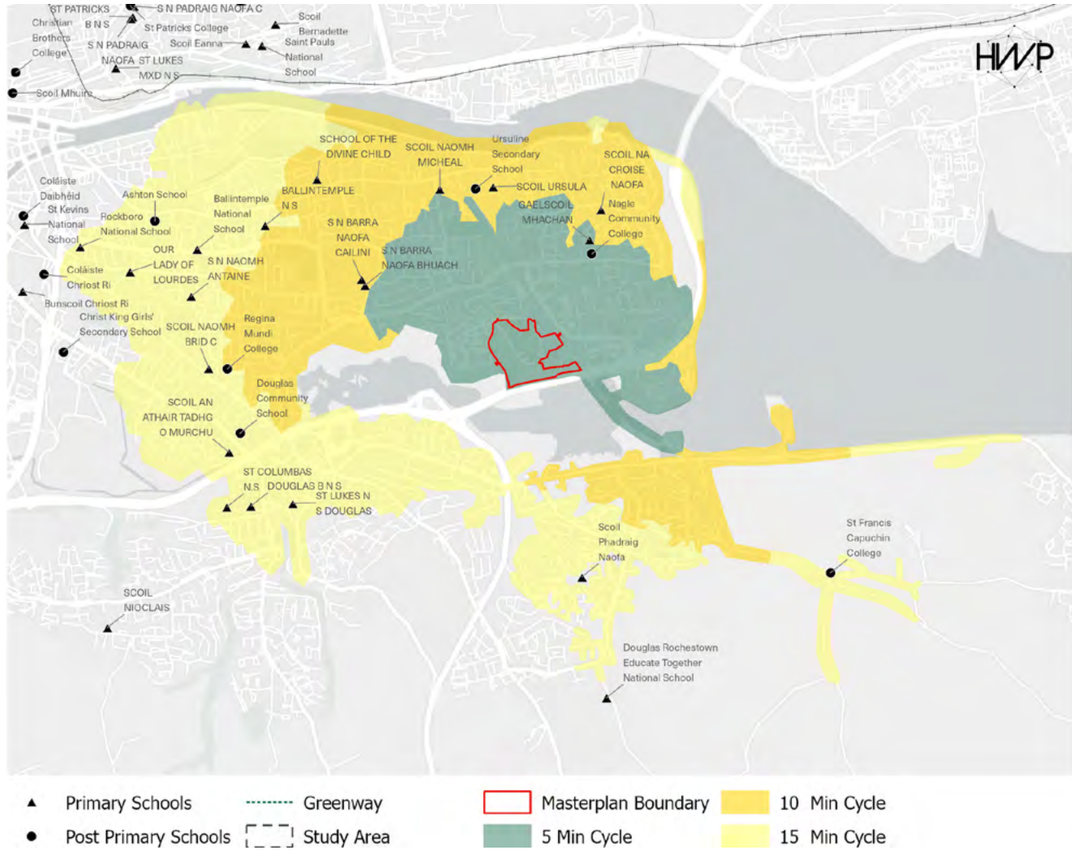


Figure 14.11 Details of Existing Education outlets in study area

14.2.3.4 Community Facilities & Emergency Services

Mahon is well served by a variety of community support services, as illustrated in Table 14.10. These services are primarily clustered within and around the several zoned neighbourhood centres, and district centre within the study area.

[6] https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/

Category of Service/Facility	Count
Community Help	2
Garda	1
Get Active/Wellbeing	2
Health Services	12
Income/Social Support	2
Older People Support	1
Retail	4
Spiritual/Religious	2
Total	**26**

Table 14.10 Summary of Community Support Services in Study Area

Given Mahon's location, and excellent connectivity with Cork City centre, its local population is particularly well-served by essential community facilities and emergency services.

Figure 14.12 Details of Existing Community facilities in study area

14.2.3.5 Retail

Reflecting its status as a District Centre, Mahon is served exceptionally well by retail services. The largest contributor to this being Mahon Point Shopping Centre, which comprises over 60 retail units including retailers such as Tesco, Zara, Rituals, Boots, Specsavers, and Lifestyle Sports. The nearby Mahon Point Retail Park also houses several well-known retailers and automotive dealers (B&Q, EZ Living Interiors, Home Focus, Currys, Halfords, Homestore and More, and Johnson and Perrot Car dealers).

Multiple local convenience stores are also located throughout the neighbourhood, namely Scally's Supervalu, Mace, Aldi, and St. Michael's stores. The majority of the study area is within a 5-to-10 minute walk of same. Figure 14.13 offers an overview of the retail services within the study area. For context, 5, 10, and 15 minute cycle time isochrones have been shown which confirm how well connected the study area is to the many retail outlet centres in the study area.

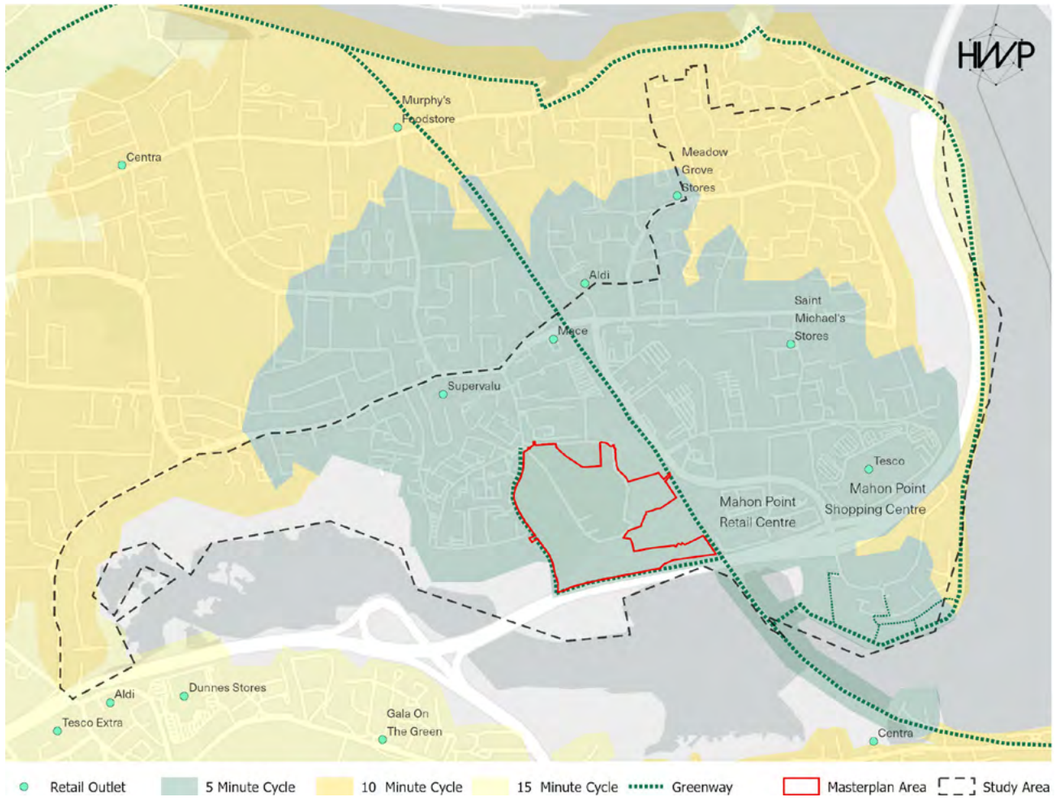


Figure 14.13 Details of Existing Retail facilities in study area

14.2.3.6 Healthcare

A range of health services exist within the study area, which are detailed in Table 14.11. The Mahon Health Centre (a Primary Care Centre) located towards the heart of the neighbourhood, offers a wide range of health and social care services to the local community. Several General Practitioners are operating within Mahon, alongside four pharmacies as shown in Figure 14.11.

Type of Health Service	Count
General Practitioners	7
Health Centre	1
Pharmacy	4
Grand Total	**12**

Table 14.11 Summary of Health Services in Study Area

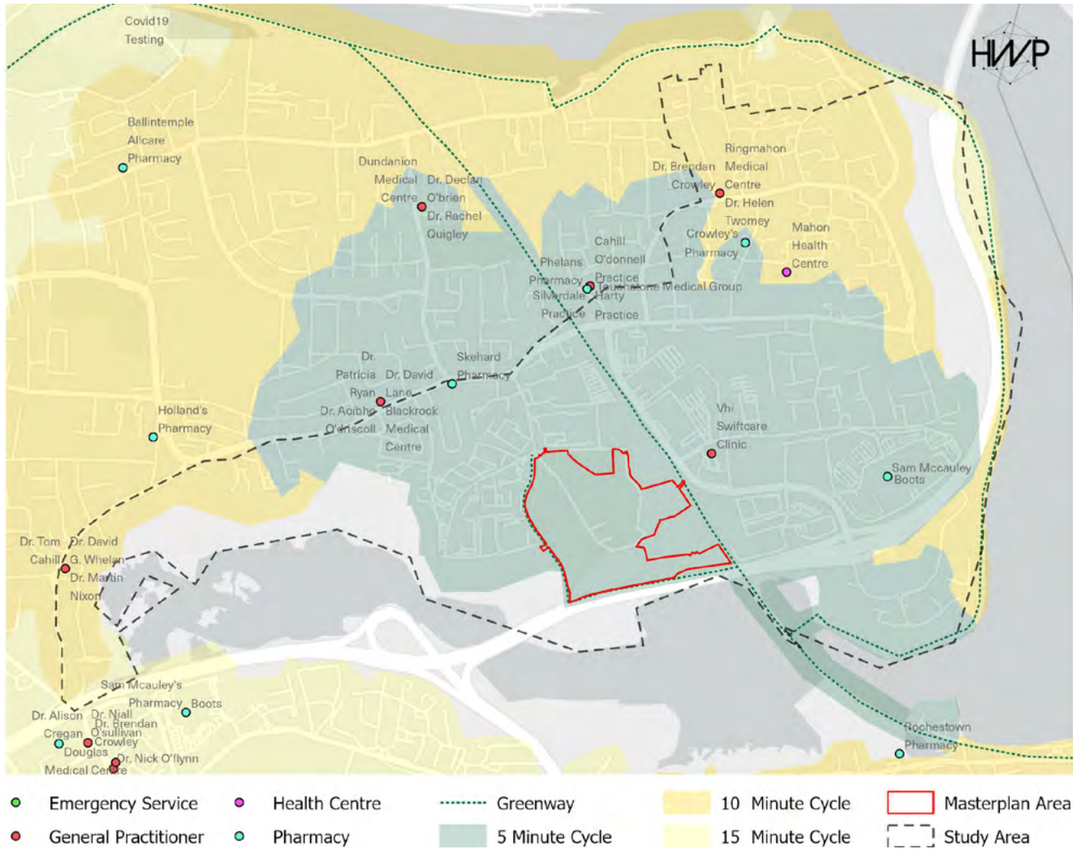


Figure 14.14 Details of Existing Health facilities in study area

14.2.3.7 Public Transport

Mahon is currently well served by a number of existing public transport services (See Table 14.12). The area is also earmarked for significant future transport investment as per the Cork Metropolitan Area Transport Strategy (CMATS), as well as per the recently published Draft New BusConnects Cork Network.[7] These plans are set to further improve Mahon's connectivity with the rest of Cork City. Table 14.12 and Figure 14.15 show the several existing bus routes within the study area.

Route ID	Route Name	Weekday Midday Frequency
202	Hollyhill to Mahon Point	20 minute
202A	OL Hollyhill to Mahon Point	20 minute
212	Kent Station to Mahon Point	60 minute
215	Jacobs Island to Cloghroe	30 minute (combined peaktime frequency of c. 10 - 15 minutes)
215A	Jacobs Island to Churchyard Lane	30 minute
219	CIT to City Gate	60 minute

Table 14.12 Summary of Existing Public Transport Services in Study Area

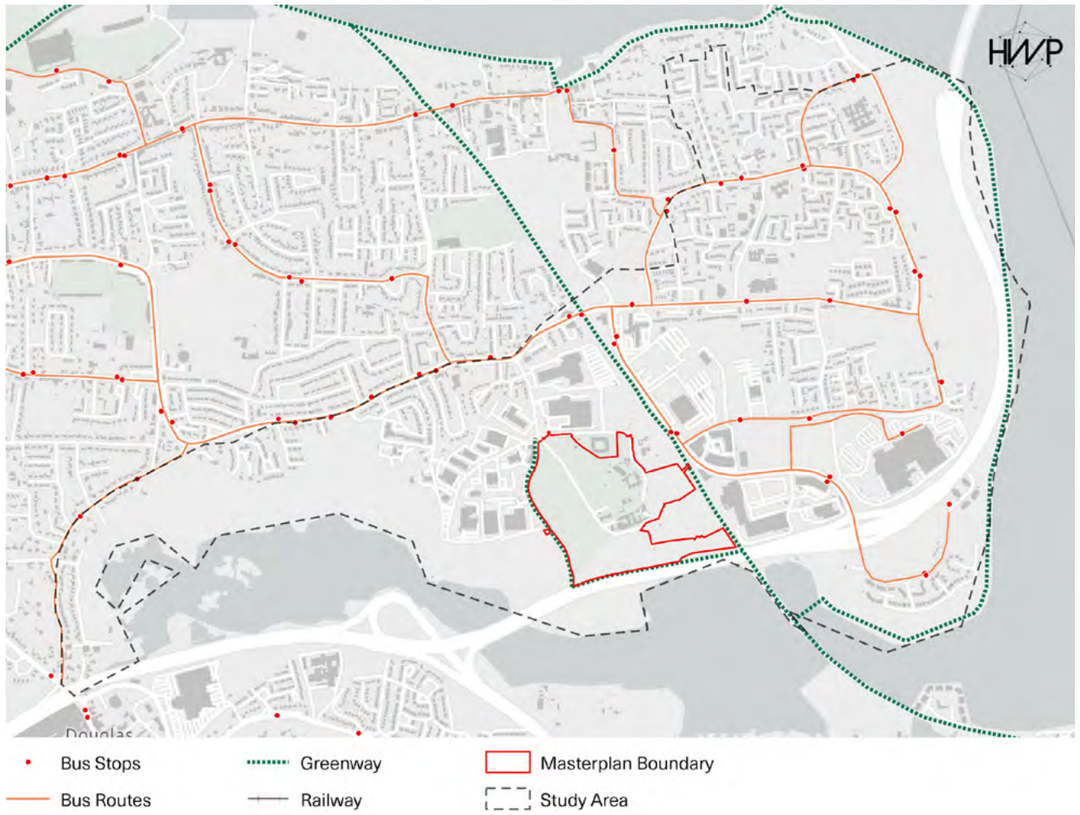


Figure 14.15 Existing Public Transport provision in Mahon

[7] https://busconnects.ie/busconnects-cork/

CMATS indicates that a new Light Rail Transport (LRT) Network will be introduced along the Passage West Greenway, directly connecting the area with the City Centre and beyond. In advance of this, the BusConnects Cork initiative will provide a more frequent network, with shorter waits and more direct routes. Specific to Mahon, a new route is proposed which will connect Bessboro with Cork Bus Station, in tandem with higher frequency routes and additional services on weekends throughout the neighbourhood. Table 14.13 show proposed public transport services as per CMATS and BusConnects Cork.

Route ID	Route Name	Weekday Midday Frequency
1	Ballincollig to Mahon Point	10 minute
9	Jacobs Island to Kent Station	20 minute
11	Mahon Point to Farranree	30 minute
14	CUH to Little Island	30 minute
20	Bessboro to Cork Bus Station	60 minute

Table 14.13 Summary of Proposed Public Transport Services in Study Area

14.3 Impact Assessment

14.3.1 Do nothing Scenario

14.3.1.1 Phase 1 'The Meadows'

In the 'do nothing' scenario, the Phase 1 'The Meadows' lands will remain undeveloped. If the proposed development of 280 no. units does not proceed the population of Mahon and the wider city will continue to be adversely impacted due to housing shortages. It will result in the continuation of the recent trend of underperformance of the Study Area in terms of population growth. With a growth rate of 2.7% in the last intercensal period, this designated 'Strategic Growth' area experienced lower growth than the city as a whole, contrary to national and regional policies of co-locating employment, public transport and population growth.

Similarly, in the 'do nothing' scenario, the lands will remain inaccessible for public recreational use. The potential public health benefits arising from the proposed enhanced connectivity via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway or the proposed enhancement of public facilities and amenities in the form of public open space, a creche or café will not ensue. Notwithstanding the above, in this scenario there will be no additional impacts on population and human health factors.

14.3.1.2 Phase 2 'The Farm'

In the 'do nothing' scenario, the Phase 2 'The Farm' lands will remain undeveloped. If the proposed development of 140 no. units does not proceed the population of Mahon and the wider city will continue to be adversely impacted due to housing shortages. It will result in the continuation of the recent trend of underperformance of the Study Area in terms of population growth. With a growth rate of 2.7% in the last intercensal period, this designated 'Strategic Growth' area experienced lower growth than the city as a whole, contrary to national and regional policies of co-locating employment, public transport and population growth.

Similarly, in the 'do nothing' scenario, the lands will remain inaccessible for public recreational use. The potential public health benefits arising from the proposed enhanced connectivity via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway or the proposed enhancement of public facilities or amenities in the form of public open space or a creche will ensue. Notwithstanding the above, in this scenario there will be no additional impacts on population and human health factors.

14.3.1.3 Combined Phase 1 and Phase 2

In the 'do nothing' scenario, the combined Phase 1 and Phase 2 lands will remain undeveloped. If the proposed development of 420 no. units does not proceed the population of Mahon and the wider city will continue to be adversely impacted due to housing shortages. It will result in the continuation of the recent trend of underperformance of the Study Area in terms of population growth. With a growth rate of 2.7% in the last intercensal period, this designated 'Strategic Growth' area experienced lower growth than the city as a whole, contrary to national and regional policies of co-locating employment, public transport and population growth.

Similarly, in the 'do nothing' scenario, the lands will remain inaccessible for public recreational use. The potential public health benefits arising from the proposed enhanced connectivity via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway or the proposed enhancement of public facilities or amenities in the form of public open space, 2 no. creches and a cafe will ensue. Notwithstanding the above, in this scenario there will be no additional impacts on population and human health factors.

14.3.2 Impacts on Existing Population and Human Health

14.3.2.1 Construction Phase

14.3.2.1.1 Phase 1 'The Meadows'

Construction works are likely to take place over a c. 24 no. month period. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts on nearby residents. Construction of the proposed development will be implemented in accordance with the Construction and Environmental Management Plan (CEMP) prepared by J. B. Barry and Partners Limited, Consulting Engineers which is included in Appendix 2-1 of this EIAR. This document describes a suite of mitigation measures to be strictly implemented and monitored during the construction phase of the development.

It is expected that on average c. 80 no. construction workers will typically be on site and that they travel from their existing residence rather than taking temporary accommodation in the local area. Impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significant for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works. The CEMP sets out that these will be undertaken in agreement with the City Council and all relevant stakeholders will be kept informed of any such closures. The CEMP sets out that delivery movement numbers are expected to be low to moderate and spread throughout the day. The HGV traffic is expected to be greater at the initial stage of development and to reduce as the construction of the buildings advance.

In Chapter 5 of this EIAR, (Material Assets Traffic and Transportation), MHL & Associates Ltd. estimate that 15 HGVs will deliver to the site on a daily basis and that it is anticipated that this traffic will be restricted to off-peak times on

the local road network to reduce the impact on the road network during the morning and evening peak. Similarly, it is also considered that construction workers will generally travel to site prior to the peak time in light of the 07.00 working hours start time. Appropriate measures will be put in place to ensure safe access to/from the site. Measures will also be implemented on-site to ensure safe manoeuvres can be carried out within the construction site. With appropriate mitigation Chapter 5 considers that the potential impacts in respect of traffic during the construction phase will be negative, of slight significance and short-term in duration.

As described in Chapter 4 of this EIAR (Landscape and Visual), the construction phase of the development will result in permanent physical effects on the land cover of this area. However, it notes that the area is not publicly accessible, nor does it provide any public open space, but is, instead, secured/cordoned off from the public, minimising any impact on the local population's enjoyment of the existing landscape. Furthermore, no significant demolition works are proposed, and tree felling will be limited to a maximum of 13 no. trees (10 within the wayleave and 3 to facilitate the construction of the pedestrian bridge over the adjacent greenway). The 24 months construction stage impacts on landscape/townscape character are considered 'short-term', within an urban fabric where the construction of multi-storey buildings has been long established. The magnitude of construction stage landscape/townscape impacts is deemed to be Medium. When combined with the Medium-low sensitivity of the receiving landscape, the overall significance of construction stage landscape/townscape impacts is considered to be Moderate. In addition, the proposed planting of approx. 108 new trees within the site, as part of the proposed landscape works which will be implemented during the construction phase, will mitigate any long-term visual impacts of the loss of the 13 no. existing trees.

Chapter 6 of the EIAR refers to potential impacts on human health relating to the implementation of services and utilities. Potential adverse impacts on existing local infrastructure and services such as water, wastewater, communications and electrical infrastructure may occur during the construction phase due to connection works from the proposed development to existing local services. The implementation of the proposed surface water/foul sewer and potable water upgrades to serve the development will be conducted in parallel with the other services and may result in some temporary disruption. The potential for brief adverse impact events on the local infrastructure during the construction phase of the development has the potential to occur over a short-term duration and range from imperceptible to slight.

The installation of power, gas and telecommunications infrastructure may result in a potential temporary loss of connection to the gas, electricity and telecommunications networks. The likely adverse impact is characterised in Chapter 6 as short-term and ranging from imperceptible to moderate, the latter in the case of gas and ESB connections.

Regarding human health effects, Chapter 7 (Land and Soils) notes that noise and vibration will be generated through the construction phase, particularly during piling and excavation works. This is dealt with in the detail in relation to Chapter 11 Noise and Vibrations below. Human health risks are also associated with the risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination. It is predicted that the potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

Potential health effects are associated with contamination of water or groundwater with pollutants associated with construction activity. However, with the proposed site design and mitigation measures outlined in EIAR Chapter 8 and the CEMP, it is predicted that the potential for impacts on groundwater or surface water (ie the Douglas River) from excavation activities, accidental spillage, concrete wash water and waste are considered to be temporary, negligible in magnitude and imperceptible in significance.

Chapter 10 of this EIAR, prepared by John Cronin & Associates assesses the potential cultural heritage impacts of the project during the construction phase. It does not anticipate any direct impact on any known archaeological or architectural heritage resources on the site. The proposed construction of a new pedestrian/cycle bridge will give rise to an impact on the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This direct negative impact is assessed as being slight in significance.

Indirect impacts on the settings of identified heritage assets in the wider vicinity were also assessed. This assessment predicted an indirect negative impact on Bessborough House and Farm, an Icehouse and Folly, however, this impact was considered temporary, of low to negligible magnitude and of slight significance. Chapter 10 includes a detailed section examining the legacy of the former Mother and Baby Homes that operated from Bessborough House. Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented, as considered appropriate by the project Consultant Forensic Archaeologist.

Chapter 11 of this EIAR prepared by DK Partnership assesses the potential impacts of noise and vibration during construction phase and predicts that the main source of noise and vibration will be due to the use of heavy plant and machinery, ground works excavators and HGV movements to, from and around the site. It is predicted that noise impacts of the construction phase will be short-term negative and not significant, with vibration impacts being considered temporary and imperceptible.

Chapters 12 and 13 of this EIAR, also prepared by DK Partnership, assesses the potential impacts on air quality and climate during the construction stage of the project. The Construction Phase could have a slight negative impact on the surrounding area due to traffic and associated nuisance and dust. In relation to vehicle emissions t is predicted that the proposed development will not have an adverse impact. In relation to dust emissions, Chapter 12 considers the implementation of best practice mitigation measures will ensure that health impacts from dust emissions and other air pollutants are predicted to be not significant.

14.3.2.1.2 Phase 2 'The Farm'

As with Phase 1, the CEMP prepared by J. B. Barry and Partners Limited, Consulting Engineers included in Appendix 2-2 of this EIAR, considers that construction works for Phase 2 'The Farm' are also likely to take place over a c. 24 no. month period. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts to nearby residents. Construction of the proposed development will be implemented in accordance with the CEMP. This document describes a suite of mitigation measures to be strictly implemented and monitored during the construction phase of the development.

It is expected that on average c. 80 no. construction workers will typically be on site and that they travel from their existing residence rather than taking temporary accommodation in the local area. Impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be temporary, limited in extent and significance for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works. The CEMP sets out that these will be undertaken in agreement with the City Council and all relevant stakeholders will be kept informed of any such closures. The CEMP sets out that delivery movement numbers are expected to be low to moderate and spread throughout the day. The HGV traffic is expected to be greater at the initial stage of development and to reduce as the construction of the buildings advances.

In Chapter 5 of this EIAR, (Material Assets Traffic and Transportation), MHL & Associates Ltd. estimate that 15 HGVs will deliver to the site on a daily basis and that it is anticipated that this traffic will be restricted to off-peak times on the local road network to reduce the impact on the road network during the morning and evening peak. Similarly, it is also considered that construction workers will generally travel to site prior to the peak time in light of the 07.00 working hours start time. Appropriate measures will be put in place to ensure safe access to/from the site. Measures will also be implemented on-site to ensure safe manoeuvres can be carried out within the construction site. With appropriate mitigation Chapter 5 considers that the potential impacts in respect of traffic during the construction phase will be negative, of slight significance and temporary duration.

As described in Chapter 4 of this EIAR (Landscape and Visual), the construction phase of the development will result in permanent physical effects on the land cover of this area. However, it notes that the area is not publicly accessible, nor

does it provide any public open space, but is, instead, secured/cordoned off from the public, minimising any impact the local population's enjoyment of the existing landscape. Demolition works are proposed, however, the Landscape and Visual Chapter emphasises that none of the impacted structures are deemed to be of architectural or heritage value. The construction phase will also entail the felling of 54 no. trees, 9 no. of which are dead or of poor quality and will be removed to protect and enhance the overall woodland (3 no. of these are to facilitate the construction of the pedestrian bridge). A total of 116 no. new tree planting is proposed. Based on this the significance of the construction stage in terms of landscape/townscape impact is considered to be short-term and moderate when viewed in the context of the medium sensitivity of the receiving environment within an urban fabric where the construction of multi-storey buildings has been long established.

Chapter 6 of the EIAR refers to potential impacts on human health relating to the implementation of services and utilities. Potential adverse impacts on existing local infrastructure and services such as water, wastewater, communications and electrical infrastructure may occur during the construction phase due to connection works from the proposed development to existing local services. The implementation of the proposed surface water/foul sewer and potable water upgrades to serve the development will be conducted in parallel with the other services and may result in some temporary disruption. The potential for brief adverse impact events on the local infrastructure during the construction phase of the development has the potential to occur over a short-term duration and range from imperceptible to slight.

The installation of power, gas and telecommunications infrastructure may result in a potential temporary loss of connection to the gas, electricity or telecommunications networks. The likely adverse impact is characterised in Chapter 6 as temporary, short-term and ranging from imperceptible to moderate, the latter in the case of gas and ESB connections.

Regarding human health effects, Chapter 7 (Land and Soils) notes that noise and vibration will be generated through the construction phase, particularly during piling and excavation works. This is dealt with in the detail in relation to Chapter 11 Noise and Vibrations below. Human health risks are also associated with the risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination. It is predicted that the potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

Potential health effects are associated with contamination of water or groundwater with pollutants associated with construction activity. However, with the proposed site design and mitigation measures outlined in EIAR Chapter 8 and the CEMP, it is predicted that the potential for impacts on groundwater or surface water (ie the Douglas Estuary) from excavation activities, accidental spillage, concrete wash water and waste are considered to be temporary, negligible in magnitude and imperceptible in significance.

Chapter 10 of this EIAR, prepared by John Cronin & Associates assesses the potential cultural heritage impacts of the project during the construction phase. It does not anticipate any direct impact on any known archaeological or architectural heritage resources on the site. The proposed demolition of structures and farm buildings of poor quality to the north of the central core of Bessorough Farm (NIAH 20872006) would not result in any significant loss of cultural heritage value. The direct negative impact is, therefore, assessed as being moderate. This is counter-balanced by the proposed retention, conservation and adaption into new uses of the better quality historic buildings within the subject area, which is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance. The proposed creation of a pedestrian entrance in the original estate wall is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance.

The proposed construction of a new pedestrian/cycle bridge will give rise to an impact on the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This direct negative impact is assessed as being slight in significance.

Indirect impacts on the settings of identified heritage assets in the wider vicinity were also assessed. This assessment predicted an indirect negative impact on Bessborough House and Farm, an Icehouse and Folly, however, this impact was considered temporary, of low to medium magnitude (in relation to Bessborough Farm) and of slight to moderate significance. Chapter 10 includes a detailed section examining the legacy of the former Mother and Baby Homes that operated from Bessborough House. Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented, as considered appropriate by the project Consultant Forensic Archaeologist.

Chapter 11 of this EIAR prepared by DK Partnership assesses the potential impacts of noise and vibration during construction phase and predicts that the main source of noise and vibration will be due to the use of heavy plant and machinery, ground works excavators and HGV movements to, from and around the site. It is predicted that the noise impacts of the construction phase will be short-term temporary, negative and not significant, with vibration impacts considered to be temporary and imperceptible.

Chapters 12 and 13 of this EIAR, also prepared by DK Partnership, assess the potential impacts on air quality and climate during the construction stage of the project. The Construction Phase could have a slight negative impact on the surrounding area due to traffic and associated nuisance and dust. In relation to vehicle emissions, it is predicted that the proposed development will not have an adverse impact. In relation to dust emissions, Chapter 12 considers the implementation of best practice mitigation measures will ensure that health impacts from dust emissions and other air pollutants are predicted to be not significant.

14.3.2.1.3 Combined Phase 1 and Phase 2

The construction works for Phase 1 'The Meadows' and Phase 2 'The Farm' are planned to be undertaken sequentially, with each phase taking place over a c. 24 no. month period, overall the combined phase 1 and Phase 2 works are anticipated to last for a 48 no. month period. It should be noted that if both phases proceed a number of the construction impacts of Phase 2 'The Farm' may be reduced in extent as some of the works will have already been completed in Phase 1 'The Meadows'.

The construction methods employed and the hours of construction proposed will be similarly designed throughout both phases to minimise potential impacts to nearby residents. Construction of the proposed development will be implemented in accordance with the 2 no. separate CEMP's prepared by J. B. Barry and Partners Limited, Consulting Engineers. These documents describe a suite of mitigation measures to be strictly implemented and monitored during the construction phase of the development.

It is expected that on average c. 80 no. construction workers will typically be on site during both phases and that they travel from their existing residence rather than taking temporary accommodation in the local area. Impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements.

The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be temporary, limited in extent and significance for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. As the impacts of the above will predominantly be associated with the first phase of the development, the impacts on the local road users will be temporary rather than short-term and be localised in extent for this stage of the works.

The CEMPs set out that these will be undertaken in agreement with the City Council and all relevant stakeholders will be kept informed of any such closures. The CEMPs set out that delivery movement numbers are expected to be low to moderate and spread throughout the day. The HGV traffic is expected to be greater at the initial stage of both phases of development and to reduce as the construction of the buildings advance.

In Chapter 5 of this EIAR, (Material Assets Traffic and Transportation), MHL & Associates Ltd. estimate that 15 HGVs will deliver to the site on a daily basis note and that it is anticipated that this traffic will be restricted to off-peak times on the local road network to reduce the impact on the road network during the morning and evening peak. Similarly, it is also considered that construction workers will generally travel to site prior to the peak time in light of the 07.00 working

hours start time. Appropriate measures will be put in place to ensure safe access to/from the site. Measures will also be implemented on-site to ensure safe manoeuvres can be carried out within the construction site. With appropriate mitigation Chapter 5 considers that the potential impacts in respect of traffic during the construction phase will be negative, of slight significance and temporary duration.

As described in Chapter 4 of this EIAR (Landscape and Visual), the construction phase of both developments will result in permanent physical effects on the land cover of the areas. However, as it notes that neither area is publicly accessible, nor do they provide any public open space, any impact on the the local population's enjoyment of the existing landscape will be minimal. Demolition works are proposed in Phase 2 'The Farm', however, the Landscape and Visual Chapter emphasises that none of the impacted structures are deemed to be of architectural or heritage value. The construction phase will also entail the felling of 64 no. trees, 13 no. of which are of poor quality and will be removed to protect and enhance the overall woodland. A total of 224 no. new tree planting is proposed. In addition, the proposed development includes the upgrading of an existing sewer pipe, the impact of which is considered to be temporary and highly localised. Chapter 4 concludes that as the phases of development are not proposed to be undertaken concurrently the overall significance of the construction stage in terms of landscape/townscape impact is considered to be moderate when viewed in the context of the medium-low and medium sensitivity of the receiving environments within an urban fabric where the construction of multi-storey buildings has been long established.

Chapter 6 of the EIAR refers to potential impacts on human health relating to the implementation of services and utilities. It identifies that the sequential implementation of Phase 1 and Phase 2 may result in a reduction in the potential impacts of Phase 2 'The Farm' where the requisite infrastructure upgrades have already taken place in Phase 1 'The Meadows'. For example, in relation to the connection of a new foul sewer to the pumping station and the upgrading of the stormwater sewer. Potential adverse impacts on existing local infrastructure and services such as water, wastewater, communications and electrical infrastructure may still occur, however, it is anticipated that they would be concentrated during the first construction phase when it is likely that connection works from both the proposed developments to existing local services would be undertaken. The implementation of the proposed surface water/foul sewer and potable water upgrades to serve the development will be conducted in parallel with the other services and may result in some temporary disruption. The potential for brief adverse impact events on the local infrastructure during the construction phase of the development has the potential to occur over a short-term duration and range from imperceptible to slight.

Similarly, while the installation of power, gas and telecommunications infrastructure may result in a potential temporary loss of connection to the gas, electricity or telecommunications networks, it is likely that this impact would be concentrated in the first phase of development. The likely adverse impact of the combined Phase 1 and Phase 2 development is therefore still characterised in Chapter 6 as short-term and ranging from imperceptible to moderate, the latter in the case of gas and ESB connections.

Regarding human health effects, Chapter 7 (Land and Soils) notes that noise and vibration will be generated through the construction phase, particularly during piling and excavation works. This is dealt with in the detail in relation to Chapter 11 Noise and Vibrations below. Human health risks are also associated with the risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination. It is predicted that the potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

The potential health effects associated with contamination of water or groundwater with pollutants associated with construction activity apply equally to both phases of construction. However, with the proposed site design and mitigation measures outlined in EIAR Chapter 8 and both CEMPs, it is predicted that the potential for impacts on groundwater or surface water (ie the Douglas River) from excavation activities, accidental spillage, concrete wash water and waste are considered to be short-term, negligible in magnitude and imperceptible in significance.

Chapter 10 of this EIAR, prepared by John Cronin & Associates assesses the potential cultural heritage impacts of the project during the construction phase. It does not anticipate any direct impact on any known archaeological or architectural heritage resources on the site. The proposed demolition of structures and farm buildings of poor quality to the north of the central core of Bessorough Farm (NIAH 20872006) would not result in any significant loss of cultural heritage value. The direct negative impact is, therefore, assessed as being moderate. This is counter-balanced by the proposed retention, conservation and adaption into new uses of the better quality historic buildings within the subject area, which is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance. The proposed creation of a pedestrian entrance in the original estate wall is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance.

The proposed construction of a new pedestrian/cycle bridge will give rise to an impact on the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This direct negative impact is assessed as being slight in significance.

Indirect impacts on the settings of identified heritage assets in the wider vicinity were also assessed. This assessment predicted an indirect negative impact on Bessborough House and Farm, an Icehouse and Folly, however, this impact was considered temporary, of low to medium magnitude (in relation to Bessborough Farm) and of slight to moderate significance. Chapter 10 includes a detailed section examining the legacy of the former Mother and Baby Homes that operated from Bessborough House. Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented, as considered appropriate by the project Consultant Forensic Archaeologist.

Chapter 11 of this EIAR prepared by DK Partnership assesses the potential impacts of noise and vibration during construction phase and predicts that the main source of noise and vibration will be due to the use of heavy plant and machinery, ground works excavators and HGV movements to, from and around the site. It is predicted that the noise impacts of the two construction phases will be short-term, negative and not significant and the vibration impacts will be temporary and imperceptible.

Chapters 12 and 13 of this EIAR, also prepared by DK Partnership, assesses the potential impacts on air quality and climate during the construction stage of the project. The 2 no. Construction Phases could have a slight negative impact on the surrounding area due to traffic and associated nuisance and dust. In relation to vehicle emissions t is predicted that the proposed development will not have an adverse impact. In relation to dust emissions, Chapter 12 considers the implementation of best practice mitigation measures will ensure that health impacts from dust emissions and other air pollutants are predicted to be not significant.

14.3.2.2 Operational Phase

14.3.2.2.1 Phase 1 'The Meadows'

Once Phase 1 'The Meadows' is constructed, the proposed development will be permanent and non-reversible. The proposed development will result in several significant long-term positive impacts for the local population including:

- The proposed development will result in the delivery of 280 no. residential units and assist in addressing the housing shortage in the Mahon area and the wider city and counter-act the recent slow-down in growth in this designated 'Strategic Growth Area'.
- Section 2.24 of the CDP notes in relation to Mahon that 'there is a need for a balance between residential and employment uses. The proposed development would contribute towards addressing this imbalance. It will assist in clustering residential growth alongside the strategic employment hub of Mahon, with consequent positive impacts on the current unsustainable commuter in and out flows in the area.
- It will contribute towards the provision of improved local services and amenities in the form of public open space, a creche and a café.

- It will contribute towards the achievement of the critical mass required to support the provision of enhanced public transport services, in particular the proposed Light Rail Transit.
- It will deliver public health and safety benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.
- Not only will the proposed shared tenant facilities, including a gym, lounge and home-working areas, benefit the future residents of the scheme, the proposed enhancement of public facilities and amenities in the form of public open space and a café will also benefit the wellbeing of the wider community. In addition, the proposed 35 no. place creche will provide a childcare outlet for the existing and future residents of Mahon.
- The proposed public open spaces, including a new plaza within the development, will be accessible to all existing and future residents of the settlement. At present the subject lands are not accessible to the public.

As detailed in EIAR Chapter 4 (Landscape and Visual), the most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 4 no blocks ranging from 1 to 10 storeys in height. This is, however, considered to be compatible with the townscape fabric and character of the wider Mahon area, and the presence of adjacent treelines will soften the vertical scale resulting in a landscape/townscape impact of medium-low magnitude. The proposed planting of new trees and shrubs throughout the site will enrich its existing verdant character which is likely to be strengthened, rather than weakened, by the proposed development.

Chapter 5 of this EIAR (Material Assets - Traffic & Transport) assesses the current and future capacity of vehicular junctions in the vicinity of the site. Chapter 5 assesses the subject junctions both with/without development traffic for both AM and PM peak hours. Results are presented starting in 2020 as the base year, 2024 modelled to include previously granted schemes, 2026 assuming Phase 1 'The Meadows' is completed, 2028, assuming Phase 2 'The Farm' is completed and 2030 and 2039 after a potential third phase is completed and the entire scheme is in full operation.

Once operational, the proposed development will result in slight negative impacts to the local road network, with vehicular movements resultant from the proposed development potentially resulting in increased local traffic congestion at peak times impacting the local population. A Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents.

As detailed in Chapter 6 of this EIAR relating to the implementation of material assets, services and utilities, the operational phase of the proposed development could lead to a potential increase in surface water run-off if not attenuated and the accidental leakage of hydrocarbon off roads into the piped surface water drainage network. Without mitigation the significance of these potential impacts is considered to be slight. The operation phase of the development will result in the increase in generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure. Irish Water have confirmed that will be sufficient capacity to accommodate the proposed development. Any potential impact on public infrastructure is considered permanent and slight. Similarly, any potential adverse impacts on electricity, gas or telecommunications networks are considered to be permanent and slight. The potential impacts on human health from groundwater contamination arising from damaged foul sewers and drains is considered to be temporary and slight.

Chapter 7 considers the possibility of soil contamination from localised hydrocarbon or foul sewage leaks and spillages from storage tanks, vehicles along access roads, loading bays and parking spaces or sewers. It is anticipated that no impacts will occur following the proposed mitigation measures. As confirmed in Chapter 8 of this EIAR, the replacement of the greenfield area with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. However, Chapter 8 concludes that the proposed implementation of SuDS measures will mitigate the risk of flooding outside of the development site so that any potential for impacts on the water environment relating to human health are imperceptible and neutral.

Chapter 10 of this EIAR, prepared by John Cronin & Associates considers that with the implementation of the mitigation measures there is no predicted direct impacts on the archaeological, architectural or cultural heritage resources during the operation phase. It does anticipate a slight negative indirect impact on the historic estate and some of its attendant features including the Icehouse and the setting of the folly as a result of a slight peripheral visual change. The proposed greenway pedestrian bridge is predicted to have a slight negative indirect impact on the undesignated cultural heritage that is the Passage West Greenway. The indirect impact on the Bessborough Farm is considered to be moderate.

Regarding potential 'Noise and Vibration' impacts on human health during the operational phase of the development, Chapter 11 of this EIAR predicts that noise from increased small vehicle traffic and other activities will result in a slight impact at the worst case and not considered to give rise to any significant human health considerations.

Negative impacts on air quality or emissions can result in knock on effects for population and human health. As detailed in Chapters 12 and 13 of this EIAR, the impact of the operational phase of the development from the emission of CO_2 through increased vehicular traffic at the development and energy usage within the buildings on ambient air quality is predicted to be long-term, localised, negative and imperceptible. The majority of the operational CO_2 emissions arise from the energy usage of the buildings. The CO_2 reduction measures proposed will minimise that the impact of the proposed development by reducing these emissions by +/- 65%. Chapters 12 and 13 also note that traffic-related air emissions may in addition generate quantities of air pollutants such as NO2, CO, and PM10. The magnitude of the effect of increased vehicular traffic arising from the proposed development by 2030 was modelled to range from small – medium, with the significance of the effect assessed as negligible.

It is noted that the Government 2030 Climate Change policy promotes the phasing out of petrol and diesel cars, reducing the potential emissions from vehicular traffic. Nevertheless, the modelled results, based on current vehicular emissions levels comply with all ambient air quality legislative limits and therefore the predicted impact is long term and negligible/imperceptible with respect to impact on human beings.

14.3.2.2.2 Phase 2 'The Farm'

Once Phase 2 'The Farm' is constructed, the proposed development will be permanent and non-reversible. The proposed development will result in several significant long-term positive impacts for the local population including:

- The proposed development will result in the delivery of 140 no. residential units and assist in addressing the housing shortage in the Mahon area and the wider city and counter-act the recent slow-down in growth in this designated 'Strategic Growth Area'.
- Section 2.24 of the CDP notes in relation to Mahon that 'there is a need for a balance between residential and employment uses. The proposed development would contribute towards addressing this imbalance. It will assist in clustering residential growth alongside the strategic employment hub of Mahon, with consequent positive impacts on the current unsustainable commuter in and out flows in the area.
- It will contribute towards the provision of improved local services and amenities in the form of public open space, a creche and a Memorial 'Farm Girl' Bench.
- It will contribute towards the achievement of the critical mass required to support the provision of enhanced public transport services, in particular the bus connects routes and proposed Light Rail Transit.
- It will deliver public health and safety benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.

- Not only will the proposed shared facilities, including a gym, lounge, function room and home-working area benefit the future residents of the scheme, the proposed enhancement of public facilities and amenities in the form of public open space will also benefit the wellbeing of the wider community. In addition, the proposed 25 no. place creche will provide a childcare outlet for the existing and future residents of Mahon.
- The proposed public open spaces, including a new plaza within the development, will be accessible to all existing and future residents of the settlement. At present the subject lands are not accessible to the public.

As detailed in EIAR Chapter 4 (Landscape and Visual), the most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 5 no blocks ranging from 1 to 5 storeys in height. This is, however, considered to be compatible with the existing cluster of buildings to the south and with the townscape fabric and character of the wider Mahon area. In addition, the impact is softened by the presence of adjacent treelines, with canopies of similar height, with Chapter 4 concluding that the high-quality architectural design being likely to prove a long-term asset to the landscape character of the area. The proposed design and planting of new trees and shrubs throughout the site is respectful of the site's context and in line with the SE4 Bessboro House Landscape Preservation Zone specific objectives. Therefore, the magnitude of the resulting landscape/townscape impact is considered to be medium-low.

Chapter 5 of this EIAR (Material Assets - Traffic & Transport) assesses the current and future capacity of vehicular junctions in the vicinity of the site. Chapter 5 assesses the subject junctions both with/without development traffic for both AM and PM peak hours. Results are presented starting in 2020 as the base year, 2024 modelled to include previously granted schemes, 2026 assuming Phase 1 'The Meadows' is completed, 2028, assuming Phase 2 'The Farm' is completed and 2030 and 2039 after a potential third phase is completed and the entire scheme is in full operation. Once operational, the proposed development will result in slight negative impacts to the local road network, with vehicular movements resultant from the proposed development potentially resulting in increased local traffic congestion at peak times impacting the local population. A Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents.

As detailed in Chapter 6 of this EIAR relating to the implementation of material assets, services and utilities, the operational phase of the proposed development could lead to a potential increase in surface water run-off if not attenuated and the accidental leakage of hydrocarbon off roads into the piped surface water drainage network. Without mitigation the significance of these potential impacts is considered to be slight. The operation phase of the development will result in the increase in generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure. Irish Water have confirmed that will be sufficient capacity to accommodate the proposed development. Any potential impact on public infrastructure is considered permanent and slight. Similarly, any potential adverse impacts on electricity, gas or telecommunications networks are considered to be permanent and slight. The potential impacts on human health from groundwater contamination arising from damaged foul sewers and drains is considered to be temporary and slight.

Chapter 7 considers the possibility of soil contamination from localised hydrocarbon or foul sewage leaks and spillages from storage tanks, vehicles along access roads, loading bays and parking spaces or sewers. It is anticipated that no impacts will occur following the proposed mitigation measures.

As confirmed in Chapter 8 of this EIAR, the replacement of the greenfield area with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. However, Chapter 8 concludes that the proposed implementation of SuDS measures will mitigate the risk of flooding outside of the development site so that any potential for impacts on the water environment relating to human health are imperceptible and neutral.

Chapter 10 of this EIAR, prepared by John Cronin & Associates considers that the proposed layout seeks to retain and enhance the landscape setting by providing wider community access to parkland that is currently publicly inaccessible. It also proposes to reinstate historic routes to the parkland and will not impact on the historic entrance avenue or the visual primacy of the front façade of Bessborough House or its views of the parkland setting to the south. It does anticipate a slight negative indirect impact on the historic estate and some of its attendant features including the Icehouse and the setting of the folly as a result of a slight peripheral visual change. The proposed greenway pedestrian bridge is predicted to have a slight negative indirect impact on the undesignated cultural heritage that is the Passage West Greenway. The indirect impact on the Bessborough Farm is considered to be moderate.

Regarding potential 'Noise and Vibration' impacts on human health during the operational phase of the development, Chapter 11 of this EIAR predicts that noise from increased small vehicle traffic and other activities will result in a slight impact at the worst case and not considered to give rise to any significant human health considerations.

Negative impacts on air quality or emissions can result in knock on effects for population and human health. As detailed in Chapters 12 and 13 of this EIAR, the impact of the operational phase of the development from the emission of CO_2 through increased vehicular traffic at the development and energy usage within the buildings on ambient air quality is predicted to be long-term, localised, negative and imperceptible. The majority of the operational CO_2 emissions arise from the energy usage of the buildings. The CO_2 reduction measures proposed will minimise that the impact of the proposed development by reducing these emissions by +/- 65%. Chapters 12 and 13 also note that traffic-related air emissions may in addition generate quantities of air pollutants such as NO2, CO, and PM10. The magnitude of the effect of increased vehicular traffic arising from the proposed development by 2030 was modelled to range from small – medium, with the significance of the effect assessed as negligible.

It is noted that the Government 2030 Climate Change policy promotes the phasing out of petrol and diesel cars, reducing the potential emissions from vehicular traffic. Nevertheless, the modelled results, based on current vehicular emissions levels comply with all ambient air quality legislative limits and therefore the predicted impact is long term and negligible/ imperceptible with respect to impact on human beings.

14.3.2.2.3 Combined Phase 1 and Phase 2

Once Phases 1 and 2 are constructed, the proposed development will be permanent and non-reversible. The proposed development will result in several significant long-term positive impacts for the local population including:

- The proposed development will result in the delivery of 420 no. residential units and assist in addressing the housing shortage in the Mahon area and the wider city and counter-act the recent slow-down in growth in this identified 'Strategic Growth Area'.
- Section 2.24 of the CDP notes in relation to Mahon that 'there is a need for a balance between residential and employment uses. The proposed development would contribute towards addressing this imbalance. It will assist in clustering residential growth alongside the strategic employment hub of Mahon, with consequent positive impacts on the current unsustainable commuter in and out flows in the area.
- It will contribute towards the provision of improved local services and amenities in the form of extensive parkland and landscaped areas of public open space, a café, 2 no. creches and a Memorial 'Farm Girl' Bench.
- It will contribute towards the achievement of the critical mass required to support the provision of enhanced public transport services, in particular the proposed Light Rail Transit.
- It will deliver public health and safety benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.
- Not only will the proposed shared resident facilities, including 2 no. gyms, 2 no. lounges, a function room, library

and 2 no. home-working areas benefit the future residents of the scheme, the proposed enhancement of public facilities and amenities in the form of public open space will also benefit the wellbeing of the wider community. In addition, the 2 no. proposed creches with an overall provision for 60 no. children will provide childcare outlets for the existing and future residents of Mahon.

- Across both proposed developments , the proposed parkland and areas of landscaped public open spaces, including a new plaza within the Phase 1 'The Meadows' development, will be accessible to all existing and future residents of the settlement. At present the subject lands are not accessible to the public.

As detailed in EIAR Chapter 4 (Landscape and Visual), the most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 9 no blocks ranging from 1 to 10 storeys in height. This is, however, considered to be compatible with the existing cluster of buildings to the south and with the townscape fabric and character of the wider Mahon area. In addition, the impact is softened by the presence of adjacent treelines, with Chapter 4 concluding that the high-quality architectural design being likely to prove a long-term asset to the landscape character of the area. The proposed design and planting of new trees and shrubs throughout the site is respectful of the site's context and in line with the SE4 Bessboro House Landscape Preservation Zone specific objectives. Therefore, the overall magnitude of the resulting landscape/townscape impact is considered to be medium-low.

Chapter 5 of this EIAR (Material Assets - Traffic & Transport) assesses the current and future capacity of vehicular junctions in the vicinity of the site. Chapter 5 assesses the subject junctions both with/without development traffic for both AM and PM peak hours. Results are presented starting in 2020 as the base year, 2024 modelled to include previously granted schemes, 2026 assuming Phase 1 'The Meadows' is completed, 2028, assuming Phase 2 'The Farm' is completed and 2030 and 2039 after a potential third phase is completed and the entire scheme is in full operation.

Once operational, the proposed development will result in slight negative impacts to the local road network, with vehicular movements resultant from the proposed development potentially resulting in increased local traffic congestion at peak times impacting the local population. A Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents.

As detailed in Chapter 6 of this EIAR relating to the implementation of material assets, services and utilities, the operational phase of the proposed development could lead to a potential increase in surface water run-off if not attenuated and the accidental leakage of hydrocarbon off roads into the piped surface water drainage network. Without mitigation the significance of these potential impacts is considered to be slight. The operation phase of the development will result in the increase in generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure. Irish Water have confirmed that will be sufficient capacity to accommodate the proposed development. Any potential impact on public infrastructure is considered permanent and slight. Similarly, any potential adverse impacts on electricity, gas or telecommunications networks are considered to be permanent and slight. The potential impacts on human health from groundwater contamination arising from damaged foul sewers and drains is considered to be temporary and slight.

Chapter 7 considers the possibility of soil contamination from localised hydrocarbon or foul sewage leaks and spillages from storage tanks, vehicles along access roads, loading bays and parking spaces or sewers. It is anticipated that no impacts will occur following the proposed mitigation measures.

As confirmed in Chapter 8 of this EIAR, the replacement of the greenfield area with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. However, Chapter 8 concludes that the proposed implementation of SuDS measures will mitigate the risk of flooding outside of the development site so that any potential for impacts on the water environment relating to human health are imperceptible and neutral.

Chapter 10 of this EIAR, prepared by John Cronin & Associates considers that given the absence of any architectural heritage structures or known archaeological sites within the boundary of the Phase 1 'The Meadows' lands and the levels of impacts predicted for both locations, it is concluded that Phase 1 and Phase 2 will not combine to result in any predicted significant impacts on the cultural heritage resource during the operation phase.

Regarding potential 'Noise and Vibration' impacts on human health during the operational phase of the development, Chapter 11 of this EIAR predicts that noise from increased small vehicle traffic and other activities will result in a slight impact at the worst case and not considered to give rise to any significant human health considerations.

Negative impacts on air quality or emissions can result in knock on effects for population and human health. As detailed in Chapters 12 and 13 of this EIAR, the impact of the operational phase of the development from the emission of CO_2 through increased vehicular traffic at the development and energy usage within the buildings on ambient air quality is predicted to be long-term, localised, negative and imperceptible. The majority of the operational CO_2 emissions arise from the energy usage of the buildings. The CO_2 reduction measures proposed will minimise that the impact of the proposed development by reducing these emissions by +/- 65%. Chapters 12 and 13 also note that traffic-related air emissions may in addition generate quantities of air pollutants such as NO2, CO, and PM10. The magnitude of the effect of increased vehicular traffic arising from the proposed development by 2030 was modelled to range from small – medium, with the significance of the effect assessed as negligible.

It is noted that the Government 2030 Climate Change policy promotes the phasing out of petrol and diesel cars, reducing the potential emissions from vehicular traffic. Nevertheless, the modelled results, based on current vehicular emissions levels comply with all ambient air quality legislative limits and therefore the predicted impact is long term and negligible/imperceptible with respect to impact on human beings.

14.3.3 Impacts on Local Economy

14.3.3.1 Construction Phase

14.3.3.1.1 Phase 1 'The Meadows'

The duration of the construction phase is likely to result in moderate temporary positive impacts for the local economy within the study area. Construction workers will likely avail of local retail outlets and restaurants in mornings and lunchtimes in particular. Supplies and materials for proposed construction works may also be supplied locally further resulting in positive impacts on the local economy. The construction phase will provide for construction related employment opportunities.

14.3.3.1.2 Phase 2 'The Farm'

The duration of the construction phase is likely to result in moderate temporary positive impacts for the local economy within the study area. Construction workers will likely avail of local retail outlets and restaurants in mornings and lunchtimes in particular. Supplies and materials for proposed construction works may also be supplied locally further resulting in positive impacts on the local economy. The construction phase will provide for construction related employment opportunities.

14.3.3.1.3 Combined Phase 1 and Phase 2

The duration of the construction phase is likely to result in moderate short-term positive impacts for the local economy

within the study area. Construction workers will likely avail of local retail outlets and restaurants in mornings and lunchtimes in particular. Supplies and materials for proposed construction works may also be supplied locally further resulting in positive impacts on the local economy. The construction phase will provide for construction related employment opportunities.

14.3.3.2 Operational Phase

14.3.3.2.1 Phase 1 'The Meadows'

The proposed development will result in significant permanent positive impacts on the local economy. The 2016 Census confirms that the average household size the study area is approximately 2.82 no. persons per household, slightly higher than the state (2.75) and city average (2.45). The proposed development of 280 no. dwellings translates to an approximate uplift of approximately 790 no. persons. The projected increase in population of the wider Mahon area is appropriate and will reverse the recent trend of slight underperformance of the Study Area in terms of population growth. With a growth rate of 2.7% in the last intercensal period, this designated 'Strategic Growth' area experienced lower growth than the city as a whole, contrary to national and regional policies of co-locating employment, public transport and population growth. The proposed development will contribute towards countering the massive inward commuter flow into Mahon, where currently 93.2% of the local jobs are held by people who commute into the area, 80% of whom use private transport. By creating more homes adjacent to this Strategic Employment Hub, a more sustainable balance will be achieved, with associated quality of life benefits for the residents and workers of the area. It is also envisaged that creation of new homes will create additional demand for local retail and service provision, providing increased local employment opportunities. The proposed development will result in providing a diverse range of apartments which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area. The development will support the recent and proposed expenditure in upgrading the bus infrastructure and will contribute towards the achievement of the critical mass necessary to realise the medium-term future proposals for an LRT in close proximity to the site.

14.3.3.2.2 Phase 2 'The Farm'

The proposed development will result in significant permanent positive impacts on the local economy. The 2016 Census confirms that the average household size the study area is approximately 2.82 no. persons per household, slightly higher than the state (2.75) and city average (2.45). The proposed development of 140 no. dwellings translates to an approximate uplift of approximately 395 no. persons. The projected increase in population of the wider Mahon area is appropriate and will reverse the recent trend of slight underperformance of the Study Area in terms of population growth. With a growth rate of 2.7% in the last intercensal period, this designated 'Strategic Growth' area experienced lower growth than the city as a whole, contrary to national and regional policies of co-locating employment, public transport and population growth. The proposed development will contribute towards countering the massive inward commuter flow into Mahon, where currently 93.2% of the local jobs are held by people who commute into the area, 80% of whom use private transport. By creating more homes adjacent to this Strategic Employment Hub, a more sustainable balance will be achieved, with associated quality of like benefits for the residents and workers of the area. It is also envisaged that creation of new homes will create additional demand for local retail and service provision, providing increased local employment opportunities. The proposed development will result in providing a diverse range of apartments which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area. The development will support the recent and proposed expenditure in upgrading the bus infrastructure and will contribute towards the achievement of the critical mass necessary to realise the medium-term future proposals for an LRT in close proximity to the site.

14.3.3.2.3 Combined Phase 1 and Phase 2

The proposed development will result in significant permanent positive impacts on the local economy. The 2016 Census confirms that the average household size the study area is approximately 2.82 no. persons per household, slightly higher than the state (2.75) and city average (2.45). The proposed development of 420 no. dwellings translates to an approximate uplift of approximately 1,184 no. persons. The projected increase in population of the wider Mahon area is appropriate and will reverse the recent trend of slight underperformance of the Study Area in terms of population growth. With a growth rate of 2.7% in the last intercensal period, this designated 'Strategic Growth' area experienced lower growth than the city as a whole, contrary to national and regional policies of co-locating employment, public transport and population growth. The proposed development will contribute towards countering the massive inward commuter flow into Mahon, where currently 93.2% of the local jobs are held by people who commute into the area, 80% of whom use private transport. By creating more homes adjacent to this Strategic Employment Hub, a more sustainable balance will be achieved, with associated quality of like benefits for the residents and workers of the area. It is also envisaged that creation of new homes will create additional demand for local retail and service provision, providing increased local employment opportunities. The proposed development will result in providing a diverse range of apartments which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area. The development will support the recent and proposed expenditure in upgrading the bus infrastructure and will contribute towards the achievement of the critical mass necessary to realise the medium-term future proposals for an LRT in close proximity to the site.

14.3.4 Impacts on Amenity, Open Space and Sports

14.3.4.1 Construction Phase

14.3.4.1.1 Phase 1 'The Meadows'

It is envisaged that the construction of the pedestrian bridge over the greenway will require the temporary closure of the access ramp from Mahon for a short period. The predicted impact on the users of the greenway will be temporary, limited in extent and significance for this stage of the works. As Chapter 4 of this EIAR notes the developable area is not publicly accessible, nor does it provide any public open space, minimising any visual impact on the local population's enjoyment of the existing landscape along the greenway. As detailed in Chapter 3 of the EIAR (Alternatives Considered), the loss of some existing trees is unavoidable to deliver the bridge to accommodate pedestrian/cyclist connectivity and to deliver requisite surface water infrastructure upgrades. However, the design team has sought to minimise the removal of trees throughout the site and this is confined to 13 no. trees, with proposals for the planting of 108 no. new trees within a robust landscape and replacement planting strategy. Therefore, the overall construction impact on the landscape is deemed to be of a temporary moderate significance. It is not anticipated that the construction phase of the proposed development will result in any impacts on other existing sports and recreational facilities in the area.

14.3.4.1.2 Phase 2 'The Farm'

It is envisaged that the construction of the pedestrian bridge over the greenway will require the temporary closure of the access ramp from Mahon for a short period. The predicted impact on the users of the greenway will be temporary, limited in extent and significance for this stage of the works. As Chapter 4 of this EIAR notes the developable area is not publicly accessible, nor does it provide any public open space, minimising any visual impact on the local population's enjoyment of the existing landscape along the greenway. As detailed in Chapter 3 of the EIAR (Alternatives Considered), to the west is 'the Park', a parkland area which was traditionally unplanted, but where a wide variety of trees have been planted since c.1980. Based on an arboricultural assessment and an historic landscape assessment (ref Appendices 3.3 and 3.4), several of these trees, including Cherry and poor quality Elm varieties, have been identified for removal. In

addition, the loss of some existing higher trees is unavoidable to accommodate the proposed development and requisite surface water upgrades and to deliver the pedestrian bridge to facilitate pedestrian/cyclist. However, the design team has sought to minimise the removal of trees throughout the site and this is confined to 54 no. trees overall of the in excess of 300 no. trees surveyed. The robust landscape and replacement planting strategy proposes the planting of 116 no. new, predominantly native, deciduous trees. Therefore, the overall construction impact on the landscape is deemed to be of a temporary moderate significance, when viewed in the context of the medium sensitivity of the receiving environment within an urban fabric. It is not anticipated that the construction phase of the proposed development will result in any impacts on other existing sports and recreational facilities in the area.

14.3.4.1.3 Combined Phase 1 and Phase 2

It is envisaged that the construction of the pedestrian bridge over the greenway, which has been included in both proposed phases of development, will require the temporary closure of the access ramp from Mahon for a short period. The predicted impact on the users of the greenway will be temporary, limited in extent and significance for this stage of the works. As Chapter 4 of this EIAR notes the developable area of both phases is not publicly accessible, nor does they provide any public open space, minimising any visual impact on the local population's enjoyment of the existing landscape along the greenway. As detailed in Chapter 3 of the EIAR (Alternatives Considered), the design team has sought to minimise the removal of trees throughout the two proposed phases of development. It is now confined to the removal of 64 no. trees overall of the in excess of 300 no. trees surveyed. The robust landscape and replacement planting strategy proposes the planting of 224 no. new, predominantly native, deciduous trees. Therefore, the overall construction impact on the landscape is deemed to be of a temporary moderate significance, when viewed in the context of the medium sensitivity of the receiving environment within an urban fabric. It is not anticipated that the construction phase of the proposed development will result in any impacts on other existing sports and recreational facilities in the area.

14.3.4.2 Operational Phase

14.3.4.2.1 Phase 1 'The Meadows'

Once operational the projected uplift in population will result in some short-term slight negative impacts relating to an additional demand for the use of local amenities, open spaces and sports facilities. However, as described previously, Mahon, and the defined study area is already well equipped for such facilities to serve the existing population. Local sports clubs such as St. Michael's GAA Club, Ballinure GAA pitch, Mahon Rugby Grounds, and Ringmahon Rangers AFC will likely benefit from increased volunteer numbers and participation rates resulting in increased membership and financial/social benefits.

Once operational, the subject lands, which are not currently accessible to the public, will be readily accessible, resulting in the existing and future residents of Ballinure and Mahon having convenient access to the grounds of the Bessborough Estate. This is in line with a long-standing Council ambition, as set out in the Mahon Local Area Plan 2014, to address severance and lack of connectivity between uses and areas in Mahon.

Once established, the proposed development will result in significant positive permanent impacts for Mahon's existing and future inhabitants. The proposed development provides for a range of public open spaces and amenity areas which will not only cater for the future residents of the proposed development but also the existing residents of Mahon and Cork City. The proposal provides for a public plaza and pedestrian street which will form a focal point of the proposed development in addition to several other smaller open space areas, which will positively contribute to the long-term public and amenity space provision in Mahon.

The proposed pedestrian/cyclist bridge and path will serve as a valuable amenity for existing and future residents of Mahon. The path will satisfy a natural desire line from Mahon to the Bessborough Estate and create linkage with the existing Heritage Park Greenway. It will promote activity and exercise amongst the population, resulting in a significant positive and permanent impact in terms of recreation and amenity provision. Mahon's current location on the high frequency bus network and pedestrian and cyclist greenway to Cork City Centre, and its potential future position on the LRT network, will result that the future residents of the scheme being in a position to avail of amenity and sport facilities in adjacent neighbourhood of Blackrock and Cork City.

Regarding visual amenities, as refenced previously the most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 4 no blocks ranging from 1 to 10 storeys in height which it is considered will have a medium low negative impact. This is, however, considered to be compatible with the townscape fabric and character of the wider Mahon area, and the presence of adjacent treelines will soften the vertical scale resulting. Once the replacement/mitigation planting matures the visual setting of the development will improve incrementally over time.

14.3.4.2.2 Phase 2 'The Farm'

Once operational the projected uplift in population will result in some short-term slight negative impacts relating to an additional demand for the use of local amenities, open spaces and sports facilities. However, as described previously, Mahon, and the defined study area is already well equipped for such facilities to serve the existing population. Local sports clubs such as St. Michael's GAA Club, Ballinure GAA pitch, Mahon Rugby Grounds, and Ringmahon Rangers AFC will likely benefit from increased volunteer numbers and participation rates resulting in increased membership and financial/social benefits.

Once operational, the subject lands, which are not currently accessible to the public, will be readily accessible, resulting in the existing and future residents of Ballinure and Mahon having convenient access to the grounds of the Bessborough Estate. This is in line with a long-standing Council ambition, as set out in the Mahon Local Area Plan 2014, to address severance and lack of connectivity between uses and areas in Mahon. The inclusion of the Memorial 'Farm Girl' Bench will go some way towards recognising the sensitive cultural heritage that is associated with this historic location and acting as a focus for remembrance in this phase.

Once established, the proposed development will result in significant positive permanent impacts for Mahon's existing and future inhabitants. The proposed development provides for a central parkland, a range of public open spaces and amenity areas which will not only cater for the future residents of the proposed development but also the existing residents of Mahon and Cork City. The proposal provides for a public plaza in the old farmyard and re-instatement of historic pedestrian paths which will form a focal point of the proposed development in addition to several other smaller open space areas, which will positively contribute to the long-term public and amenity space provision in Mahon.

The proposed pedestrian/cyclist bridge and path will serve as a valuable amenity for existing and future residents of Mahon. The path will satisfy a natural desire line from Mahon to the Bessborough Estate and create linkage with the existing Heritage Park Greenway. It will promote activity and exercise amongst the population, resulting in a significant positive and permanent impact in terms of recreation and amenity provision. Mahon's current location on the high frequency bus network and pedestrian and cyclist greenway to Cork City Centre, and its potential future position on the LRT network, will result that the future residents of the scheme being in a position to avail of amenity and sport facilities in adjacent neighbourhood of Blackrock and Cork City.

Regarding visual amenities, as refenced previously the most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 5 no blocks ranging from 1 to 5 storeys in heigh which it is considered will have a medium low negative impact. This is, however, considered to be compatible with the existing cluster of buildings to the south and with the townscape fabric and character of the wider Mahon area. The impact is softened by the presence of adjacent treelines, with canopies of similar height. The proposed design and planting of new trees and shrubs throughout the site is respectful of the site's context and

in line with the SE4 Bessboro House Landscape Preservation Zone specific objectives. Once the this matures the visual setting of the development will improve incrementally over time.

14.3.4.2.3 Combined Phase 1 and Phase 2

Once operational the projected uplift in population will result in some short-term slight negative impacts relating to an additional demand for the use of local amenities, open spaces and sports facilities. However, as described previously, Mahon, and the defined study area is already well equipped for such facilities to serve the existing population. Local sports clubs such as St. Michael's GAA Club, Ballinure GAA pitch, Mahon Rugby Grounds, and Ringmahon Rangers AFC will likely benefit from increased volunteer numbers and participation rates resulting in increased membership and financial/social benefits.

Once operational, the subject lands, which are not currently accessible to the public, will be readily accessible, resulting in the existing and future residents of Ballinure and Mahon having convenient access to the grounds of the Bessborough Estate. This is in line with a long-standing Council ambition, as set out in the Mahon Local Area Plan 2014, to address severance and lack of connectivity between uses and areas in Mahon. The inclusion of the Memorial 'Farm Girl' Bench will go some way towards recognising the sensitive cultural heritage that is associated with this historic location and acting as a focus for remembrance.

Once established, the proposed development will result in significant positive permanent impacts for Mahon's existing and future inhabitants. The proposed development provides for a central parkland, a range of public open spaces and amenity areas which will not only cater for the future residents of the proposed development but also the existing residents of Mahon and Cork City. The proposal provides for a 2 no. public plazas, a pedestrian street and re-instatement of historic pedestrian paths which will form a focal point of the proposed development in addition to several other smaller open space areas, which will positively contribute to the long-term public and amenity space provision in Mahon.

The proposed pedestrian/cyclist bridge and path will serve as a valuable amenity for existing and future residents of Mahon. The path will satisfy a natural desire line from Mahon to the Bessborough Estate and create linkage with the existing Heritage Park Greenway. It will promote activity and exercise amongst the population, resulting in a significant positive and permanent impact in terms of recreation and amenity provision. Mahon's current location on the high frequency bus network and pedestrian and cyclist greenway to Cork City Centre, and its potential future position on the LRT network, will result that the future residents of the scheme being in a position to avail of amenity and sport facilities in adjacent neighbourhood of Blackrock and Cork City.

Regarding visual amenities, as refenced previously the most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 9 no blocks ranging from 3 to 10 storeys in heigh which it is considered will have a medium low negative impact. This is, however, considered to be compatible with the existing cluster of buildings to the south and with the townscape fabric and character of the wider Mahon area. The impact is softened by the presence of adjacent treelines, with in Phase 1 'The Meadows' canopies of similar height. The proposed design and planting of new trees and shrubs throughout the site is respectful of the site's context and in line with the SE4 Bessboro House Landscape Preservation Zone specific objectives. Once the this matures the visual setting of the development will improve incrementally over time.

14.3.5 Impacts on Childcare and Education

14.3.5.1 Construction Phase

14.3.5.1.1 Phase 1 'The Meadows'

It is considered that the proposed development will result not significant impacts on childcare or education outlets in the area during the construction phase. Some slight negative short-term impacts relating to noise, vibration, dust emissions and increased traffic levels may occur to the Bessborough's Crèche in the absence of appropriate mitigation measures during construction. It is concluded that the impacts of proposed construction phase will be neutral and will not negatively impact the operations of any childcare/education facility, subject to the specified mitigation measures as described in the CEMP (Appendix 2-1) being implemented.

14.3.5.1.2 Phase 1 'The Farm'

It is considered that the proposed development will not result in significant impacts on childcare or education outlets in the area during the construction phase. Some slight negative short-term impacts relating to noise, vibration, dust emissions and increased traffic levels may occur to the Bessborough's Crèche in the absence of appropriate mitigation measures during construction. It is concluded that the impacts of proposed construction phase will be neutral and will not negatively impact the operations of any childcare/education facility, subject to the specified mitigation measures as described in the CEMP (Appendix 2-2) being implemented.

14.3.5.1.3 Combined Phase 1 and Phase 2

It is considered that the proposed development will result not significant impacts on childcare or education outlets in the area during the construction phase. Some slight negative short-term impacts relating to noise, vibration, dust emissions and increased traffic levels may occur to the Bessborough's Crèche in the absence of appropriate mitigation measures during construction. It is concluded that the impacts of proposed construction phase will be neutral and will not negatively impact the operations of any childcare/education facility, subject to the specified mitigation measures as described in the Phase 1 and Phase 2 CEMPs (Appendices 2-1 and 2-2) being implemented.

14.3.5.2 Operational Phase

14.3.5.2.1 Phase 1 'The Meadows'

Childcare

The proposed development provides for a 306.7 sqm childcare facility with capacity for 35 no. children. The proposed development consists of the construction of 280 no. residential units comprising

- 12 no. 3 bedroom apartments (4.3%),
- 150 no. 2 bedroom apartments (53.6%),
- 112 no. 1 bedroom apartments (40%),
- 6 no. 1 bedroom studio apartments (2.1%).

Section 14.3.3.2 notes however, that there are 7 no. existing childcare facilities within the study area, with an overall capacity of 462 no places and an estimated vacancy level of 163 vacancies based on the most recent Tusla reports.

Nevertheless, the proposed development includes provision for a 35 no. child place creche. Of the proposed 280 no. units, it is considered that demand for creche places is more likely to be associated with the 3 bedroom units, and to a lesser extent, 2 bedroom units. We note section 4.7 of the 2020 Apartment Guidelines which states that:

> *One-bedroom or studio type units should not generally be considered to contribute to a requirement for any childcare provision and subject to location, this may also apply in part or whole, to units with two or more bedrooms.*

In line with the Guidelines 1 bedroom or studio units have not been included in the childcare provision calculation. Similarly, the Guidelines states that a similar approach may apply in part or whole to 2 bedroom units. We have taken a precautionary approach in relation to the latter and included childcare provision for 75% of the 2 bedroom units and 100% of the 3 bedroom units.

This represents 125 no. units, which Appendix 2 of the Childcare Facilities Guidelines sets out as triggering a minimum requirement of 20 creche places, which the proposed provision of 35 no. childcare places exceeds.

The creche, with a 315 sqm outdoor play area and located centrally within the northern-western land parcel, while adjacent to the access road, is also accessible from the pedestrian plaza and pedestrian street promotes healthy, sustainable travel in the new neighbourhood.

Consultation with the Cork City Childcare Committee indicated that childcare facilities should be developed in the first phase of any multi-phase development, to prevent the scenario whereby facilities permitted in later phases remain unbuilt. Each phase of the proposed development includes a self-contained creche to address this issue. The Committee's request that provision be made for full day care, part time and sessional care for ages birth to 6 years, is a creche management issue and outside the remit of the subject application. Overall, it is considered that the creche will result in a positive long-term impact, as the proposed creche will not only cater for the childcare needs of the proposed development but also the wider neighbourhood of Mahon.

Schools

Of the proposed 280 no. units, as with creche demand, the 1 or 2 bedroom units are less likely to generate as much demand for school places as 3 -bedroom dwellings within the development. As noted above a calculation of 100% of the 3 bedroom units and 75% of the 2 bedroom units. This represents 125 no. units.

It should also be noted that it generally takes multiple years for residential developments to become established and that the development is likely to initially be occupied by younger couples, young professionals and empty nesters. Due to this, it is envisaged that demand initially will be primarily for childcare services and as the development becomes more established, demand for primary and secondary will increase.

However, for the purposes of this assessment, the 'worst case scenario' has been assessed. According to 2016 Census figures, approximately 11.7% of the resident population of the study area are of primary school age (between 5 – 12 years old) with 6.7% of the population of secondary school age (between 13 – 17 years old).

Given the average household size in the study area is approximately 2.8 persons per household, the population uplift generated from the proposed development of 280 no. units would be c. 790 no. people. Therefore, it is estimated that the proposed development would result in an additional c. 92 no. children (11.7%) of primary school age in the 'worst case' scenario. If 125 no. units only are considered, which are identified above as likely to generate demand for school places then an uplift of c. 41 no children of primary school is anticipated. Therefore, the likely range is a demand for 41 – 92 primary school places.

The 2016 census figures confirm that approximately 6.7% of the study areas resident population is of secondary school age (13-17 years). This indicates that the proposed development would result in an additional c. 52 no. children of secondary school age in future years in the 'worst-case scenario'. Again, if the more realistic 125 no. units only are considered, which are identified above as likely to generate demand for school places then an uplift of c. 24 no children of secondary school is anticipated. Therefore, the likely range is a demand for 24 – 52 secondary school places.

2016 Census Reference	No. of Persons in Private Households	Average Household Size	% of population of Primary School Age (4-12 years)	% of population of Post-Primary School Age (13-17 years)
Mahon Neighbourhood	6,421	2.8 persons per household	11.7%	6.7%

Table 14.9 Summary of 'School Going' Population of Study Area (Source: 2016 Census - based on AIRO Neighbourhood Area Study in Support of the Draft City Development Plan 2021)

Projections from the Department of Education and Skills estimate that enrolment levels in schools will decrease in the coming years, initially in primary schools and subsequently in post-primary schools. The Department of Education published the *'Projections of Full-Time Enrolment Primary and Second Level 2018-2036' (2018)* which outlines various scenarios of future intake for both primary and post-primary schools. The report estimates that primary school enrolment peaked in 2018 and a continuous decline in new enrolments is expected until 2036.

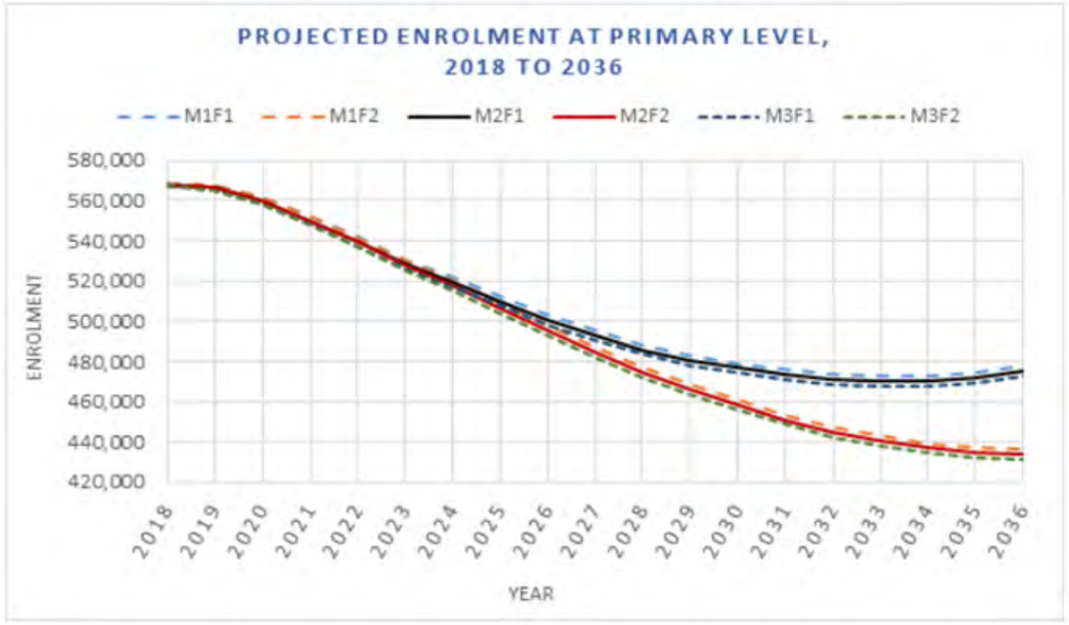


Fig 14.16 Projections of Enrolment at Primary Level, 2018–2036 (Source: Projections of Full-Time Enrolment Primary and Second Level 2018-2036 - Department of Education and Skills)

Post-primary school enrolment is not envisaged to peak until 2024/2025. Similar to trends for primary schools, a continuous decline in post primary enrolment is then expected until 2036.

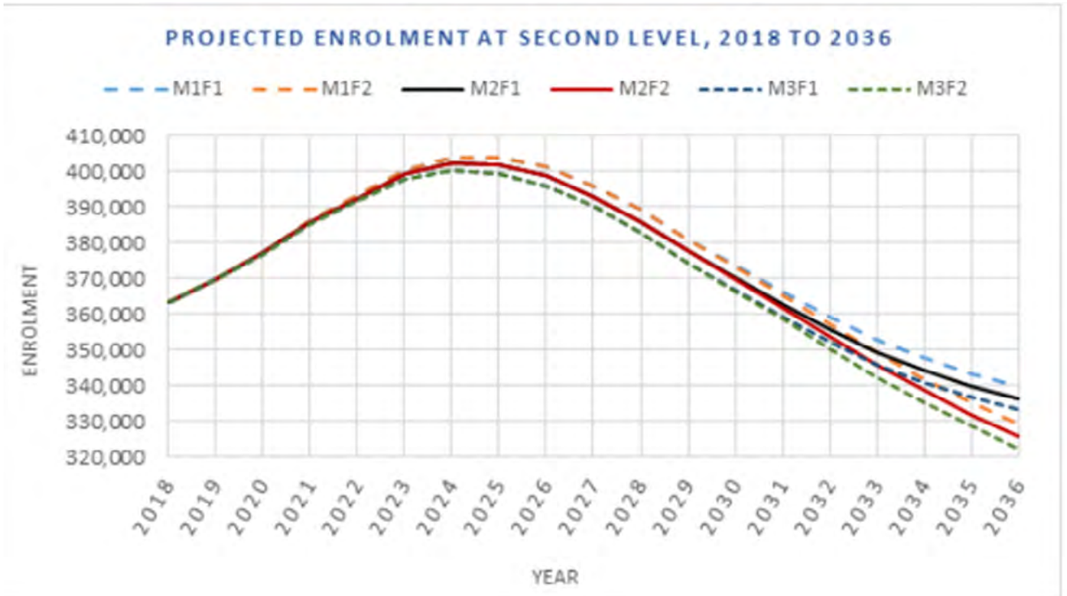


Fig 14.17 Projections of Enrolment at Second Level, 2018–2036 (Source: Projections of Full-Time Enrolment Primary and Second Level 2018-2036 - Department of Education and Skills)

Given the projected fall in both primary and secondary school enrolments in the coming years and the factors described relating to the proposed housing mix, it is considered likely, that the demand for school places will be less than the 'worst-case' scenario outlined above.

In preparation of this EIAR, a request was made to the Department of Education and Skills, 'Forward Planning' section in respect of local school's spare capacity data [8]. At the time of preparation of this EIAR no information was provided by the Department regarding the current excess capacity of existing schools within the study area.

Having regard to Figure 14.11, which indicates there is both a primary and secondary school within 15 minutes walks of the subject site, and the wider network of existing schools in the area, with 7 no. primary schools and 3 no secondary schools within a 10 minute cycle of the subject site, it is considered that there will be sufficient capacity locally to cater for future demand arising from the proposed development and that the development will result in neutral impacts on local schools and educational facilities.

The proposed development will provide a dedicated pedestrian/cycle route from the proposed development to the Passage West Greenway, which facilitates easy pedestrian and public transport access to a wide number of schools off Skehard Road and in the neighbouring Blackrock area.

[8] Refer to Email Correspondence in Appendix 14-2

14.3.5.2.2 Phase 2 'The Farm'

Childcare

The proposed development provides for a 236 sqm childcare facility with capacity for 25 no. children. The proposed development consists of the construction of 140 no. residential units comprising

- 1 no. 3 bedroom apartments (0.7%),
- 69 no. 2 bedroom apartments (49.3%),
- 70 no. 1 bedroom apartments (50%),

Section 14.3.3.2 notes however, that there are 7 no. existing childcare facilities within the study area, with an overall capacity of 462 no places and an estimated vacancy level of 163 vacancies based on the most recent Tusla reports. Nevertheless, the proposed development includes provision for a 25 no. child place creche. Of the proposed 140 no. units, it is considered that demand for creche places is more likely to be associated with the 3 bedroom units, and to a lesser extent, 2 bedroom units. We note section 4.7 of the 2020 Apartment Guidelines which states that:

> *One-bedroom or studio type units should not generally be considered to contribute to a requirement for any childcare provision and subject to location, this may also apply in part or whole, to units with two or more bedrooms.*

In line with the Guidelines 1 bedroom or studio units have not been included in the childcare provision calculation. Similarly, the Guidelines states that a similar approach may apply in part or whole to 2 bedroom units. We have taken a precautionary approach in relation to the latter and included childcare provision for 75% of the 2 bedroom units and 100% of the 3 bedroom units.

This represents 53 no. units, which based on the Appendix 2 of the Childcare Facilities Guidelines is under the minimum requirement of 75 units that triggers the requirement for a 20 creche places. Notwithstanding this it is proposed to make provision for a 25 no. childcare place creche.

The creche, with a 237 sqm outdoor play area and located centrally within the northern-western land parcel, while adjacent to the access road, is also accessible from the proposed re-instated pedestrian pathways and promotes healthy, sustainable travel in the new neighbourhood.

Consultation with the Cork City Childcare Committee indicated that childcare facilities should be developed in the first phase of any multi-phase development, to prevent the scenario whereby facilities permitted in later phases remain unbuilt. Each phase of the proposed development includes a self-contained creche to address this issue. The Committee's request that provision be made for full day care, part time and sessional care for ages birth to 6 years, is a creche management issue and outside the remit of the subject application. Overall, it is considered that the creche will result in a positive long-term impact, as the proposed creche will not only cater for the childcare needs of the proposed development but also the wider neighbourhood of Mahon.

Schools

Of the proposed 140 no. units, as with creche demand, the 1 or 2 bedroom units are less likely to generate as much demand for school places as 3 -bedroom dwellings within the development. As noted above a calculation of 100% of the 3 bedroom units and 75% of the 2 bedroom units. This represents 53 no. units.

It should also be noted that it generally takes multiple years for residential developments to become established and that the development is likely to initially be occupied by younger couples, young professionals and empty nesters. Due to this, it is envisaged that demand initially will be primarily for childcare services and as the development becomes more established, demand for primary and secondary will increase.

However, for the purposes of this assessment, the 'worst case scenario' has been assessed. As table 14.9 indicates, according to 2016 Census figures, approximately 11.7% of the resident population of the study area are of primary school age (between 5 – 12 years old) with 6.7% of the population of secondary school age (between 13 – 17 years old).

Given the average household size in the study area is approximately 2.8 persons per household, the population uplift generated from the proposed development of 140 no. units would be c. 392 no. people. From this it is estimated that the proposed development would result in an additional c. 46 no. children (11.7%) of primary school age in the 'worst case' scenario. If 53 no. units only are considered, which are identified above as likely to generate demand for school places then an uplift of c. 17 no children of primary school is anticipated. Therefore, the likely range is a demand for 17 – 46 primary school places.

The 2016 census figures confirm that approximately 6.7% of the study areas resident population is of secondary school age (13-17 years). This indicates that the proposed development would result in an additional c. 26 no. children of secondary school age in future years in the 'worst-case scenario'. Again, if the more realistic 53 no. units only are considered, which are identified above as likely to generate demand for school places then an uplift of c. 10 no children of secondary school is anticipated. Therefore, the likely range is a demand for 10 – 26 secondary school places.

Projections from the Department of Education and Skills estimate that enrolment levels in schools will decrease in the coming years, initially in primary schools and subsequently in post-primary schools. The Department of Education published the *'Projections of Full-Time Enrolment Primary and Second Level 2018-2036' (2018)* which outlines various scenarios of future intake for both primary and post-primary schools. The report estimates that primary school enrolment peaked in 2018 and a continuous decline in new enrolments is expected until 2036 (refer to Figure 14.16).

Post-primary school enrolment is not envisaged to peak until 2024/2025. Similar to trends for primary schools, a continuous decline in post primary enrolment is then expected until 2036 (refer to Figure 14.17).

Given the projected fall in both primary and secondary school enrolments in the coming years and the factors described relating to the proposed housing mix, it is considered likely, that the demand for school places will be less than the 'worst-case' scenario outlined above.

In preparation of this EIAR, a request was made to the Department of Education and Skills, 'Forward Planning' section in respect of local school's spare capacity data [9]. At the time of preparation of this EIAR no information was provided by the Department regarding the current excess capacity of existing schools within the study area.

Having regard to Figure 14.11, which indicates there is both a primary and secondary school within 15 minutes walks of the subject site, and the wider network of existing schools in the area, with 7 no. primary schools and 3 no secondary schools within a 10 minute cycle of the subject site, it is considered that there will be sufficient capacity locally to cater for future demand arising from the proposed development and that the development will result in neutral impacts on local schools and educational facilities.

The proposed development will provide a dedicated pedestrian/cycle route from the proposed development to the Passage West Greenway, which facilitates easy pedestrian and public transport access to a wide number of schools off Skehard Road and in the neighbouring Blackrock area.

[9] Refer to Email Correspondence in Appendix 14-2

14.3.5.2.3 Combined Phase 1 and Phase 2

Childcare

The proposed development provides for 2 no (306.7sqm and a 236 sqm) childcare facilites with a combined capacity for 60 no. children. The combined Phase 1 and Phase 2 proposed development consists of the construction of 420 no. residential units comprising

- 13 no. 3 bedroom apartments (3.1%),
- 219 no. 2 bedroom apartments (52.1%),
- 182 no. 1 bedroom apartments (43.3%),
- 6 no. 1 bedroom studio apartments (1.4%).

Section 14.3.3.2 notes however, that there are 7 no. existing childcare facilities within the study area, with an overall capacity of 462 no places and an estimated vacancy level of 163 vacancies based on the most recent Tusla reports. Nevertheless, the proposed development includes provision for an overall 60 no. child place facilities. Of the proposed 420 no. units, it is considered that demand for creche places is more likely to be associated with the 3 bedroom units, and to a lesser extent, 2 bedroom units.

We note section 4.7 of the 2020 Apartment Guidelines which states that:

> *One-bedroom or studio type units should not generally be considered to contribute to a requirement for any childcare provision and subject to location, this may also apply in part or whole, to units with two or more bedrooms.*

In line with the Guidelines 1 bedroom or studio units have not been included in the childcare provision calculation. Similarly, the Guidelines states that a similar approach may apply in part or whole to 2 bedroom units. We have taken a precautionary approach in relation to the latter and included childcare provision for 75% of the 2 bedroom units and 100% of the 3 bedroom units.

This represents 177 no. units, which based on the Appendix 2 of the Childcare Facilities Guidelines triggers a requirement for 40 creche places. Notwithstanding this it is proposed to make provision for a 60 no. childcare place creche.

The creches, both have generous outdoor play areas and are located centrally, while adjacent to the access roads, they are also accessible from the proposed re-instated pedestrian pathways and promotes healthy, sustainable travel in the new neighbourhood.

Consultation with the Cork City Childcare Committee indicated that childcare facilities should be developed in the first phase of any multi-phase development, to prevent the scenario whereby facilities permitted in later phases remain unbuilt. Each phase of the proposed development includes a self-contained creche to address this issue. The Committee's request that provision be made for full day care, part time and sessional care for ages birth to 6 years, is a creche management issue and outside the remit of the subject application. Overall, it is considered that the creches will result in a positive long-term impact, as the proposed creche will not only cater for the childcare needs of the proposed development but also the wider neighbourhood of Mahon.

Schools

Of the proposed 420 no. units, as with creche demand, the 1 or 2 bedroom units are less likely to generate as much demand for school places as 3 -bedroom dwellings within the development. As noted above a calculation of 100% of the 3 bedroom units and 75% of the 2 bedroom units. This represents 177 no. units.

It should also be noted that it generally takes multiple years for residential developments to become established and that the development is likely to initially be occupied by younger couples, young professionals and empty nesters. Due to this, it is envisaged that demand initially will be primarily for childcare services and as the development becomes more established, demand for primary and secondary will increase.

However, for the purposes of this assessment, the 'worst case scenario' has been assessed. As table 14.9 indicates, according to 2016 Census figures, approximately 11.7% of the resident population of the study area are of primary school age (between 5 – 12 years old) with 6.7% of the population of secondary school age (between 13 – 17 years old).

Given the average household size in the study area is approximately 2.8 persons per household, the population uplift generated from the proposed development of 420 no. units would be c. 1,176 no. people. It is estimated that the proposed development would result in an additional c. 138 no. children (11.7%) of primary school age in the 'worst case' scenario. If 177 no. units only are considered, which are identified above as likely to generate demand for school places then an uplift of c. 58 no children of primary school is anticipated. Therefore, the likely range is a demand for 58 – 138 primary school places.

The 2016 census figures confirm that approximately 6.7% of the study areas resident population is of secondary school age (13-17 years). This indicates that the proposed development would result in an additional c. 79 no. children of secondary school age in future years in the 'worst-case scenario'. Again, if the more realistic 177 no. units only are considered, which are identified above as likely to generate demand for school places then an uplift of c. 33 no children of secondary school is anticipated. Therefore, the likely range is a demand for 33 – 79 secondary school places.

Projections from the Department of Education and Skills estimate that enrolment levels in schools will decrease in the coming years, initially in primary schools and subsequently in post-primary schools. The Department of Education published the *'Projections of Full-Time Enrolment Primary and Second Level 2018-2036' (2018)* which outlines various scenarios of future intake for both primary and post-primary schools. The report estimates that primary school enrolment peaked in 2018 and a continuous decline in new enrolments is expected until 2036 (refer to Figure 14.16).

Post-primary school enrolment is not envisaged to peak until 2024/2025. Similar to trends for primary schools, a continuous decline in post primary enrolment is then expected until 2036 (refer to Figure 14.17).

Given the projected fall in both primary and secondary school enrolments in the coming years and the factors described relating to the proposed housing mix, it is considered likely, that the demand for school places will be less than the 'worst-case' scenario outlined above.

In preparation of this EIAR, a request was made to the Department of Education and Skills, 'Forward Planning' section in respect of local school's spare capacity data [10]. At the time of preparation of this EIAR no information was provided by the Department regarding the current excess capacity of existing schools within the study area.

Having regard to Figure 14.11, which indicates there is both a primary and secondary school within 15 minutes walks of the subject site, and the wider network of existing schools in the area, with 7 no. primary schools and 3 no secondary schools within a 10 minute cycle of the subject site, it is considered that there will be sufficient capacity locally to cater for future demand arising from the proposed development and that the development will result in neutral impacts on local schools and educational facilities.

The proposed development will provide a dedicated pedestrian/cycle route from the proposed development to the Passage West Greenway, which facilitates easy pedestrian and public transport access to a wide number of schools off Skehard Road and in the neighbouring Blackrock area.

[10] Refer to Email Correspondence in Appendix 14-2

14.3.6 Impacts on Community Facilities

14.3.6.1 Construction Phase

14.3.6.1.1 Phase 1 'The Meadows'

Due to the distance between the subject site and the majority of the nearest community facilities it is expected that any impacts during construction phase will be imperceptible. However, due to its proximity some slight negative short-term impacts relating to noise, vibration, dust emissions and increased traffic levels may occur at the Bessborough Day Care Centre in the absence of appropriate mitigation measures during construction. It is concluded that the impacts of proposed construction phase will be neutral and will not negatively impact the operations of any community facilities, subject to the specified mitigation measures as described in the Phase 1 CEMP (Appendix 2-1) being implemented.

14.3.6.1.2 Phase 2 'The Farm'

Due to the distance between the subject site and the majority of the nearest community facilities it is expected that any impacts during construction phase will be imperceptible. However, due to its proximity some slight negative short-term impacts relating to noise, vibration, dust emissions and increased traffic levels may occur at the Bessborough Day Care Centre in the absence of appropriate mitigation measures during construction. It is concluded that the impacts of proposed construction phase will be neutral and will not negatively impact the operations of any community facilities, subject to the specified mitigation measures as described in the Phase 2 CEMP (Appendix 2-2) being implemented.

14.3.6.1.3 Combined Phase 1 and Phase 2

Due to the distance between the subject site and the majority of the nearest community facilities it is expected that any impacts during construction phase will be imperceptible. However, due to its proximity some slight negative short-term impacts relating to noise, vibration, dust emissions and increased traffic levels may occur at the Bessborough Day Care Centre in the absence of appropriate mitigation measures during construction. It is concluded that the impacts of proposed construction phase will be neutral and will not negatively impact the operations of any community facilities, subject to the specified mitigation measures as described in the Phase 1 and Phase 2 CEMPs (Appendices 2-1 and 2-2) being implemented.

14.3.6.2 Operational Phase

14.3.6.2.1 Phase 1 'The Meadows'

Once operational the proposed development will likely result in an increased demand for local community services such as the local post office, community centre, churches and banks amongst other similar uses. In addition to the various public open spaces and play areas within the proposed development, provision is made for a café and a creche and a range of communal residents' facilities.

14.3.6.2.2 Phase 2 'The Farm'

Once operational the proposed development will likely result in an increased demand for local community services such as the local post office, community centre, churches and banks amongst other similar uses. In addition to the central parkland, various public open spaces and play areas within the proposed development, provision is made for a creche and a range of communal residents' facilities providing for significant positive and permanent impacts.

14.3.6.2.3 Combined Phase 1 and Phase 2

Once operational the proposed development will likely result in an increased demand for local community services such as the local post office, community centre, churches and banks amongst other similar uses. In addition to the central parkland, various public open spaces and play areas within the proposed development, provision is made for a café, a creche and a range of communal residents' facilities providing for significant positive and permanent impacts.

14.3.7 Impacts on Retail Services

14.3.7.1 Construction Phase

14.3.7.1.1 Phase 1 'The Meadows'

Construction phase of the proposed development is likely to result in moderate short term positive impacts to local retail outlets. Construction workers will likely avail of local retail services for food and refreshments reflecting increased economic and retail activities in the settlement.

14.3.7.1.2 Phase 2 'The Farm'

Construction phase of the proposed development is likely to result in moderate short term positive impacts to local retail outlets. Construction workers will likely avail of local retail services for food and refreshments reflecting increased economic and retail activities in the settlement.

14.3.7.1.3 Combined Phase 1 and Phase 2

Construction phase of the proposed development is likely to result in moderate short term positive impacts to local retail outlets. Construction workers will likely avail of local retail services for food and refreshments reflecting increased economic and retail activities in the settlement.

14.3.7.2 Operational Phase

14.3.7.2.1 Phase 1 'The Meadows'

Once operational, the population increase resultant from the proposed development will result in significant positive and permanent impacts to the local economy and retail services in Mahon. The proposed uplift in population will not only assist in achieving a critical population base in the Skehard Road area, where it will supporting the continued viability of existing retail outlets, but also create further opportunities to diversify the existing retail/commercial environment. It will in addition, support the continued successful development of the Mahon District Centre.

14.3.7.2.2 Phase 2 'The Farm'

Once operational, the population increase resultant from the proposed development will result in significant positive and permanent impacts to the local economy and retail services in Mahon. The proposed uplift in population will not only assist in achieving a critical population base in the Skehard Road area, where it will supporting the continued viability of existing retail outlets, but also create further opportunities to diversify the existing retail/commercial environment. It will in addition, support the continued successful development of the Mahon District Centre.

14.3.7.2.3 Combined Phase 1 and Phase 2

Once operational, the population increase resultant from the proposed development will result in significant positive and permanent impacts to the local economy and retail services in Mahon. The proposed uplift in population will not only assist in achieving a critical population base in the Skehard Road area, where it will supporting the continued viability of existing retail outlets, but also create further opportunities to diversify the existing retail/commercial environment. It will in addition, support the continued successful development of the Mahon District Centre.

14.3.8 Impacts on Health Services

14.3.8.1 Construction Phase

14.3.8.1.1 Phase 1 'The Meadows'

Due to the subject site's lack of immediate proximity to the nearest health outlet/service, it envisaged that the construction phase of the development will result in no significant impacts (ref to Section 14.4.6 in relation to the Bessborough Day Care Centre).

14.3.8.1.2 Phase 2 'The Farm'

Due to the subject site's lack of immediate proximity to the nearest health outlet/service, it envisaged that the construction phase of the development will result in no significant impacts (ref to Section 14.4.6 in relation to the Bessborough Day Care Centre).

14.3.8.1.3 Phase 1 and Phase 2

Due to the subject site's lack of immediate proximity to the nearest health outlet/service, it envisaged that the construction phase of the development will result in no significant impacts (ref to Section 14.4.6 in relation to the Bessborough Day Care Centre).

14.3.8.2 Operational Phase

14.3.8.2.1 Phase 1 'The Meadows'

Once operational, the population increase generated by the proposed development will result in increased demand for local healthcare services, particularly in the Mahon Health Centre and other services in the Mahon area. Given the wide variety of medical facilities in the study area and the predicted demographics of the proposed scheme it is considered that the proposed development will result in imperceptible impacts on local health services.

14.3.8.2.2 Phase 2 'The Farm'

Once operational, the population increase generated by the proposed development will result in increased demand for local healthcare services, particularly in the Mahon Health Centre and other services in the Mahon area. Given the wide variety of medical facilities in the study area and the predicted demographics of the proposed scheme it is considered that the proposed development will result in imperceptible impacts on local health services.

14.3.8.2.3 Phase 1 and Phase 2

Once operational, the population increase generated by the proposed development will result in increased demand for local healthcare services, particularly in the Mahon Health Centre and other services in the Mahon area. Given the wide variety of medical facilities in the study area and the predicted demographics of the proposed scheme it is considered that the proposed development will result in imperceptible impacts on local health services.

14.3.9 Impacts on Emergency Services

14.3.9.1 Construction Phase

14.3.9.1.1 Phase 1 'The Meadows'

There are no emergency services in the site's immediate vicinity. The construction phase will not result in any imperceptible impacts for local emergency services.

14.3.9.1.2 Phase 2 'The Farm'

There are no emergency services in the site's immediate vicinity. The construction phase will not result in any imperceptible impacts for local emergency services.

14.3.9.1.3 Phase 1 and Phase 2

There are no emergency services in the site's immediate vicinity. The construction phase will not result in any imperceptible impacts for local emergency services.

14.3.9.2 Operational Phase

14.3.9.2.1 Phase 1 'The Meadows'

As referenced previously, the closest Garda Station to Mahon is at Blackrock and the closest fire station is at Anglesea Street in Cork City. The closest hospitals include the Mater Private in Mahon, St Finbarrs Hospital and South Infirmary Hospital in Cork City. Due to the scale and nature of the prosed development in addition to the availability of emergency services in the area, it is considered that the proposed development will result in imperceptible impacts on emergency service provision.

14.3.9.2.2 Phase 2 'The Farm'

As referenced previously, the closest Garda Station to Mahon is at Blackrock and the closest fire station is at Anglesea Street in Cork City. The closest hospitals include the Mater Private in Mahon, St Finbarrs Hospital and South Infirmary Hospital in Cork City. Due to the scale and nature of the prosed development in addition to the availability of emergency services in the area, it is considered that the proposed development will result in imperceptible impacts on emergency service provision.

14.3.9.2.3 Combined Phase 1 and Phase 2

As referenced previously, the closest Garda Station to Mahon is at Blackrock and the closest fire station is at Anglesea Street in Cork City. The closest hospitals include the Mater Private in Mahon, St Finbarrs Hospital and South Infirmary Hospital in Cork City. Due to the scale and nature of the prosed development in addition to the availability of emergency services in the area, it is considered that the proposed development will result in imperceptible impacts on emergency service provision.

14.3.10 Impacts on Public Transport

14.3.10.1 Construction Phase

14.3.10.1.1 Phase 1 'The Meadows'

The site's location is adjacent to a bus stop which is currently well served by a number of existing public transport services (See Table 14.12). During construction, the proposed development is likely to result in an uplift in the use of public transport services (See Table 14.12) with an associated moderate short-term positive impact. The increased use of public transport will promote sustainable commuting patterns and positively support public transport services in the area.

14.3.10.1.2 Phase 2 'The Farm'

The site's location is adjacent to a bus stop which is currently well served by a number of existing public transport services (See Table 14.12). During construction, the proposed development is likely to result in an uplift in the use of public transport services (See Table 14.12) with an associated moderate short-term positive impact. The increased use of public transport will promote sustainable commuting patterns and positively support public transport services in the area.

14.3.10.1.3 Combined Phase 1 and Phase 2

The site's location is adjacent to a bus stop which is currently well served by a number of existing public transport services (See Table 14.12). During construction, the proposed development is likely to result in an uplift in the use of public transport services (See Table 14.12) with an associated moderate short-term positive impact. The increased use of public transport will promote sustainable commuting patterns and positively support public transport services in the area.

14.3.10.2 Operational Phase

14.3.10.2.1 Phase 1 'The Meadows'

Once operational, it is envisaged that the proposed development will likely result in profound positive, permanent impacts in terms of public transport provision. The proposed development will support the continued viability of public transport services in the area, reduce car car-dependent inward commuter flows into Mahon by juxtaposing population and employment centres and promote sustainable modes of transport. In addition, increased population density at this location will support proposal for an LRT in proximity to the site, serving the City Centre.

The subject site's location is immediately adjacent to 2 no. greenways, which lead directly to the Mahon District Centre, a number of other employment hubs, towards education and recreational facilities. Future residents of the scheme will have convenient pedestrian/cyclist access to a high frequency public transport link..

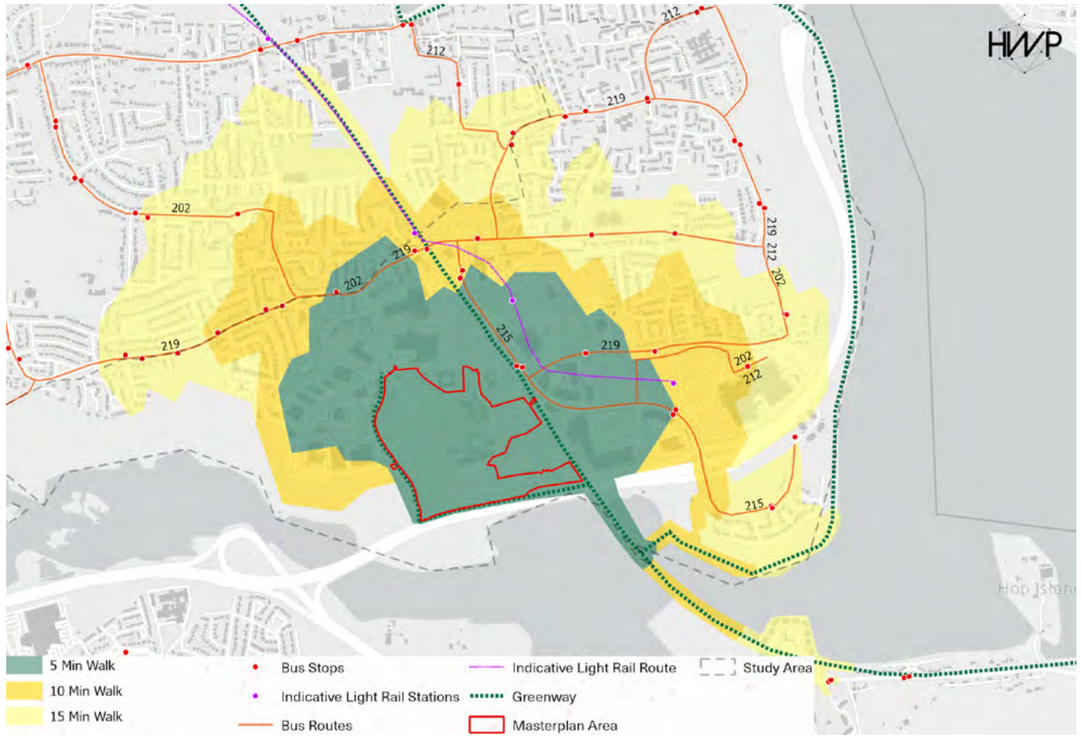


Fig 14.18 5-10 minute cycling times from the subject lands

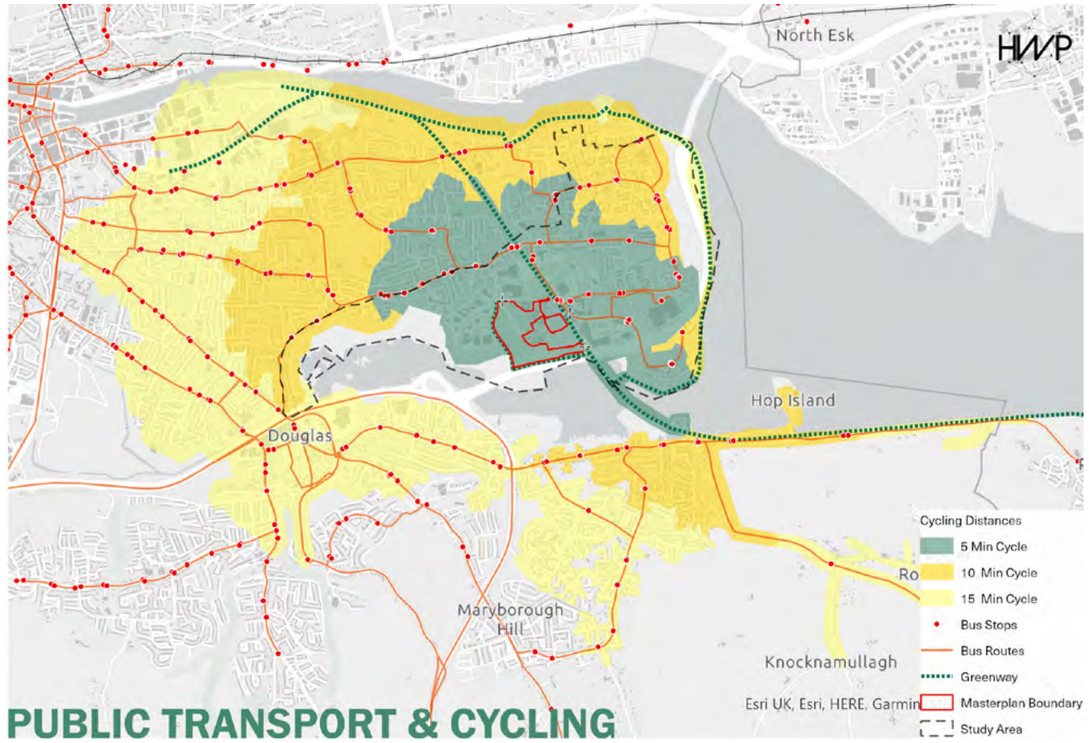


Fig 14.19 5-10 minute walking times from the subject lands

The population uplift generated from the development will result in the creation of a new community who will avail of public transport as a means of commuting to other urban centres such as the City Centre, Blackrock, Douglas and Rochestown.

As evidenced by 2016 census information, Mahon's inward commuter flows are disproportionately car-dependant. The proposed development represents the concentration of growth on an undeveloped site within walking/cycling distance of the Strategic Employment Hub. The public realm upgrades proposed will promote sustainable commuting patterns and reduce car dependency. This will result in significant positive long-term impacts on sustainable modes of travel and public transport.

14.3.10.2.2 Phase 2 'The Farm'

Once operational, it is envisaged that the proposed development will likely result in profound positive, permanent impacts in terms of public transport provision. The proposed development will support the continued viability of public transport services in the area, reduce car car-dependent inward commuter flows into Mahon by juxtaposing population and employment centres and promote sustainable modes of transport. In addition, increased population density at this location will support proposal for an LRT in proximity to the site, serving the City Centre.

The subject site's location is immediately adjacent to 2 no. greenways, which lead directly to the Mahon District Centre, a number of other employment hubs, towards education and recreational facilities. Future residents of the scheme will have convenient pedestrian/cyclist access to a high frequency public transport link (ref Figure 14.18 and Figure 14.19).

The population uplift generated from the development will result in the creation of a new community who will avail of public transport as a means of commuting to other urban centres such as the City Centre, Blackrock, Douglas and Rochestown.

As evidenced by 2016 census information, Mahon's inward commuter flows are disproportionately car-dependant. The proposed development represents the concentration of growth on an undeveloped site within walking/cycling distance of the Strategic Employment Hub. The public realm upgrades proposed will promote sustainable commuting patterns and reduce car dependency. This will result in significant positive long-term impacts on sustainable modes of travel and public transport.

14.3.10.2.3 Combined Phase 1 and Phase 2

Once operational, it is envisaged that the proposed development will likely result in profound positive, permanent impacts in terms of public transport provision. The proposed development will support the continued viability of public transport services in the area, reduce car car-dependent inward commuter flows into Mahon by juxtaposing population and employment centres and promote sustainable modes of transport. In addition, increased population density at this location will support proposal for an LRT in proximity to the site, serving the City Centre.

The subject site's location is immediately adjacent to 2 no. greenways, which lead directly to the Mahon District Centre, a number of other employment hubs, towards education and recreational facilities. Future residents of the scheme will have convenient pedestrian/cyclist access to a high frequency public transport link (ref Figure 14.18 and Figure 14.19).

The population uplift generated from the development will result in the creation of a new community who will avail of public transport as a means of commuting to other urban centres such as the City Centre, Blackrock, Douglas and Rochestown.

As evidenced by 2016 census information, Mahon's inward commuter flows are disproportionately car-dependant. The proposed development represents the concentration of growth on an undeveloped site within walking/cycling distance of the Strategic Employment Hub. The public realm upgrades proposed will promote sustainable commuting patterns and reduce car dependency. This will result in significant positive long-term impacts on sustainable modes of travel and public transport.

14.4 Mitigation Measures, Monitoring and Residual Impacts

14.4.1 Mitigation & Monitoring

14.4.1.1 Construction Phase

14.4.1.1.1 Phase 1 'The Meadows'

The potential impacts on the human environment relate to other environmental aspects such as air quality, noise and vibration, water quality and traffic and where required, the related mitigation measures are dealt with in the corresponding chapters of this EIAR. Full details of all mitigation and monitoring procedures during construction phase are described in the CEMP (Appendix 2-1) prepared by J.B. Barry and Associates. The CEMP has been specifically designed and will be monitored to ensure that any negative impacts arising from the construction phase of the development on neighbouring properties or surrounding areas are minimised through mitigation measures which include.

- The construction phase will be in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- In addition to the CEMP the appointed Contractor will ensure any employed subcontractors will also be required to adhere to all safety reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) has been appointed as part of the design stage. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction. A Project Supervisor for the Construction Stage (PSCS) will be appointed as part of the construction stage.
- Protective barriers will be installed around trees to be retained prior to commencement of works on site which shall remain in place for the duration of construction works.
- Site hoarding and barriers will prevent unauthorised access to the each works area.
- In order to mitigate any impact of construction activities there will be, coordination of deliveries to site within working hours and scheduling of noisier activities at earlier times of the day Noise and vibration mitigation measures will be adopted as outlined in the CEMP. The delivery of materials to the site during the construction phase shall be organised so that deliveries are minimised and do not cause traffic hazard. Deliveries will not permitted a peak times of traffic 8.00am to 9.00am and 5.00pm to 6.00pm and all construction vehicles are parked within the site.
- A Dust Management Plan will be implemented.
- 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.

14.4.1.1.2 Phase 2 'The Farm'

The potential impacts on the human environment relate to other environmental aspects such as air quality, noise and vibration, water quality and traffic and where required, the related mitigation measures are dealt with in the corresponding chapters of this EIAR. Full details of all mitigation and monitoring procedures during construction phase are described in the CEMP (Appendix 2-2) prepared by J.B. Barry and Associates. The CEMP has been specifically designed and will be monitored to ensure that any negative impacts arising from the construction phase of the development on neighbouring properties or surrounding areas are minimised through mitigation measures which include.

- The construction phase will be in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- In addition to the CEMP the appointed Contractor will ensure any employed subcontractors will also be required to adhere to all safety reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) has been appointed as part of the design stage. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction. A Project Supervisor for the Construction Stage (PSCS) will be appointed as part of the construction stage.
- Protective barriers will be installed around trees to be retained prior to commencement of works on site which shall remain in place for the duration of construction works.
- Site hoarding and barriers will prevent unauthorised access to the each works area.
- In order to mitigate any impact of construction activities there will be, coordination of deliveries to site within working hours and scheduling of noisier activities at earlier times of the day Noise and vibration mitigation measures will be adopted as outlined in the CEMP. The delivery of materials to the site during the construction phase shall be organised so that deliveries are minimised and do not cause traffic hazard. Deliveries will not permitted a peak times of traffic 8.00am to 9.00am and 5.00pm to 6.00pm and all construction vehicles are parked within the site.
- A Dust Management Plan will be implemented.
- 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.

14.4.1.1.3 Combined Phase 1 and Phase 2

The potential impacts on the human environment relate to other environmental aspects such as air quality, noise and vibration, water quality and traffic and where required, the related mitigation measures are dealt with in the corresponding chapters of this EIAR. Full details of all mitigation and monitoring procedures during construction phase are described in the Phase 1 and Phase 2 CEMPs (Appendix 2-1 and Appendix 2-2) prepared by J.B. Barry and Associates. The CEMPs have been specifically designed and will be monitored to ensure that any negative impacts arising from the construction phase of the development on neighbouring properties or surrounding areas are minimised through mitigation measures which include.

- The construction phase will be in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- In addition to the CEMPs the appointed Contractor will ensure any employed subcontractors will also be required to adhere to all safety reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) has been appointed as part of the design stage. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction. A Project Supervisor for the Construction Stage (PSCS) will be appointed as part of the construction stage.
- Protective barriers will be installed around trees to be retained prior to commencement of works on site which shall remain in place for the duration of construction works.
- Site hoarding and barriers will prevent unauthorised access to the each works area.
- In order to mitigate any impact of construction activities there will be, coordination of deliveries to site within working hours and scheduling of noisier activities at earlier times of the day Noise and vibration mitigation measures will be adopted as outlined in the CEMP. The delivery of materials to the site during the construction phase shall be organised so that deliveries are minimised and do not cause traffic hazard. Deliveries will not permitted a peak times of traffic 8.00am to 9.00am and 5.00pm to 6.00pm and all construction vehicles are parked within the site.
- A Dust Management Plan will be implemented.
- 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.

14.4.1.2 Operational Phase

14.4.1.2.1 Phase 1 'The Meadows'

The site layout responds to the site's cultural and landscape sensitivities within the historic Bessborough Estate and the evolving development context of Mahon. The proposed landscape and planting strategy will mitigate the minimal tree loss required to accommodate the proposed pedestrian/cyclist bridge over the greenway and water infrastructure connection through the site.

The pedestrian/cyclist routes through the proposed development will result in significant positive and permanent impacts to pedestrian and cyclist mobility in the wider Mahon neighbourhood and will deliver the long-standing Council objective of addressing severance and increasing the integration between the Bessborough Estate and Mahon. By promoting the usage of public transport as a viable means of commuting to nearby District Centre and other employment and education destinations, the proposed development will result in a positive impact on the private car based inward commuter flows into Mahon identified in the 2016 Census. The proposed public open spaces and creche will all significantly positively and permanently contribute to the communal and public facilities in Mahon.

14.4.1.2.2 Phase 2 'The Farm'

The site layout responds to the site's cultural and landscape sensitivities within the historic Bessborough Estate and the evolving development context of Mahon. The proposed landscape and planting strategy will mitigate the tree loss required to accommodate the proposed development, the proposed pedestrian/cyclist bridge over the greenway and water infrastructure connection through the site. Critically, the landscape plan focussed on re-instating the historic landscape character and features where feasible. The opening up of the currently publicly inaccessible parkland into a public amenity space will have a significant positive impact on the population of Mahon and the wider city.

The pedestrian/cyclist routes through the proposed development will also result in significant positive and permanent impacts to pedestrian and cyclist mobility in the wider Mahon neighbourhood and will deliver the long-standing Council objective of addressing severance and increasing the integration between the Bessborough Estate and Mahon. By promoting the usage of public transport as a viable means of commuting to nearby District Centre and other employment and education destinations, the proposed development will result in a positive impact on the private car based inward commuter flows into Mahon identified in the 2016 Census. The proposed public open spaces and creche will all significantly positively and permanently contribute to the communal and public facilities in Mahon.

14.4.1.2.3 Combined Phase 1 and Phase 2

The site layout responds to the site's cultural and landscape sensitivities within the historic Bessborough Estate and the evolving development context of Mahon. The proposed landscape and planting strategy will mitigate the tree loss required to accommodate the proposed development, the proposed pedestrian/cyclist bridge over the greenway and water infrastructure connection through the site. Critically, the landscape plan focussed on re-instating the historic landscape character and features where feasible. The opening up of the currently publicly inaccessible parkland into a public amenity space will have a significant positive impact on the population of Mahon and the wider city.

The pedestrian/cyclist routes through the proposed development will also result in significant positive and permanent impacts to pedestrian and cyclist mobility in the wider Mahon neighbourhood and will deliver the long-standing Council objective of addressing severance and increasing the integration between the Bessborough Estate and Mahon. By promoting the usage of public transport as a viable means of commuting to nearby District Centre and other employment and education destinations, the proposed development will result in a positive impact on the private car based inward commuter flows into Mahon identified in the 2016 Census. The proposed public open spaces and creche will all significantly positively and permanently contribute to the communal and public facilities in Mahon.

14.4.2 Residual Impacts

14.4.2.1 Phase 1 'The Meadows'

Residual impacts refer to those impacts that remain following the implementation of mitigation measures. It is considered that subject to the mitigation measures outlined in the CEMP, and EIAR being implemented, the proposed development will result in many positive and permanent residual impacts including.

- The creation of a new community in Ballinure, orientated around a high frequency public transport link which can promote sustainable commuting patterns to nearby urban and employment centres.
- The delivery of a new pedestrian/cyclist route connection linking the Bessborough Estate and Mahon

- The delivery of a new café, creche, plaza, pedestrian street and public amenity areas which will positively contribute to the Mahon neighbourhood's childcare and community facilities.

It is acknowledged that the loss of a minimal number of mature trees will occur as a residual impact of the proposed development, specifically the pedestrian bridge and the water infrastructure connection. As detailed in Chapter 3 of this EIAR (Alternatives Considered) the route and form of these have been designed to minimise impacts on all good quality trees as defined in the arborists report. While, the development will result in a landscape/townscape impact of medium-low magnitude the proposed planting of new trees and shrubs throughout the site will enrich its existing verdant character which is likely to be strengthened, rather than weakened, by the proposed development and mitigate the loss of those existing trees.

In relation to the impact of the proposed project on Population and Human Health it is considered that the monitoring measures outlined in regard to the other environmental topics such as water, air quality and climate and noise etc. sufficiently address monitoring requirements.

14.4.2.1.1 Phase 2 'The Farm'

Residual impacts refer to those impacts that remain following the implementation of mitigation measures. It is considered that subject to the mitigation measures outlined in the CEMP, and EIAR being implemented, the proposed development will result in many positive and permanent residual impacts including.

- The creation of a new community in Ballinure, orientated around a high frequency public transport link which can promote sustainable commuting patterns to nearby urban and employment centres.
- The delivery of a new pedestrian/cyclist route connection linking the Bessborough Estate and Mahon
- The delivery of a new public parkland, a creche, a plaza, and public amenity areas will positively contribute to the Mahon neighbourhood's recreation, childcare and community facilities.

It is acknowledged that the loss of a number of mature trees will occur as a residual impact of the proposed development. As detailed in Chapter 3 of this EIAR (Alternatives Considered) the form of the layout has been designed to minimise impacts on all good quality trees as defined in the arborists report. While the development will result in a landscape/townscape impact of medium-low magnitude the proposed planting of new trees and shrubs throughout the site will enrich its existing verdant character which is likely to be strengthened, rather than weakened, by the proposed development and mitigate the loss of those existing significant trees.

In relation to the impact of the proposed project on Population and Human Health it is considered that the monitoring measures outlined in regard to the other environmental topics such as water, air quality and climate and noise etc. sufficiently address monitoring requirements.

14.4.2.1.2 Combined Phase 1 and Phase 2

Residual impacts refer to those impacts that remain following the implementation of mitigation measures. It is considered that subject to the mitigation measures outlined in the Phase 1 and Phase 2 CEMPs, and EIAR being implemented, the proposed development will result in many positive and permanent residual impacts including.

- The creation of a new community in Ballinure, orientated around a high frequency public transport link which can promote sustainable commuting patterns to nearby urban and employment centres,
- The delivery of a new pedestrian/cyclist route connection linking the Bessborough Estate and Mahon,
- The delivery of a new public parkland, a café, 2 no. creches, 2 no. plazas, and public amenity areas will positively contribute to the Mahon neighbourhood's recreation, childcare and community facilities.

It is acknowledged that the loss of a number of mature trees will occur as a residual impact of the proposed development. As detailed in Chapter 3 of this EIAR (Alternatives Considered) the form of the layout has been designed to minimise impacts on all good quality trees as defined in the arborists report. While the development will result in a landscape/townscape impact of medium-low magnitude the proposed planting of new trees and shrubs throughout the site will enrich its existing verdant character which is likely to be strengthened, rather than weakened, by the proposed development and mitigate the loss of those existing significant trees.

In relation to the impact of the proposed project on Population and Human Health it is considered that the monitoring measures outlined in regard to the other environmental topics such as water, air quality and climate and noise etc. sufficiently address monitoring requirements.

14.5 Cumulative Impacts

The potential cumulative impact of the relevant plan for the area was assessed, which is considered to be the 2015 Cork City Development Plan. The assessment of the potential impacts on the environment of the Cork City Development Plan 2015, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 1, Population as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

To create a sustainable compact city, a high quality safe environment in which to live, work or visit.

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 1 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in the most positive interaction for most of the population with EPO 1

14.5.1 Construction Phase

14.5.1.1 Phase 1 'The Meadows'

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These include.

Application Reference	Applicant(s)	Description	Outcome/Current Status
Cork City Council Ref: 17/37565	Denis O' Brien Developments (Cork) Ltd.	Construction of 66 no. residential units and all associated ancillary development works including vehicular access, parking, footpaths, landscaping, drainage and amenity areas.	Granted by way of Material Contravention of City Development Plan on 24/04/2018. Crawford Gate Development. Last phase under construction.
Cork City Council Ref: 18/37820	Bessboro Warehouse Holdings Ltd	The demolition and removal of the existing warehouse/distribution building and associated structures and the construction of 135 no. residential units comprising 24 no. dwelling houses, 64 no. duplex apartments and a three storey apartment block (comprising 20 no. apartments) and a four storey apartment block (comprising 27 no. apartments) and 1 no. creche.	Granted by way of Material Contravention of City Development Plan on 28/02/2019.
Cork City Council Ref: 21/40481	The Bessborough Centre Limited	Permission for the construction of a new single storey detached classroom to be associated with the existing Bessborough Creche including all associated site works.	Conditional Grant on the 13/12/2021
Cork City Council Ref: 2140503	The Bessborough Centre Limited	Permission for the change of use of an existing building from office use to classrooms and associated educational use. The building area subject to the change of use is the ground floor of the existing two storey Coach Building, the existing single storey Anvil Building with attached toilet block, and the existing two storey Gallery Building, all part of an enclosed courtyard structure.	Conditional Grant on the 22/12/2021
Cork City Council Ref: 2140453	First Step Homes Ireland Ltd	Permission to alter and extend the previously granted Creche building granted under planning reference No. 18/37820 and An Bord Pleanala ABP-302784-18 to incorporate a larger ground floor Creche/Community facility and bin store. The application is also to include for the permission of 10. no. first and second floors apartments to consist of the following: 5 no. first floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and 5 no. second floor apartments: 2 no. 1 bed and 3 no. 2 bed with communal storage and all associated site works.	Conditional Grant on 17/1/2022

Table 14.10 Cumulative Impacts – Projects Considered

The assessment also has regard to the development opportunity that remains in the nearby site where the following planning applications were refused in 2021

Application Reference	Applicant(s)	Description	Outcome/Current Status
An Bord Pleanala Ref: ABP-308790-20	MWB Two Limited	Permission for the construction of a strategic housing development of 179 number residential units. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 25/05/2021 on basis of prematurity related to resolution of matters concerning a potential burial ground on the site.
Cork City Council Ref: 2039705/ABP-309560-1	MWB Two Limited	Permission for the construction of 67 apartments in an 8-storey apartment. A Natura impact statement (NIS) will be submitted to the planning authority with the application. Bessboro, Ballinure, Blackrock, Co Cork.	Refused on the 15/07 /2021 as would result in Haphazard form of Development. The ABP Inspector considered that, in principle, should the lands immediately to the north be developed the subject site would be suitable for residential development whereby a material contravention of the zoning provisions of the development plan could be countenanced. These lands therefore are included in this assessment as they retain development potential. At the time of writing this EIAR, the zoning in the operative CDP supports the principle of development on the ABP-308790-20 lands. It is included here on that basis.

Table 14.11 Cumulative Impacts – Development Potential

For the purposes of this assessment of impacts a 'worst case' scenario has been assessed based on the information contained in these planning applications and the other projects stated in Chapter 1. It is envisaged that subject to the implementation of mitigation measures proposed, that the proposed development will result in no significant impacts relating to air quality, noise, vibration or traffic.

14.5.1.2 Phase 2 'The Farm'

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These are outlined in Table 14.10. The assessment also has regard to the development opportunity that remains in the nearby site where the following planning application was refused in 2021 (refer Table 14.11).

For the purposes of this assessment of impacts a 'worst case' scenario has been assessed based on the information contained in these planning applications and the other projects stated in Chapter 1. It is envisaged that subject to the implementation of mitigation measures proposed, that the proposed development will result in no significant impacts relating to air quality, noise, vibration or traffic.

14.5.1.3 Combined Phase 1 and Phase 2

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These are outlined in Table 14.10. The assessment also has regard to the development opportunity that remains in the nearby sites where planning application were refused in 2021 (refer Table 14.11).

For the purposes of this assessment of impacts a 'worst case' scenario has been assessed based on the information contained in these planning applications and the other projects stated in Chapter 1. It is envisaged that subject to the implementation of mitigation measures proposed, that the proposed development will result in no significant impacts relating to air quality, noise, vibration or traffic.

14.5.1.4 Combined Masterplan Area (including Phases 1 - 3)

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other permitted developments in the area, which are currently under construction. These are outlined in Table 14.10. The assessment also has regard to the development opportunity that remains in the nearby sites where planning application were refused in 2021 (refer Table 14.11).

For the purposes of this assessment of impacts a 'worst case' scenario has been assessed based on the information contained in these planning applications and the other projects stated in Chapter 1. It is envisaged that subject to the implementation of mitigation measures proposed, that the proposed development will result in no significant impacts relating to air quality, noise, vibration or traffic.

The assessment of the potential impacts on the environment of the Cork City Development Plan, the operative development plan, was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

EPO 1, Population as detailed in Table 4-1 of Volume Four of the Cork City Development Plan 2015 is to

> *To create a sustainable compact city, a high quality safe environment in which to live, work or visit.*

Table 4-2 of Volume Four of the Cork City Development Plan 2015 indicates that Scenario 3, the 'Preferred Scenario' has a positive interaction with the status of EPO 1 and Sections 4.30 – 4.41 indicate that the preferred scenario will result in the most positive interaction for most of the population with EPO 1.

14.5.2 Operational Phase

14.5.2.1 Phase 1 'The Meadows'

Once constructed, the proposed development will be permanent and non-reversible. It is considered that cumulative impacts relating to human health factors including traffic, road safety, air quality, water quality, noise and vibration will be not significant.

The proposed development in context of other developments in the area may result in negative impacts in terms on the existing landscape, dependant on the context of the visual analysis conducted. This is further detailed in Chapter 4 of this EIAR.

However, in the context of profound benefits in terms of the delivery of cyclist/pedestrian connectivity between the Bessborough Estate and Mahon, a new much needed residential community adjacent to this strategic employment hub, well served by public transport with access to a greenway and including a café, a creche and public open space, it is considered that the development will result in significant benefits in terms of wider human health considerations.

14.5.2.2 Phase 2 'The Farm'

Once constructed, the proposed development will be permanent and non-reversible. It is considered that cumulative impacts relating to human health factors including traffic, road safety, air quality, water quality, noise and vibration will be not significant.

The proposed development in context of other developments in the area may result in negative impacts in terms on the existing landscape, dependant on the context of the visual analysis conducted. This is further detailed in Chapter 4 of this EIAR.

However, in the context of profound benefits in terms of the delivery of cyclist/pedestrian connectivity between the Bessborough Estate and Mahon, a new much needed residential community adjacent to this strategic employment hub, well served by public transport with access to a greenway and including a new publicly accessible parkland which connects to the 2 no existing greenways, a creche and public open space, it is considered that the development will result in significant benefits in terms of wider human health considerations.

14.5.2.3 Combined Phase 1 and Phase 2

Once constructed, the proposed development will be permanent and non-reversible. It is considered that cumulative impacts relating to human health factors including traffic, road safety, air quality, water quality, noise and vibration will be not significant.

The proposed development in context of other developments in the area may result in negative impacts in terms on the existing landscape, dependant on the context of the visual analysis conducted. This is further detailed in Chapter 4 of this EIAR.

However, in the context of profound benefits in terms of the delivery of cyclist/pedestrian connectivity between the Bessborough Estate and Mahon, a new much needed residential community adjacent to this strategic employment hub, well served by public transport with access to a greenway and including a new publicly accessible parkland

which connects to the 2 no existing greenways, a café, 2 no. creches and public open space, it is considered that the development will result in significant benefits in terms of wider human health considerations.

14.5.2.4 Combined Masterplan Area (including Phases 1 - 3)

Once constructed, the proposed development will be permanent and non-reversible. It is considered that cumulative impacts relating to human health factors including traffic, road safety, air quality, water quality, noise and vibration will be not significant.

The proposed development in the context of other developments in the area may result in negative impacts in terms on the existing landscape, dependant on the context of the visual analysis conducted. This is further detailed in Chapter 4 of this EIAR, where overall, it is considered that Overall, it is considered that the proposed development is an appropriate contribution to the built fabric of the study area that will not result in any significant townscape or visual impacts.

In the context of profound benefits in terms of the delivery of cyclist/pedestrian connectivity between the Bessborough Estate and Mahon, a new much needed residential community adjacent to this strategic employment hub, well served by public transport with access to a greenway and including a National Memorial and Records Centre building and Remembrance Park to the south, a second new publicly accessible parkland which connects to the 2 no existing greenways, a café, 3 no. creches and public open space, it is considered that the combined development will result in significant positive benefits in terms of wider human health considerations.

In respect of the sensitivities associated with the former intuitional use of the site as a mother and baby home, the masterplanning of the area has included positive and sensitive consideration of memorialisation consistent with Theme 6 of the Action Plan for Survivors and Former Residents of Mother and Baby and County Home Institutions. It incorporates a suggestion by local survivors that former ‘farm girls’ should be memorialised in Phase 2 ‘The Farm’. The provision of an expansive memorial park to the south of the site as part of Phase 3 is considered fitting and the provision of a possible National Memorial and Records Centre building also has the potential to respond directly and positively to the needs of survivors and former residents, and their families.

14.6 Difficulties in Compiling Information

In preparation of this Chapter, the following difficulties were encountered.

- The census data which informed this chapter’s analysis are from 2016 and may be considered out of date. However, this is the most recent census data available.
- This chapter has been prepared during the Covid-19 pandemic. Not only was the 2021 Census deferred due this, it also impacted on the ease of collecting and availability of data. For example, Tusla Childcare Inspection Reports, used as a source of attendance figures, have not been carried out as routinely as in pre-Covid circumstances.
- Despite a request from the Department of Education and Skills, ‘Forward Planning’ section in respect of local school’s spare capacity data, at the time of preparation of this EIAR no information was provided by the Department regarding the current excess capacity of existing schools within the study area.
- Notwithstanding the above, we consider that the data collected, and analyses outlined reflects an accurate representation of the population and human health considerations with respect of the proposed development.

14.7 References

www.education.ie

www.cso.ie

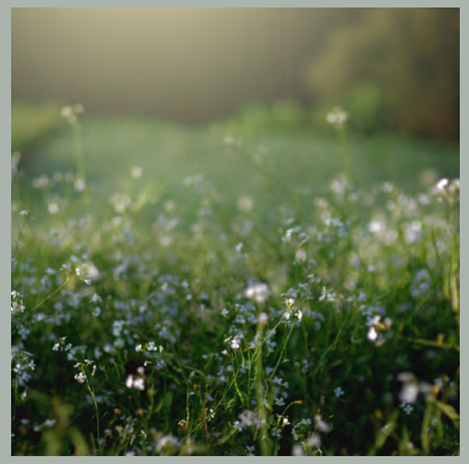
www.irishrail.ie

www.pobal.ie

Cork City Development Plan 2015.

Draft Cork City Development Plan 2021.

Cork City Councils Planning Enquiry System.



BESSBOROUGH, CORK

CHAPTER 15

Interaction of Impacts

BESSBOROUGH, CORK

CHAPTER 15

Interaction of Impacts

CHAPTER 15

15 Interaction of Impacts

15.1 Chapter Context

Article 3(1) of the EIA Directive states.

> *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)."*

Annex IV of the amended Directive states that a description of impacts should include:

> *"...the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project"*

Table 15.1 as shown summarises the relevant interactions and interdependencies between specific environmental aspects.

15.2 Description of Significant Interactions

15.2.1 Landscape and Visual

15.2.1.1 Construction Phase

15.2.1.1.1 Phase 1 'The Meadows'

Chapter 4 of this EIAR assesses landscape and visual impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with landscape and visual impacts:

Material Assets – Services, Infrastructure & Utilities /Water– The necessary earthworks/excavations to facilitate the proposed development will result in the permanent loss of the existing landscape of the site, representing an interaction between landscape/visual and material assets impacts during the construction phase. The impact of the trench excavation required for the connection of the water wastewater infrastructure will be temporary, however. Visual impacts will be mitigated through appropriate site management measures and work practices including the fencing off of trees being retained and the staggering of construction activities.

Land, Soils and Geology – The initial development of the site would require extensive removal or stripping of the existing topsoil for enabling works for the pile installation, pile capping and other site services. The removal of the subsoils would be necessary to accommodate levelling of the site, the construction of the foundations of the buildings, the provisions of drainage and service infrastructure and road construction. This will result in a permanent relocation of soil and subsoil. The excavations and earthworks during the construction phase will result in interactions with the existing landscape. Chapter 7 of this EIAR and the CEMP (ref Appendix 2.1) describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the car park podium and landscaping and features of the development to be delivered during the construction phase.

Biodiversity - The majority of habitats and flora within the site's interior will be removed, this includes areas of the following habitats: artificial surfaces, scrub, dry meadow and grassy verges and recolonising bare ground, and improved agricultural grassland. In addition, while most of the following habitats will be retained: treelines, scattered trees and broadleaved woodland, up to a maximum of 13 no trees will be removed to accommodate the proposed pedestrian/cycle bridge and the wayleave. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Effects on terrestrial habitats are generally restricted to direct removal of habitats and possible impacts from the spread of invasive species. The construction phase will result in interactions with biodiversity and potential long-term negative impacts ranging from not significant to slight on local flora/fauna species due to the displacement of habitats.

Cultural Heritage – Limited tree felling required to accommodate the wayleave and pedestrian/cyclist bridge, will result in negative impacts to the setting of Bessborough House. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site which will be implemented during the construction phase. In view of the cultural heritage that is associated with this historic location, and the legacy of the former Mother and Baby Homes that operated from Bessborough house, Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented at this sensitive site, as considered appropriate by the project Consultant Forensic Archaeologist.

Population and Human Health - Potential short-term impacts to visual amenity in the area as a result from construction works, include the necessary removal of a maximum of 13 no. existing trees, construction traffic, earthworks and erection of tall tower cranes, gradual emergence of proposed buildings and pedestrian/cycle bridge, material storage, security fencing and site lighting. Chapter 4 notes however, that these lands currently have '*a tone of dereliction and dilapidation that is broadly inconsistent and unsupportive of the wider sense of place of the study area*' and are not formally publicly accessible. The construction phase of the development provides for mitigation/replacement planting

which will mitigate the long-term impacts of the removal of existing vegetation and land cover. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significance for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

15.2.1.1.2 Phase 2 'The Farm'

Chapter 4 of this EIAR assesses landscape and visual impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with landscape and visual impacts:

Material Assets – Services, Infrastructure & Utilities/Water– The necessary earthworks/excavations to facilitate the proposed development will result in the permanent loss of the existing landscape within the development footprint, representing an interaction between landscape/visual and material assets impacts during the construction phase. The impact of the trench excavation required for the connection of the water and wastewater infrastructure will be temporary, however. Visual impacts will be mitigated through appropriate site management measures and work practices including the fencing off of trees being retained and the staggering of construction activities.

Land, Soils and Geology – The initial development of the site would require extensive removal or stripping of the existing topsoil for enabling works for the pile installation, pile capping and other site services. The removal of the subsoils would be necessary to accommodate levelling of the site, the construction of the foundations of the buildings, the provisions of drainage and service infrastructure and road construction. This will result in a permanent relocation of soil and subsoil. The excavations and earthworks during the construction phase will result in interactions with the existing landscape. Chapter 7 of this EIAR and the CEMP (ref Appendix 2.2) describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the proposed landscaping and features of the development to be delivered during the construction phase.

Cultural Heritage – Tree felling required to accommodate the wayleave and pedestrian/cyclist bridge, will result in negative impacts to the setting of Bessborough House. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site which will be implemented during the construction phase. In view of the cultural heritage that is associated with this historic location, and the legacy of the former Mother and Baby Homes that operated from Bessborough house, Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented at this sensitive site, as considered appropriate by the project Consultant Forensic Archaeologist.

Biodiversity – The proposed development footprint includes areas of the following habitats: buildings and artificial surfaces, scrub, dry meadow and grassy verges and recolonising bare ground, and horticultural land which will be largely removed. Chapter 9 of this EIAR considers the impact of this to be negative, long-term and range from not significant to slight. In addition, while most areas of scattered trees, broadleaved woodland, treelines, treelines/broadleaved woodland and improved agricultural grassland will be retained, there is proposals for a maximum of 51 no. existing trees to be removed and a small area of improved grassland to be impacted. The majority of the trees identified for removal (40 no.) are non native with limited biodiversity value. The potential impact is considered to be negative, slight and long-term. Modification to the stone wall within the formal garden which supports some specialise species are considered to have a potential negative, long term not significant impact. Effects on terrestrial habitats are generally restricted to direct removal of habitats and possible impacts from the spread of invasive species. The construction phase will result in interactions with biodiversity and potential long-term negative impacts ranging from not significant to slight on local flora/fauna species due to the displacement of habitats.

Population and Human Health – Chapter 4 notes that this largely greenfield area is not currently publicly accessible, nor does it provide any public open space, but is, instead, secured/cordoned off from the public. Potential short-term impacts to visual amenity in the area as a result from construction works, include the necessary removal of a maximum of 51 no. existing trees, construction traffic, earthworks and erection of tall tower cranes, gradual emergence of proposed buildings and pedestrian/cycle bridge, material storage, security fencing and site lighting. Multiple demolitions are also proposed, including 4 no. small single storey buildings and 6 no. shed-like structures, none of which are considered to be of architectural or heritage value. The construction phase of the development provides for mitigation/replacement planting which will mitigate the long-term impacts of the removal of existing vegetation and land cover. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significance for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

15.2.1.1.3 Combined Phase 1 and Phase 2

Chapter 4 of this EIAR assesses landscape and visual impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with landscape and visual impacts:

Material Assets – Services, Infrastructure & Utilities /Water– The necessary earthworks/excavations to facilitate the proposed development will result in the permanent loss of the existing landscape within the development footprint, representing an interaction between landscape/visual and material assets impacts during the construction phase. The impact of the trench excavation required for the connection of the water and wastewater infrastructure will be temporary, however. Visual impacts will be mitigated through appropriate site management measures and work practices including the fencing off of trees being retained and the staggering of construction activities. Chapter 6 of this EIAR notes that if the Phase 1 development proceeds, a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place. Examples of this include the connection of a new foul sewer inlet to the existing wastewater pumping station to the west of the site and connection of a stormwater sewer to the existing 1350mm stormwater sewer through the site. In this context the individual impacts noted for Phase 1 and 2 will be reduced or eliminated.

Land, Soils and Geology – The initial development of the site would require extensive removal or stripping of the existing topsoil for enabling works for the pile installation, pile capping and other site services. The removal of the subsoils would be necessary to accommodate levelling of the site, the construction of the foundations of the buildings, the provisions of drainage and service infrastructure and road construction. This will result in a permanent relocation of soil and subsoil. As noted above, if the Phase 1 development proceeds, the requirement for topsoil and subsoil removal to accommodate infrastructure connections in Phase 2 may be reduced in extent as some of the connections to existing infrastructure will already have taken place, for example the connection of a new foul sewer inlet to the existing wastewater pumping station to the west. The excavations and earthworks during the construction phase will result in interactions with the existing landscape. Chapter 7 of this EIAR and the CEMP (ref Appendix 2.1 and Appendix 2.2) describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the proposed landscaping and features of the development to be delivered during the construction phase.

Biodiversity – Chapter 9 identifies that the combined Phase 1 and Phase 2 development will impact on the following habitats: buildings and artificial surfaces, scrub, dry meadow and grassy verges and recolonising bare ground, and horticultural land which will be largely removed. Chapter 9 considers the impact of this to be negative, long-term and range from not significant to slight. In addition, while most areas of scattered trees, broadleaved woodland, treelines, treelines/broadleaved woodland and improved agricultural grassland will be retained, there is proposals for a maximum of 64 no. existing trees to be removed and a small area of improved grassland to be impacted. The potential impact is

considered to be negative, slight and long-term. Modification to the stone wall within the formal garden which supports some specialise species are considered to have a potential negative, long term not significant impact. Effects on terrestrial habitats are generally restricted to direct removal of habitats and possible impacts from the spread of invasive species. The construction phase will result in interactions with biodiversity and potential long-term negative impacts ranging from not significant to slight on local flora/fauna species due to the displacement of habitats.

Chapter 9 notes that as the phases are planned to be constructed sequentially, the impacts will occur separately with no combined effect. However, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Cultural Heritage – Tree felling required to accommodate the wayleave and pedestrian/cyclist bridge, will result in negative impacts to the setting of Bessborough House. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site which will be implemented during the construction phase. In view of the cultural heritage that is associated with this historic location, and the legacy of the former Mother and Baby Homes that operated from Bessborough house, Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented at this sensitive site, as considered appropriate by the project Consultant Forensic Archaeologist.

Population and Human Health – Chapter 4 notes that neither Phase 1 'The Meadows' or Phase 2 'The Farm' lands are currently formally publicly accessible. Potential short-term impacts to visual amenity in the area as a result from construction works, include the necessary removal of a maximum of 64 no. existing trees, construction traffic, earthworks and erection of tall tower cranes, gradual emergence of proposed buildings and pedestrian/cycle bridge, material storage, security fencing and site lighting. Multiple demolitions are also proposed, including 4 no. small single storey buildings and 6 no. shed-like structures, none of which are considered to be of architectural or heritage value. The construction phase of the developments provides for mitigation/replacement planting which will mitigate the long-term impacts of the removal of existing vegetation and land cover. Chapter 4 notes that the proposed phases of development will be undertaken sequentially, with a resulting medium magnitude of impact from the combined phases. It is also of note that should Phase 1 development proceed, the pedestrian/cycle bridge and associated felling of 3 no. trees will be completed prior to the commencement of Phase 2. Thus, the impacts of Phase 2, requiring the temporary closure of the Greenway access ramp for a short period and road closures for a short period to enable the tower crane to be transported to/from site, will be reduced.

15.2.1.2 Operational Phase

15.2.1.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are:

Material Assets – Services, Infrastructure & Utilities – Utilities such as public lighting will result in interactions with landscape and visual considerations. The proposed lighting scheme is in accordance with national & international industry standards and accounts for light pollution, disability and discomfort glare and sky glow.

Material Assets – Traffic and Transportation – The proposed development will deliver landscape and public health benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.

Land, Soils and Geology/Water –The proposed landscape strategy seeks to respond to the site-specific context including by utilising appropriate areas for public open space and incorporating Sustainable Urban Drainage (SUDs) to reduce run-off and provide biodiversity benefits where appropriate.

Biodiversity – Loss of habitat is considered under the construction phase. During operation the suburbanisation of lands will increase noise and disturbance at the site. In the absence of mitigation measures, significant operational impacts could include light spill onto retained vegetation within and outside the study area used for feeding or breeding by protected species. Chapter 9 considers potential operational impacts on habitats, water quality and aquatic ecology, air quality, bats, otters, other mammals, amphibians and reptile, birds and other fauna and from invasive species. While long-term, negative impacts were predicted at a local level these were not considered to be significant. The landscape-led design, which includes the planting of 108 new trees with Native Yew and Hawthorn hedges proposed on boundaries to promote a more ecologically biodiverse landscape and provide new opportunities for flora and fauna habitats. In addition, it is proposed that ten bat boxes will be located on the site at location selected by the project ecologist.

Cultural Heritage – As indicated in the Primary Planting Plan prepared by Ilsa Rutgers Landscape Architecture (Appendix 2.5), the proposed layout includes the planting of 108 new trees, to bolster and enhance the existing planting. This will result in a long-term, positive impact on the setting of the historic estate

Population and Human Health –The proposed development will result in the extension of the townscape fabric and character of the broader vicinity into the subject lands. Chapter 4 of this EIAR considers the proposed high-end architectural design compatible with the 3 -storey Bessborough Estate buildings c.100m to the south-west and the multi-storey mixed-used buildings c.200m to the east and north. Chapter 4 concludes that the proposed development will result in a distinct increase in scale and intensity, appropriate to such a dynamic environment, and will knit into the prevailing fabric. Chapter 14 notes that the proposed public open spaces, including a new plaza within the development, will be accessible to all existing and future residents of the settlement, unlike the current situation where the subject lands are not formally accessible to the public.

Potential impacts of landscape have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.1.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are:

Material Assets – Services, Infrastructure & Utilities – Utilities such as public lighting will result in interactions with landscape and visual considerations. The proposed lighting scheme is in accordance with national & international industry standards and accounts for light pollution, disability and discomfort glare and sky glow.

Material Assets – Traffic and Transportation – The proposed development will deliver landscape and public health benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. Historic paths will be re-instated to reflect traditional desire lines. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.

Land, Soils and Geology/Water –The proposed landscape strategy seeks to respond to the site-specific context including by utilising appropriate areas for public open space and incorporating Sustainable Urban Drainage (SUDs) to reduce run-off and provide biodiversity benefits where appropriate.

Biodiversity – Loss of habitat is considered under the construction phase. During operation the suburbanisation of lands will increase noise and disturbance at the site. In the absence of mitigation measures, significant operational

impacts could include light spill onto retained vegetation within and outside the study area used for feeding or breeding by protected species. Chapter 9 considers potential operational impacts on habitats, water quality and aquatic ecology, air quality, bats, otters, other mammals, amphibians and reptile, birds and other fauna and from invasive species. While long-term, negative impacts were predicted at a local level these were not considered to be significant. The landscape-led design includes the planting of 116 new trees, with a minimum of two native trees to be planted for every existing tree impacted. The proposed woodland planting mix will be dominated by native species including Quercus robur, Quercus petrea, Pinus sylvestris, Sorbus aucuparia and Pyrus avium. The objective of these elements is to create natural, multi-layered woodland habitat which will be of local ecological value and has the potential to support native flora and fauna. A native wildflower/grassmix will be utilised to provide a more diverse sward which is of higher ecological value for invertebrates and birds. The final grassland/wildflower mix will be specified by the Project ecologist based on final ground conditions including alkalinity, fertility and moisture levels to promote a more ecologically biodiverse landscape and provide new opportunities for flora and fauna habitats. In addition, it is proposed that eight bat boxes will be located on the site at location selected by the project ecologist.

Cultural Heritage –. The proposed layout includes the planting of 116 new trees, to bolster and enhance the existing planting. This will result in a long-term, positive impact on the setting of the historic estate and contribute toward the reinstatement of the historic landscape. As indicated in the Primary Planting Plan prepared by Ilsa Rutgers Landscape Architecture (Appendix 2.6) the landscape proposal intends to remove the winding paths and small structures introduced in the park in the 1990's and reinstate the historical paths along the perimeter of the park. Furthermore, it is proposed to re wild large areas of the park to create wild meadow and rough grass with mowed routes along desire lines rather than hard standing. The inclusion of the Memorial 'Farm Girl' Bench will go some way towards recognising the sensitive cultural heritage that is associated with this historic location and acting as a focus for remembrance of the legacy of the Mother and Baby Homes that operated out of Bessborough House.

Population and Human Health –The proposed development will result in the extension of the townscape fabric and character of the broader vicinity into the subject lands, however, the scheme has been designed and buildings positioned specifically in order to reduce the impact on existing mature trees in the parkland. Chapter 4 of this EIAR considers the proposed high-end architectural design compatible with the 3 -storey Bessborough Estate buildings c.100m to the south-west and the multi-storey mixed-used buildings c.500m to the east and north. Chapter 4 concludes that the proposed 1 – 5 storey development will result in a distinct vertical imprint upon the previously undeveloped areas of the site, however, it will be compatible with the existing cluster of buildings to the south, with several of the proposed buildings of a similar height to the adjacent tree canopy, assisting the layout to knit into the prevailing fabric. Chapter 14 notes that the proposed public open spaces, including a parkland and new plaza within the development, will be accessible to all existing and future residents of the settlement, unlike the current situation where the subject lands are not accessible to the public.

Potential impacts of landscape have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.1.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are:

Material Assets – Services, Infrastructure & Utilities – Utilities such as public lighting will result in interactions with landscape and visual considerations. The proposed lighting scheme is in accordance with national & international industry standards and accounts for light pollution, disability and discomfort glare and sky glow.

Material Assets – Traffic and Transportation – The proposed development will deliver landscape and public health benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. Historic paths will be re-instated to reflect traditional desire lines. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.

Land, Soils and Geology/Water –The proposed landscape strategy seeks to respond to the site-specific context including by utilising appropriate areas for public open space and incorporating Sustainable Urban Drainage (SUDs) to reduce run-off and provide biodiversity benefits where appropriate.

Biodiversity – Loss of habitat is considered under the construction phase. During operation the suburbanisation of lands will increase noise and disturbance at the site. In the absence of mitigation measures, significant operational impacts could include light spill onto retained vegetation within and outside the study area used for feeding or breeding by protected species. Chapter 9 considers potential operational impacts on habitats, water quality and aquatic ecology, air quality, bats, otters, other mammals, amphibians and reptile, birds and other fauna and from invasive species. While long-term, negative impacts were predicted at a local level these were not considered to be significant. It notes that the developments will become operational sequentially. In this context, it considers the impacts of each development will not be additive. Given the separation distance between the phases and the retention of boundary habitats no significant in combination lighting effects on the foraging habitat for bats are foreseen. Similarly, in view of the retention of treelines, grassland and mature trees at the site impacts on mammals are considered to be negative, slight and long-term at a local level and on local birds as negative, moderate and long-term.

The landscape-led design includes the planting of 224 new trees. The proposed woodland planting mix will be dominated by native species. The objective of these elements is to create natural, multi-layered woodland habitat which will be of local ecological value and has the potential to support native flora and fauna. A native wildflower/grassmix will be utilised to provide a more diverse sward which is of higher ecological value for invertebrates and birds. The final grassland/wildflower mix will be specified by the Project ecologist based on final ground conditions including alkalinity, fertility and moisture levels to promote a more ecologically biodiverse landscape and provide new opportunities for flora and fauna habitats. In addition, it is proposed that eighteen bat boxes will be located on the site at location selected by the project ecologist.

Cultural Heritage –. The proposed layout includes the planting of 224 new trees, to bolster and enhance the existing planting. This will result in a long-term, positive impact on the setting of the historic estate and contribute toward the reinstatement of the historic landscape. As indicated in the Primary Planting Plan prepared by Ilsa Rutgers Landscape Architecture (Appendix 2.5 and Appendix 2.6) the landscape proposal intends to remove the winding paths and small structures introduced in the park in the 1990's and reinstate the historical paths along the perimeter of the park. Furthermore, it is proposed to re wild large areas of the park to create wild meadow and rough grass with mowed routes along desire lines rather than hard standing. The inclusion of the Memorial 'Farm Girl' Bench will go some way towards recognising the sensitive cultural heritage that is associated with this historic location and acting as a focus for remembrance of the legacy of the Mother and Baby Homes that operated out of Bessborough House.

Population and Human Health –The proposed development will result in the extension of the townscape fabric and character of the broader vicinity into the subject lands. Chapter 4 of this EIAR considers the proposed high-end architectural design compatible with the 3 -storey Bessborough Estate buildings c.100m to the south-west and the multi-storey mixed-used buildings c.200m to the east and north. Chapter 4 concludes that the proposed 1 – 10 storey development will result in a marked increase in the scale and intensity of development within these areas, and the wider Bessborough Estate, such a development is to be expected in an ever-evolving locale as this, and will broadly knit into the prevailing urban fabric rather than contrasting against it.

Chapter 14 notes that the proposed public open spaces, including a parkland and 2 no. new plazas within the development, will be accessible to all existing and future residents of the settlement, unlike the current situation where the subject lands are not accessible to the public.

Potential impacts of landscape have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.2 Material Assets – Traffic and Transportation

15.2.2.1 Construction Phase

15.2.2.1.1 Phase 1 'The Meadows'

Chapter 5 of this EIAR assesses traffic impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with traffic/transportation impacts.

Material Assets – Services, Infrastructure & Utilities – During construction, interactions between Material Assets and traffic /transportation, may include road openings to install project utilities.

Land, Soils and Geology – Site excavations and earthworks will require HGV's, heavy machinery and vehicles to access the site during the construction phase, in addition to the erection of tower cranes. Increased traffic associated with the construction works would have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. However, with the mitigation measures and traffic management measures proposed in the CEMP prepared by JB Barry and Partners (ref. Appendix 2-1), it is predicted that any interactions will not be significant, with any negative interactions being slight and short term.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills and other pollutants, potentially impacting on local water quality. However, with the proposed suite of mitigation measures detailed in the CEMP, no significant interactions are envisaged.

Biodiversity – Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP (ref. Appendix 2-1), which will prioritise the minimisation of any potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions.

Noise and vibration - Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents and businesses.

Air Quality and Climate - Emissions from construction traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from construction traffic may contribute to climate change.

Population and Human Health – Construction traffic has potential to result in temporary negative impacts on local residents, businesses and services and other uses in the area by way of traffic volumes. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significant for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

15.2.2.1.2 Phase 2 'The Farm'

Chapter 5 of this EIAR assesses traffic impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with traffic/transportation impacts.

Material Assets – Services, Infrastructure & Utilities – During construction, interactions between Material Assets and traffic /transportation, may include road openings to install project utilities.

Land, Soils and Geology – Site excavations and earthworks will require HGV's, heavy machinery and vehicles to access the site during the construction phase, in addition to the erection of tower cranes. Increased traffic associated with the construction works would have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. However, with the mitigation measures and traffic management measures proposed in the CEMP prepared by JB Barry and Partners (ref. Appendix 2-2), it is predicted that any interactions will not be significant, with any negative interactions being slight and short term.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills and other pollutants, potentially impacting on local water quality. However, with the proposed suite of mitigation measures detailed in the CEMP, no significant interactions are envisaged.

Biodiversity – Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP (ref. Appendix 2-2), which will prioritise the minimisation of any potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions.

Noise and vibration - Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents and businesses.

Air Quality and Climate - Emissions from construction traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from construction traffic may contribute to climate change.

Population and Human Health – Construction traffic has potential to result in temporary negative impacts on local residents, businesses and services and other uses in the area by way of traffic volumes. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significant for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

15.2.2.1.3 Combined Phase 1 and Phase 2

Chapter 5 of this EIAR assesses traffic impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with traffic/transportation impacts.

Material Assets – Services, Infrastructure & Utilities – During construction, interactions between Material Assets and traffic /transportation, may include road openings to install project utilities.

Land, Soils and Geology – Site excavations and earthworks will require HGV's, heavy machinery and vehicles to access the site during the construction phase, in addition to the erection of tower cranes. Increased traffic associated with the construction works would have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. However, with the mitigation measures and traffic management measures proposed in the CEMP prepared by JB Barry and Partners (ref. Appendix

2-1 and Appendix 2-2), it is predicted that any interactions will not be significant, with any negative interactions being slight and short term.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills and other pollutants, potentially impacting on local water quality. However, with the proposed suite of mitigation measures detailed in the CEMP, no significant interactions are envisaged.

Biodiversity – Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP (ref. Appendix 2-1 and Appendix 2-2), which will prioritise the minimisation of any potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions.

Noise and vibration - Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents and businesses.

Air Quality and Climate - Emissions from construction traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from construction traffic may contribute to climate change.

Population and Human Health – Construction traffic has potential to result in temporary negative impacts on local residents, businesses and services and other uses in the area by way of traffic volumes. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significant for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

15.2.2.2 Operational Phase

15.2.2.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are:

Landscape and Visual – The proposed development will deliver landscape and public health benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills and other pollutants, potentially impacting on local water quality. However, with the proposed suite of mitigation measures detailed in the CEMP, no significant interactions are envisaged.

Noise and Vibration – During the operational phase of the development, Chapter 11 of this EIAR predicts that noise from increased small vehicle traffic and other activities will result in a slight impact at the worst case.

Air Quality and Climate - Regarding Air Quality, EIAR Chapter 12 predicts that when operational and the predicted traffic modelling is realised, that any impacts on ambient air quality will be long-term, localised, negative and imperceptible. The increase in traffic volumes in the area resultant from the proposed development will impact the local climate. However, the predicted overall magnitude of the changes on climate will not be significant.

Population and Human Health – Once operational the proposed development will result in increased traffic volumes accessing the site and on the surrounding road network. Users of the local road network may experience increased delays in car journeys. However, the Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents.

Potential impacts of Material Assets – Traffic and Transport have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.2.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are.

Landscape and Visual – The proposed development will deliver landscape and public health benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. Historic paths will be re-instated to reflect traditional desire lines. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.

Noise and Vibration – During the operational phase of the development, Chapter 11 of this EIAR predicts that noise from increased small vehicle traffic and other activities will result in a slight impact at the worst case.

Air Quality and Climate - Regarding Air Quality, EIAR Chapter 12 predicts that when operational and the predicted traffic modelling is realised, that any impacts on ambient air quality will be long-term, localised, negative and imperceptible. The increase in traffic volumes in the area resultant from the proposed development will impact the local climate. However, the predicted overall magnitude of the changes on climate will not be significant.

Population and Human Health – Once operational the proposed development will result in increased traffic volumes accessing the site and on the surrounding road network. Users of the local road network may experience increased delays in car journeys. However, the Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents.

Potential impacts of Material Assets – Traffic and Transport have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.2.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are.

Landscape and Visual – The proposed development will deliver landscape and public health benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations.

Noise and Vibration – During the operational phase of the development, Chapter 11 of this EIAR predicts that noise from increased small vehicle traffic and other activities will result in a slight impact at the worst case.

Air Quality and Climate - Regarding Air Quality, EIAR Chapter 12 predicts that when operational and the predicted traffic modelling is realised, that any impacts on ambient air quality will be long-term, localised, negative and imperceptible. The increase in traffic volumes in the area resultant from the proposed development will impact the local climate. However, the predicted overall magnitude of the changes on climate will not be significant.

Population and Human Health – Once operational the proposed development will result in increased traffic volumes accessing the site and on the surrounding road network. Users of the local road network may experience increased delays in car journeys. However, the Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents.

Potential impacts of Material Assets – Traffic and Transport have been assessed and considered within each chapter/ discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.3 Material Assets – Services, Infrastructure & Utilities

15.2.3.1 Construction Phase

15.2.3.1.1 Phase 1 'The Meadows'

Chapter 6 of this EIAR assesses servicing impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Material Assets – Services, Infrastructure & Utilities' impacts:

Landscape – As Chapter 6 of this EIAR outlines, the installation of surface water sewers, foul sewers, temporary foul connection to service the site compound and the provision of a new water main distribution network will involve construction activities within the subject lands mainly involving trench excavations with some tree/vegetation removal required. The installation of the power, gas and telecommunication utilities for the development will be conducted in parallel with the other services and will primarily involve construction of ducting and chambers using open excavation. This will result short-term/temporary changes to the existing landscape/land cover. Visual impacts during construction will be mitigated through the erection of hoardings and appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and public areas are kept free from building material and site waste.

Material Assets – Traffic and Transportation - During construction, interactions between Material Assets and traffic / transportation may include necessary periods of road openings to deliver utilities. During these times minor local traffic management may result in slight temporary negative impacts. In addition, the construction phase may give rise to a potential temporary disruption to the local road network and greenway. As referenced previously, the CEMP prepared by JB Barry and Partners (ref. Appendix 2-1) details the management of construction traffic matters. Due to the nature of the proposed development and given that the majority of the utilises/service infrastructure is being delivered within the development site, it is not considered that there will be significant inconveniences caused or interactions between Material Assets and traffic /transportation considerations.

Land, Soils and Geology – During construction, the installation of services and utilities will have direct interactions with Land, Soils and Geology due to necessary excavations, site clearance, rock breaking and trenching. As detailed in Chapter 7 of this EIAR, given the specific nature of the proposed project and mitigation measures proposed it is not predicated that there will be significant negative interactions between Land & Soils and Material Assets during the construction.

Water (Hydrology and Hydrogeology) - Much of the utility service infrastructure to be installed for the development is to serve water infrastructure. In the absence of appropriate mitigation measures, works to provide connections to utilities and services such as foul and surface water, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Any stockpiling of materials or works impeding site drainage may lead to temporary localised flooding if drains become blocked. However, as predicted in EIAR Chapter 8 (Water), interactions between the implementation of utilities and water will be imperceptible in significance.

Biodiversity – During construction, in the absence of appropriate mitigation measures the necessary works to accommodate service infrastructure including vegetation and tree removal, earthworks/excavation and refuelling on site may result in the displacement, deterioration or destruction of habitats and flora/fauna species. As detailed in EIAR Chapter 9 prepared by Dixon Brosnan Environmental Consultants, with the proposed mitigation measures in place, any negative impacts will be localised and restricted to the development site during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (ref. Appendix 9-5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Cork Harbour SPA.

Noise and Vibration – The implementation of service infrastructure and utilities may result in noise and vibration emissions during construction. The mitigation measures stated in the CEMP and EIAR Chapter 11, including the erection of noise barriers where necessary, will mitigate any potential negative impacts relating the noise and vibration interactions during construction.

Cultural Heritage –As detailed in EIAR Chapter 10 prepared by John Cronin & Associates, and the CEMP, the construction phase is anticipated to have a slight, temporary negative impact on Bessborough House and Farm and the associated Icehouse and Folly historic features. Given the cultural sensitivity of the lands Chapter 10 recommends that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. During site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.4** by Aidan Harte, Forensic Archaeologist. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between cultural Heritage and Material Assets.

Air Quality and Climate - In the absence of appropriate mitigation measures, the installation of material assets including necessary excavation works and connections may result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature.

Population and Human Health – The construction phase could give rise to potential temporary impacts on existing services such as water, communications, electrical infrastructure resulting from connections from the proposed development to existing local services. However, with the proposed mitigation measures outlined, it is not expected that these impacts will be significant.

15.2.3.1.2 Phase 2 'The Farms'

Chapter 6 of this EIAR assesses servicing impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Material Assets – Services, Infrastructure & Utilities' impacts:

Landscape – As Chapter 6 of this EIAR outlines, the installation of surface water sewers, foul sewers, temporary foul connection to service the site compound and the provision of a new water main distribution network will involve construction activities within the subject lands mainly involving trench excavations with some tree/vegetation removal required. The installation of the power, gas and telecommunication utilities for the development will be conducted in parallel with the other services and will primarily involve construction of ducting and chambers using open excavation. This will result short-term/temporary changes to the existing landscape/land cover. Visual impacts during construction will be mitigated through the erection of hoardings and appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and public areas are kept free from building material and site waste.

Material Assets – Traffic and Transportation - During construction, interactions between Material Assets and traffic /transportation may include necessary periods of road openings to deliver utilities. During these times minor local traffic management may result in slight temporary negative impacts. In addition, the construction phase may give rise to a potential temporary disruption to the local road network and greenway. As referenced previously, the CEMP prepared by JB Barry and Partners (ref. Appendix 2-2) details the management of construction traffic matters. Due to the nature of the proposed development and given that the majority of the utilises/service infrastructure is being delivered within the development site, it is not considered that there will be significant inconveniences caused or interactions between Material Assets and traffic /transportation considerations.

Land, Soils and Geology – During construction, the installation of services and utilities will have direct interactions with Land, Soils and Geology due to necessary excavations, site clearance, rock breaking and trenching. As detailed in Chapter 7 of this EIAR, given the specific nature of the proposed project and mitigation measures proposed it is not predicated that there will be significant negative interactions between Land & Soils and Material Assets during the construction.

Water (Hydrology and Hydrogeology) - Works to provide connections to utilities and services, such as foul and surface water sewer, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Stockpiling of materials or works may to drainage system may lead to temporary localised flooding if drains become blocked.

Biodiversity – During construction, in the absence of appropriate mitigation measures the necessary works to accommodate service infrastructure including vegetation and tree removal, earthworks/excavation and refuelling on site may result in the displacement, deterioration or destruction of habitats and flora/fauna species. As detailed in EIAR Chapter 9 prepared by Dixon Brosnan Environmental Consultants, with the proposed mitigation measures in place, any negative impacts will be localised and restricted to the development site during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (ref. Appendix 9-6) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Cork Harbour SPA.

Noise and Vibration – The implementation of service infrastructure and utilities may result in noise and vibration emissions during construction. The mitigation measures stated in the CEMP and EIAR Chapter 11, including the erection of noise barriers where necessary, will mitigate any potential negative impacts relating the noise and vibration interactions during construction.

Cultural Heritage –As detailed in EIAR Chapter 10 prepared by John Cronin & Associates, and the CEMP, the construction phase is anticipated to have a slight, temporary negative impact on Bessborough House and Farm and the associated Icehouse and Folly historic features. Given the cultural sensitivity of the lands Chapter 10 recommends that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. During site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.4** by Aidan Harte, Forensic Archaeologist. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between cultural Heritage and Material Assets.

Air Quality and Climate - In the absence of appropriate mitigation measures, the installation of material assets including necessary excavation works and connections may result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature.

Population and Human Health – The construction phase could give rise to potential temporary impacts on existing services such as water, communications, electrical infrastructure resulting from connections from the proposed development to existing local services. However, with the proposed mitigation measures outlined, it is not expected that these impacts will be significant.

15.2.3.1.3 Combined Phase 1 and Phase 2

Chapter 6 of this EIAR assesses servicing impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Material Assets – Services, Infrastructure & Utilities' impacts:

Landscape – As Chapter 6 of this EIAR outlines, the installation of surface water sewers, foul sewers, temporary foul connection to service the site compound and the provision of a new water main distribution network will involve construction activities within the subject lands mainly involving trench excavations with some tree/vegetation removal required. The installation of the power, gas and telecommunication utilities for the development will be conducted in parallel with the other services and will primarily involve construction of ducting and chambers using open excavation. This will result short-term/temporary changes to the existing landscape/land cover. Visual impacts during construction will be mitigated through the erection of hoardings and appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and public areas are kept free from building material and site waste. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Material Assets – Traffic and Transportation - During construction, interactions between Material Assets and traffic / transportation may include necessary periods of road openings to deliver utilities. During these times minor local traffic management may result in slight temporary negative impacts. In addition, the construction phase may give rise to a potential temporary disruption to the local road network and greenway. As referenced previously, the CEMP prepared by JB Barry and Partners (ref. Appendix 2-2) details the management of construction traffic matters. Due to the nature of the proposed development and given that the majority of the utilises/service infrastructure is being delivered within the development site, it is not considered that there will be significant inconveniences caused or interactions between Material Assets and traffic /transportation considerations. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Land, Soils and Geology – During construction, the installation of services and utilities will have direct interactions with Land, Soils and Geology due to necessary excavations, site clearance, rock breaking and trenching. As detailed in Chapter 7 of this EIAR, given the specific nature of the proposed project and mitigation measures proposed it is not predicated that there will be significant negative interactions between Land & Soils and Material Assets during the construction. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Water (Hydrology and Hydrogeology) - Works to provide connections to utilities and services, such as foul and surface water sewer, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Stockpiling of materials or works may to drainage system may lead to temporary localised flooding if drains become blocked. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Biodiversity – During construction, in the absence of appropriate mitigation measures the necessary works to accommodate service infrastructure including vegetation and tree removal, earthworks/excavation and refuelling on site may result in the displacement, deterioration or destruction of habitats and flora/fauna species. As detailed in EIAR Chapter 9 prepared by Dixon Brosnan Environmental Consultants, with the proposed mitigation measures in place, any negative impacts will be localised and restricted to the development site during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (ref. Appendix 9-6) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Cork Harbour SPA. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Noise and Vibration – The implementation of service infrastructure and utilities may result in noise and vibration emissions during construction. The mitigation measures stated in the CEMP and EIAR Chapter 11, including the erection of noise barriers where necessary, will mitigate any potential negative impacts relating the noise and vibration interactions during construction. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Cultural Heritage –As detailed in EIAR Chapter 10 prepared by John Cronin & Associates, and the CEMP, the construction phase is anticipated to have a slight, temporary indirect negative impact on Bessborough House and Farm and the associated Icehouse and Folly historic features. Given the cultural sensitivity of the lands Chapter 10 recommends that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. During site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.4** by Aidan Harte, Forensic Archaeologist. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between cultural Heritage and Material Assets. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Air Quality and Climate - In the absence of appropriate mitigation measures, the installation of material assets including necessary excavation works and connections may result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature. As noted previously, as construction of Phase 1 and Phase 2 are proposed sequentially, if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Population and Human Health – The construction phase could give rise to potential temporary impacts on existing services such as water, communications, electrical infrastructure resulting from connections from the proposed development to existing local services. However, with the proposed mitigation measures outlined, it is not expected that these impacts will be significant. Chapter 6 notes that Phase 1 and 2 developments are planned to be constructed sequentially so the individual impacts noted above will take effect over a period of time, with many of the Phase 1 impacts repeated again when the Phase 2 development is taking place. However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place. Examples of this include the connection of a new foul sewer inlet to the existing wastewater pumping station to the west of the site and connection of a stormwater sewer to the existing 1350mm stormwater sewer through the site. In this context the individual impacts noted for Phase 1 and 2 will be reduced or eliminated.

15.2.3.2 Operational Phase

15.2.3.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are.

Landscape and Visual – The proposed utility/servicing proposals will result in an altered landscape with public lighting and proposed tree/vegetation planting having an interdependency. The proposed public open spaces will be served by public lighting resulting in more useable communal areas of the development. The landscape strategy for the site also includes the provision of a landscaped public park and green route with open grassland on the northern and southern boundaries which facilitates SUDs principles.

Water (Hydrology and Hydrogeology) – The proposed development will result in a reduction of recharge area due to the introduction of impermeable surfaces, however, the overall impact on the groundwater resource due to reduction in recharge area will be imperceptible. Similarly, surface water run-off discharge rates from the development sites may be increased due to the increase in the area of impermeable surfaces. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development.

Biodiversity– During the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme and potential disturbance to otters, other mammals and birds due to human presence, noise, fencing and additional lighting. Chapter 9 of this EIAR notes however that in the absence of mitigation the negative impact of lighting on low to moderate value foraging habitats for bats will be slight. It notes that the design of the development will allow otters connectivity to the wider area and that otters currently utilising the site are habituated to on-going disturbance factors, with operational impacts predicted to be not significant. With the retention of wider connectivity and treelines the impact on other mammals is considered to be slight, as is the impact on birds. Other potential interactions include impacts on the Cork Harbour SPA designated site, resultant from foul water from the proposed development ultimately discharging to the Carrigrennan WWTP for treatment and disposal to Lough Mahon which overlap with that of the Cork Harbour SPA. It is predicted in EIAR Chapter 9, that no impact from wastewater discharges during operation are predicted to occur relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref. Appendix 9.5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Noise and Vibration – Potential noise and vibration sources during the operational phase include residents' small vehicle and delivery traffic, and mechanical and electrical plant used to service the buildings. As stated in EIAR Chapter 11, based on the assessments carried out, the anticipated operational noise impact is categorised as 'Slight' at the worst case scenario.

Population and Human Health – Interactions between population and Human Health and material assets during the operational phase of the development will include the generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure including telecommunications. Irish Water have confirmed, via a Confirmation of Design Acceptance, that there will be sufficient water and wastewater capacity to accommodate the proposed development. Chapter 6 of this EIAR indicates that the potential adverse impact of the proposed development on the Power, Gas and Telecommunications networks is likely to be permanent and minimal.

Potential impacts of Material Assets – Services, Infrastructure & Utilities have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.3.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are.

Landscape and Visual – The proposed utility/servicing proposals will result in an altered landscape with public lighting and proposed tree/vegetation planting having an interdependency. The proposed public open spaces will be served by public lighting resulting in more useable communal areas of the development. The landscape strategy for the site also includes the provision of a landscaped parkland which facilitates SUDs principles.

Water (Hydrology and Hydrogeology) – The proposed development will result in a reduction of recharge area due to the introduction of impermeable surfaces, however, the overall impact on the groundwater resource due to reduction in recharge area will be imperceptible. Similarly, surface water run-off discharge rates from the development sites may be increased due to the increase in the area of impermeable surfaces. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development.

Biodiversity– During the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme and potential disturbance to otters, other mammals and birds due to human presence, noise, fencing and additional lighting. Chapter 9 of this EIAR notes however that in the absence of mitigation the negative impact of lighting on low to moderate value foraging habitats for bats will be moderate. It notes that the design of the development will allow otters connectivity to the wider area and that otters currently utilising the site are habituated to on-going disturbance factors, with operational impacts predicted to be not significant. Given the availability of similar habitat in the vicinity and the mobile nature of the species the impact on other mammals is considered to be not significant, with the impact on birds considered to be slight. Other potential interactions include impacts on the Cork Harbour SPA designated site, resultant from foul water from the proposed development ultimately discharging to the Carrigrennan WWTP for treatment and disposal to Lough Mahon which overlap with that of the Cork Harbour SPA. It is predicted in EIAR Chapter 9, that no impact from wastewater discharges during operation are predicted to occur relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref. Appendix 9.6) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Noise and Vibration – Potential noise and vibration sources during the operational phase include residents' small vehicle and delivery traffic, and mechanical and electrical plant used to service the buildings. As stated in EIAR Chapter 11, based on the assessments carried out, the anticipated operational noise impact is categorised as 'Slight' at the worst case scenario.

Population and Human Health – Interactions between population and Human Health and material assets during the operational phase of the development will include the generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure including telecommunications. Irish Water have confirmed, via a Confirmation of Design Acceptance, that there will be sufficient water and wastewater capacity to accommodate the proposed development. Chapter 6 of this EIAR indicates that the potential adverse impact of the proposed development on the Power, Gas and Telecommunications networks is likely to be permanent and minimal.

Potential impacts of Material Assets – Services, Infrastructure & Utilities have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.3.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are.

Landscape and Visual – The proposed utility/servicing proposals will result in an altered landscape with public lighting and proposed tree/vegetation planting having an interdependency. The proposed public open spaces will be served by public lighting resulting in more useable communal areas of the development. The landscape strategy for the site also includes the provision of a landscaped areas which facilitate SUDs principles.

Water (Hydrology and Hydrogeology) – The proposed development will result in a reduction of recharge area due to the introduction of impermeable surfaces, however, the overall impact on the groundwater resource due to reduction in recharge area will be imperceptible. Similarly, surface water run-off discharge rates from the development sites may be increased due to the increase in the area of impermeable surfaces. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development. The Phase 1 and Phase 2 developments are to be constructed sequentially and also will be become operational sequentially, in this context no combined operational effects have been identified.

Biodiversity - Chapter 9 of this EIAR notes that during the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme. However, given the separation distance of the Phase 1 'The Meadows' and Phase 2 'The Farm' sites and the retention of boundary habitats no significant in-combination lighting effects on the foraging habitat for bats will occur. Chapter 9 also notes in relation to other mammals that given the retention of treelines, grassland and mature trees at the site and the mobile nature of these species, potential in-combination operational impacts on other mammals are predicted to be slight, and on birds considered to be moderate. In addition no combined effects on water quality have been identified.

Noise and Vibration – Potential noise and vibration sources during the operational phase include residents' small vehicle and delivery traffic, and mechanical and electrical plant used to service the buildings. As stated in EIAR Chapter 11, based on the assessments carried out, the anticipated operational noise impact is categorised as 'Slight' at the worst case scenario.

Population and Human Health – Interactions between population and Human Health and material assets during the operational phase of the development will include the generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure including telecommunications. Irish Water have confirmed, via a Confirmation of Design Acceptance, that there will be sufficient water and wastewater capacity to accommodate the proposed development. Chapter 6 of this EIAR indicates that the potential adverse impact of the proposed development on the Power, Gas and Telecommunications networks is likely to be permanent and minimal. The Phase 1 and Phase 2 developments are to be constructed sequentially and also will be become operational sequentially, in this context no combined operational effects have been identified.

Potential impacts of Material Assets – Services, Infrastructure & Utilities have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.4 Land, Soils and Geology

15.2.4.1 Construction Phase

15.2.4.1.1 Phase 1 'The Meadows'

Chapter 7 of this EIAR assesses 'Land, Soils and Geology' impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Land, Soils and Geology' impacts.

Landscape and Visual - The necessary earthworks/excavations and piling to facilitate the proposed development will result in permanent changes to the existing landscape setting of the site. Soil and subsoil excavations will be required for site levelling, the installation of foundations, service trenching and proposed landscaping measures reflecting interactions between both areas. This will result in a permanent relocation of soil and subsoil at most excavation locations. The CEMP describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the landscaping strategy and features of the development to be delivered during the construction phase.

Material Assets – Traffic and Transportation – Site excavations and earthworks will require HGV's and other heavier machinery and vehicles to access the site during construction. Increased traffic associated with the construction works could have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. With the implementation of the mitigation measures proposed in the CEMP (ref. appendix 2.1) prepared by JB Barry and Partners impacts and interactions will not be significant.

Material Assets – Services, Infrastructure & Utilities – To accommodate the installation of utilities and service infrastructure during construction, land excavations and site clearance will be required. However, with the implementation of the proposed mitigation measures outlined in Chapter 7 of this EIAR, it is not predicated that there will be significant negative interactions.

Water (Hydrology and Hydrogeology) - There is potential for surface water or groundwater to be contaminated with pollutants associated with construction activity. The removal of topsoil and localised excavations across the site will potentially increase the vulnerability of the underlying groundwater aquifer. The impact is considered to be is negligible on the groundwater contained within the bedrock aquifer and the risk to the Douglas River is considered to be imperceptible given the distance from the site.

Biodiversity - The proposed development provides for site clearance, excavations, earthworks, piling and tree/hedgerow removal (to maximum of 13 no. trees), which may result in disturbance/displacement of existing habitats/flora during the construction phase. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Chapter 9 of this EIAR assessed the habitats to be removed to be predominantly of local value (lower importance), with areas of local value (higher importance) also impacted. The potential impacts on habitats are determined to be negative, long-term and range from slight to not significant in significance. With the implementation of appropriate mitigation measures, as outlined in Chapter 9 of this EIAR, it is not predicted that there will be any significant negative interactions between Land and Soil and Biodiversity.

Noise and Vibration – Chapter 7 identifies potential noise and vibration sources that could arise during the construction phase as including pilling and excavation works. As stated in EIAR Chapter 11, based on the assessments carried out, the anticipated construction noise impact is categorised as short-term and comfortably below the BS5228-1 limits.

Cultural Heritage and Archaeology - As detailed in EIAR Chapter 10 prepared by John Cronin & Associates, and the CEMP, the construction phase is anticipated to have a slight, temporary negative impact on Bessborough House and Farm and the associated Icehouse and Folly historic features. Given the cultural sensitivity of the lands Chapter 10 recommends that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. During site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.4** by Aidan Harte, Forensic Archaeologist. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between Land and Soil and Cultural Heritage.

Air Quality and Climate - In the absence of appropriate mitigation measures, Chapter 7 identifies potential for dust generated through the construction phase works, particularly during the pilling and excavation works, to result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature.

Population and Human Health – In the absence of appropriate mitigation measures, construction activities including construction traffic, site clearance/excavations and piling may result in increased dust, noise and vibration levels in the locality as well as potential soil contamination interacting with population and human beings. Hydrocarbons will be used onsite during construction. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. The potential residual impacts associated with soil or ground contamination and subsequent health effects are predicted to be negligible.

15.2.4.1.2 Phase 2 'The Farm'

Chapter 7 of this EIAR assesses 'Land, Soils and Geology' impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Land, Soils and Geology' impacts.

Landscape and Visual - The necessary earthworks/excavations and piling to facilitate the proposed development will result in permanent changes to the existing landscape setting of the site. Soil and subsoil excavations will be required for site levelling, the installation of foundations, service trenching and proposed landscaping measures reflecting interactions between both areas. This will result in a permanent relocation of soil and subsoil at most excavation locations. The CEMP describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the landscaping strategy and features of the development to be delivered during the construction phase.

Material Assets – Traffic and Transportation – Site excavations and earthworks will require HGV's and other heavier machinery and vehicles to access the site during construction. Increased traffic associated with the construction works could have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. With the implementation of the mitigation measures proposed in the CEMP (ref. appendix 2.2 prepared by JB Barry and Partners impacts and interactions will not be significant.

Material Assets – Services, Infrastructure & Utilities – To accommodate the installation of utilities and service infrastructure during construction, land excavations and site clearance will be required. However, with the implementation of the proposed mitigation measures outlined in Chapter 7 of this EIAR, it is not predicated that there will be significant negative interactions.

Water (Hydrology and Hydrogeology) - There is potential for surface water or groundwater to be contaminated with pollutants associated with construction activity. The removal of topsoil and localised excavations across the site will potentially increase the vulnerability of the underlying groundwater aquifer. The impact is considered to be is negligible on the groundwater contained within the bedrock aquifer and the risk to the Douglas River is considered to be imperceptible given the distance from the site.

Biodiversity - The proposed development provides for site clearance, excavations, earthworks, piling and tree/hedgerow removal (to maximum of 54 no. trees), which may result in disturbance/displacement of existing habitats/flora during the construction phase. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Chapter 9 of this EIAR notes that the habitats within the footprint of the proposed development are not rare, threatened nor do they require any special protection under existing or pending legislation and categorises the habitats to be removed to be predominantly of local value (lower importance), with areas of local value (higher importance) also impacted. The potential impacts on habitats are determined to be negative, long-term and range from slight to not significant in significance. With the implementation of appropriate mitigation measures, as outlined in Chapter 9 of this EIAR, it is not predicted that there will be any significant negative interactions between Land and Soil and Biodiversity.

Noise and Vibration – Chapter 7 identifies potential noise and vibration sources that could arise during the construction phase as including pilling and excavation works. As stated in EIAR Chapter 11, based on the assessments carried out, the anticipated construction noise impact is categorised as short-term and comfortably below the BS5228-1 limits.

Cultural Heritage and Archaeology - As detailed in EIAR Chapter 10 prepared by John Cronin & Associates, and the CEMP, the construction phase is anticipated to have a slight, temporary negative impact on Bessborough House and Farm and the associated Icehouse and Folly historic features. Given the cultural sensitivity of the lands Chapter 10 recommends that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. During site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.4** by Aidan Harte, Forensic Archaeologist. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between Land and Soil and Cultural Heritage.

Air Quality and Climate - In the absence of appropriate mitigation measures, Chapter 7 identifies potential for dust generated through the construction phase works, particularly during the pilling and excavation works, to result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature.

Population and Human Health – In the absence of appropriate mitigation measures, construction activities including construction traffic, site clearance/excavations and piling may result in increased dust, noise and vibration levels in the locality as well as potential soil contamination interacting with population and human beings. Hydrocarbons will be used onsite during construction. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. The potential residual impacts associated with soil or ground contamination and subsequent health effects are predicted to be negligible.

15.2.4.1.3 Combined Phase 1 and Phase 2

Chapter 7 of this EIAR assesses 'Land, Soils and Geology' impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Land, Soils and Geology' impacts.

Landscape and Visual - The necessary earthworks/excavations and piling to facilitate the proposed development will result in permanent changes to the existing landscape setting of the site. Soil and subsoil excavations will be required for site levelling, the installation of foundations, service trenching and proposed landscaping measures reflecting interactions between both areas. This will result in a permanent relocation of soil and subsoil at most excavation locations. The CEMP describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the landscaping strategy and features of the development to be delivered during the construction phase.

Material Assets – Traffic and Transportation – Site excavations and earthworks will require HGV's and other heavier machinery and vehicles to access the site during construction. Increased traffic associated with the construction works could have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. With the implementation of the mitigation measures proposed in the CEMP (ref. appendix 2.2 prepared by JB Barry and Partners impacts and interactions will not be significant.

Material Assets – Services, Infrastructure & Utilities – To accommodate the installation of utilities and service infrastructure during construction, land excavations and site clearance will be required. However, with the implementation of the proposed mitigation measures outlined in Chapter 7 of this EIAR, it is not predicated that there will be significant negative interactions. Chapter 6 notes that Phase 1 and 2 developments are planned to be constructed sequentially. However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Water (Hydrology and Hydrogeology) - There is potential for surface water or groundwater to be contaminated with pollutants associated with construction activity. The removal of topsoil and localised excavations across the site will potentially increase the vulnerability of the underlying groundwater aquifer. The impact is considered to be is negligible on the groundwater contained within the bedrock aquifer and the risk to the Douglas River is considered to be imperceptible given the distance from the site.

Biodiversity - The proposed development provides for site clearance, excavations, earthworks, piling and tree/hedgerow removal (to maximum of 13 no. trees), which may result in disturbance/displacement of existing habitats/flora during the construction phase. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Chapter 9 of this EIAR notes that the habitats within the footprint of the proposed development are not rare, threatened nor do they require any special protection under existing or pending legislation and categorises the habitats to be removed to be predominantly of local value (lower importance), with areas of local value (higher importance) also impacted. The potential impacts on habitats are determined to be negative, long-term and range from slight to not significant in significance. With the implementation of appropriate mitigation measures, as outlined in Chapter 9 of this EIAR, it is not predicted that there will be any significant negative interactions between Land and Soil and Biodiversity.

Noise and Vibration – Chapter 7 identifies potential noise and vibration sources that could arise during the construction phase as including pilling and excavation works. As stated in EIAR Chapter 11, based on the assessments carried out, the anticipated construction noise impact is categorised as short-term and comfortably below the BS5228-1 limits.

Cultural Heritage and Archaeology - As detailed in EIAR Chapter 10 prepared by John Cronin & Associates, and the CEMP, the construction phase is anticipated to have a slight, temporary negative impact on Bessborough House and Farm and the associated Icehouse and Folly historic features. Given the cultural sensitivity of the lands Chapter 10 recommends that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. During site development works, such works will be monitored in accordance with the methodology outlined in **Appendix 10.4** by Aidan Harte, Forensic Archaeologist. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between Land and Soil and Cultural Heritage.

Air Quality and Climate - In the absence of appropriate mitigation measures, Chapter 7 identifies potential for dust generated through the construction phase works, particularly during the pilling and excavation works, to result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature.

Population and Human Health – In the absence of appropriate mitigation measures, construction activities including construction traffic, site clearance/excavations and piling may result in increased dust, noise and vibration levels in the locality as well as potential soil contamination interacting with population and human beings. Hydrocarbons will be used onsite during construction. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. The potential residual impacts associated with soil or ground contamination and subsequent health effects are predicted to be negligible.

15.2.4.2 Operational Phase

15.2.4.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are:

Landscape and Visual / Water (Hydrology & Hydrogeology) - The proposed landscape strategy responds to the sites topography, with cut and fill generated from the site utilised elsewhere in the development where possible, and incorporated into the landscape strategy for the site. The proposed landscape strategy seeks to respond to the site-specific context including the utilisation of appropriate areas for public open space and incorporation of Sustainable Urban Drainage (SUDs) where appropriate.

Potential impacts of Land, Soils and Geology have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.4.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are:

Landscape and Visual / Water (Hydrology & Hydrogeology) - The proposed landscape strategy responds to the sites topography, with cut and fill generated from the site utilised elsewhere in the development where possible, and incorporated into the landscape strategy for the site. The proposed landscape strategy seeks to respond to the site-specific context including the utilisation of appropriate areas for public open space and incorporation of Sustainable Urban Drainage (SUDs) where appropriate.

Potential impacts of Land, Soils and Geology have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.4.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are:

Landscape and Visual / Water (Hydrology & Hydrogeology) - The proposed landscape strategy responds to the sites topography, with cut and fill generated from the site utilised elsewhere in the development where possible, and incorporated into the landscape strategy for the site. The proposed landscape strategy seeks to respond to the site-specific context including the utilisation of appropriate areas for public open space and incorporation of Sustainable Urban Drainage (SUDs) where appropriate.

Potential impacts of Land, Soils and Geology have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicte

15.2.5 Water (Hydrology and Hydrogeology)

15.2.5.1 Construction Phase

15.2.5.1.1 Phase 1 'The Meadows'

Chapter 8 of this EIAR assesses Water (Hydrology and Hydrogeology) impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Water (Hydrology and Hydrogeology) impacts.

Material Assets – Services, Infrastructure & Utilities – In the absence of appropriate mitigation measures, works to provide connections to utilities and services such as foul and surface water, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Any stockpiling of materials or works impeding site drainage may lead to temporary localised flooding if drains become blocked. However, as predicted in EIAR Chapter 8 (Water), interactions between the implementation of utilities and water will not be significant/negative.

Land, Soils and Geology– Any contamination of local surface water or groundwater may result in negative geological impacts. The necessary earthworks to facilitate the site levelling and the implementation of the attenuation system will require the alteration of the existing soil/land profile. In the absence of appropriate mitigation measures, construction activities may result in discharge of contaminated run-off to surface water or result in contamination of groundwater. However, it is predicted that with the suite of relevant mitigation measures proposed in the CEMP (ref Appendix 2.1) and this EIAR that there will be no significant interactions.

Biodiversity – Any negative impacts affecting water quality during construction activities may result in negative impacts on local biodiversity and wildlife. These include potential surface water run-off/discharge, wastewater/foul effluent from construction activities impacting the Cork Harbour SPA and local for surface water or groundwater. A series of mitigation measures are proposed in Chapter 8 to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard. Chapter 9 of the EIAR (Biodiversity), predicts that with the proposed mitigation and monitoring measures in place, that there will be no significant negative interactions between biodiversity/ecology and Water (Hydrology & Hydrogeology) impacts.

Population and Human Health – In the absence of appropriate mitigation measures, there is potential for surface water or groundwater to be contaminated with pollutants associated with construction activity, resulting in negative impacts relating to human health. Other potential health effects are associated with flooding. The proposed site design and mitigation measures ensures that the potential for impacts on the water environment is not significant.

15.2.5.1.2 Phase 2 'The Farm'

Chapter 8 of this EIAR assesses Water (Hydrology and Hydrogeology) impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Water (Hydrology and Hydrogeology) impacts.

Material Assets – Services, Infrastructure & Utilities – In the absence of appropriate mitigation measures, works to provide connections to utilities and services such as foul and surface water, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Any stockpiling of materials or works impeding site drainage may lead to temporary localised flooding if drains become blocked. However, as predicted in EIAR Chapter 8 (Water), interactions between the implementation of utilities and water will not be significant/negative.

Land, Soils and Geology – Any contamination of local surface water or groundwater may result in negative geological impacts. The necessary earthworks to facilitate the site levelling and the implementation of the attenuation system will require the alteration of the existing soil/land profile. In the absence of appropriate mitigation measures, construction activities may result in discharge of contaminated run-off to surface water or result in contamination of groundwater. However, it is predicted that with the suite of relevant mitigation measures proposed in the CEMP (ref Appendix 2.2) and this EIAR that there will be no significant interactions.

Biodiversity – Any negative impacts affecting water quality during construction activities may result in negative impacts on local biodiversity and wildlife. These include potential surface water run-off/discharge, wastewater/foul effluent from construction activities impacting the Cork Harbour SPA and local for surface water or groundwater. A series of mitigation measures are proposed in Chapter 8 to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard. Chapter 9 of the EIAR (Biodiversity), predicts that with the proposed mitigation and monitoring measures in place, that there will be no significant negative interactions between biodiversity/ecology and Water (Hydrology & Hydrogeology) impacts.

Population and Human Health – In the absence of appropriate mitigation measures, there is potential for surface water or groundwater to be contaminated with pollutants associated with construction activity, resulting in negative impacts relating to human health. Other potential health effects are associated with flooding. The proposed site design and mitigation measures ensures that the potential for impacts on the water environment is not significant.

15.2.5.1.3 Combined Phase 1 and Phase 2

Chapter 8 of this EIAR assesses Water (Hydrology and Hydrogeology) impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Water (Hydrology and Hydrogeology) impacts.

Material Assets – Services, Infrastructure & Utilities – In the absence of appropriate mitigation measures, works to provide connections to utilities and services such as foul and surface water, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Any stockpiling of materials or works impeding site drainage may lead to temporary localised flooding if drains become blocked. However, as predicted in EIAR Chapter 8 (Water), interactions between the implementation of utilities and water will not be significant/negative. Chapter 6 notes that Phase 1 and 2 developments are planned to be constructed sequentially. However, it should also be noted that if the Phase 1 development proceeds, then a number of the Phase 2 impacts may be reduced in extent as some of the connections to existing infrastructure will already have taken place.

Land, Soils and Geology – Any contamination of local surface water or groundwater may result in negative geological impacts. The necessary earthworks to facilitate the site levelling and the implementation of the attenuation system will require the alteration of the existing soil/land profile. In the absence of appropriate mitigation measures, construction activities may result in discharge of contaminated run-off to surface water or result in contamination of groundwater. However, it is predicted that with the suite of relevant mitigation measures proposed in the CEMP (ref Appendix 2.1 and Appendix 2.2) and this EIAR that there will be no significant interactions.

Biodiversity – Any negative impacts affecting water quality during construction activities may result in negative impacts on local biodiversity and wildlife. These include potential surface water run-off/discharge, wastewater/foul effluent from construction activities impacting the Cork Harbour SPA and local for surface water or groundwater. A series of mitigation measures are proposed in Chapter 8 to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard. Chapter 9 of the EIAR (Biodiversity), predicts that with the proposed mitigation and monitoring measures in place, that there will be no significant negative interactions between biodiversity/ecology and Water (Hydrology & Hydrogeology) impacts.

Population and Human Health – In the absence of appropriate mitigation measures, there is potential for surface water or groundwater to be contaminated with pollutants associated with construction activity, resulting in negative impacts relating to human health. Other potential health effects are associated with flooding. The proposed site design and mitigation measures ensures that the potential for impacts on the water environment is not significant.

15.2.5.2 Operational Phase

15.2.5.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are.

Landscape and Visual The proposed development provides for Sustainable Urban Drainage Systems (SUDS) which also is reflects in the wider landscape strategy for the site.

Material Assets-Services Infrastructure & Utilities – A key environmental interaction with Water is Material Assets – Services, Infrastructure & Utilities which outlines the existing wastewater and surface water networks capacity to facilitate scheme discharges. Irish Water have confirmed, via a Confirmation of Design Acceptance, that there will be sufficient water and wastewater capacity to accommodate the operational phase of the proposed development.

Biodiversity – Other potential interactions include impacts on the Cork Harbour SPA designated site, resultant from foul water from the proposed development ultimately discharging to the Carrigrennan WWTP for treatment and disposal to Lough Mahon which overlap with that of the Cork Harbour SPA. It is predicted in EIAR Chapter 9, that no impact from wastewater discharges during operation are predicted to occur relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref. Appendix 9.5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Population and Human Health – The reduction of recharge area due to the introduction of impermeable surfaces will severely restrict recharge. This coupled with shorter flow paths through pipes and reduced roughness co-efficient will result in an increased surface water run-off discharge rates and increased risk of pluvial flooding, potentially impacting the local population and human health. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development. The proposed development will also result in an increase for demand in for local water services. However, it is predicted that the scheme design and proposed mitigation measures will ensure that the potential for impacts on the water environment relating to human health are not significant.

However, it is predicted that the scheme design and proposed mitigation measures will ensure that the potential for impacts on the water environment relating to human health are not significant.

15.2.5.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are.

Landscape and Visual The proposed development provides for Sustainable Urban Drainage Systems (SUDS) which also is reflects in the wider landscape strategy for the site.

Material Assets-Services Infrastructure & Utilities – A key environmental interaction with Water is Material Assets – Services, Infrastructure & Utilities which outlines the existing wastewater and surface water networks capacity to facilitate scheme discharges. Irish Water have confirmed, via a Confirmation of Design Acceptance, that there will be sufficient water and wastewater capacity to accommodate the operational phase of the proposed development.

Biodiversity – Other potential interactions include impacts on the Cork Harbour SPA designated site, resultant from foul water from the proposed development ultimately discharging to the Carrigrennan WWTP for treatment and disposal to Lough Mahon which overlap with that of the Cork Harbour SPA. It is predicted in EIAR Chapter 9, that no impact from wastewater discharges during operation are predicted to occur relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref. Appendix 9.5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Population and Human Health – The reduction of recharge area due to the introduction of impermeable surfaces will severely restrict recharge. This coupled with shorter flow paths through pipes and reduced roughness co-efficient will result in an increased surface water run-off discharge rates and increased risk of pluvial flooding, potentially impacting the local population and human health. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development. The proposed development will also result in an increase for demand in for local water services. However, it is predicted that the scheme design and proposed mitigation measures will ensure that the potential for impacts on the water environment relating to human health are not significant.

However, it is predicted that the scheme design and proposed mitigation measures will ensure that the potential for impacts on the water environment relating to human health are not significant.

15.2.5.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are.

Landscape and Visual The proposed development provides for Sustainable Urban Drainage Systems (SUDS) which also is reflects in the wider landscape strategy for the site.

Material Assets-Services Infrastructure & Utilities – A key environmental interaction with Water is Material Assets – Services, Infrastructure & Utilities which outlines the existing wastewater and surface water networks capacity to facilitate scheme discharges. Irish Water have confirmed, via a Confirmation of Design Acceptance, that there will be sufficient water and wastewater capacity to accommodate the operational phase of the proposed development.

Biodiversity – Other potential interactions include impacts on the Cork Harbour SPA designated site, resultant from foul water from the proposed development ultimately discharging to the Carrigrennan WWTP for treatment and disposal to Lough Mahon which overlap with that of the Cork Harbour SPA. It is predicted in EIAR Chapter 9, that no impact from wastewater discharges during operation are predicted to occur relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref. Appendix 9.5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Population and Human Health – The reduction of recharge area due to the introduction of impermeable surfaces will severely restrict recharge. This coupled with shorter flow paths through pipes and reduced roughness co-efficient will result in an increased surface water run-off discharge rates and increased risk of pluvial flooding, potentially impacting the local population and human health. Surface water attenuation storage has been incorporated into the design to safeguard against storms and associated flooding throughout the lifetime of the development. The proposed development will also result in an increase for demand in for local water services. However, it is predicted that the scheme design and proposed mitigation measures will ensure that the potential for impacts on the water environment relating to human health are not significant.

Potential impacts of Water (Hydrology) have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.6 Biodiversity

15.2.6.1 Construction Phase

15.2.6.1.1 Phase 1 'The Meadows'

Chapter 9 of this EIAR assesses Biodiversity impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Biodiversity impacts.

Landscape and Visual - The removal of a maximum of 13 existing trees and other vegetation during the construction phase, will result in interactions with biodiversity considerations and potential short term negative impacts on local flora/fauna species and the displacement of habitats.

Material Assets – Traffic and Transportation –. Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP (ref Appendix 2-1) which prioritises the minimisation of potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions between biodiversity and traffic and transportation impacts during the construction phase.

Material Assets – Services, Infrastructure & Utilities – During the construction phase the necessary works to accommodate service infrastructure including earthworks, tree/hedgerow removal, earthworks/excavation and refuelling on site may result in the short-term displacement, deterioration or destruction of habitats, flora/fauna species in the absence of appropriate mitigation measures. Similarly, without mitigation, artificial light spillage from construction lighting could cause potential disturbance to bats, otters, other mammals and birds. Chapter 9 of this EIAR notes however that in the absence of mitigation the negative impact of lighting on low to moderate value foraging habitats for bats will be moderate and not significant in relation to the other fauna. The CEMP sets out appropriate mitigation measures. As detailed in EIAR Chapter 9, with the proposed mitigation measures in place, it is predicted that there will not be significant interactions between biodiversity and material assets during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (ref Appendix 9-5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Land, Soils and Geology – The proposed site excavations/groundworks, clearance and piling have the potential to result in the disturbance of existing habitats during the construction phase. However, as described in detail in EIAR Chapter 9, it is not predicted there will be significant negative impacts and interactions been ecology and Land, Soils and Geology, with the treatment of existing invasive species on the site considered a beneficial aspect.

Noise and Vibration – Noise and vibration resultant from the construction phase may result in the disturbance of local habitats. However, given the nature of the proposed development and the existing noise environment, construction activities are not expected to generate significant noise beyond the site boundary. It is noted that the surrounding landscape are already subject to high levels of disturbance from traffic and human activity.

Air Quality and Climate – As detailed in EIAR Chapter 9, dust emissions arising from demolition and earthworks during the construction phase could impact on habitats and theoretically could have impacts on associated flora and fauna. They present, therefore, a risk of ecological impacts prior to mitigation measures being adopted. It is predicted that the proposed mitigation measures identified in the CEMP including a Dust Management Plan will mitigate any significant negative interactions during construction.

15.2.6.1.2 Phase 2 'The Farm'

Chapter 9 of this EIAR assesses Biodiversity impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Biodiversity impacts.

Landscape and Visual - The removal of a maximum of 54 existing trees and other vegetation during the construction phase, will result in interactions with biodiversity considerations and potential short term negative impacts on local flora/fauna species and the displacement of habitats.

Material Assets – Traffic and Transportation –. Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP (ref Appendix 2-2) which prioritises the minimisation of potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions between biodiversity and traffic and transportation impacts during the construction phase.

Material Assets – Services, Infrastructure & Utilities – During the construction phase the necessary works to accommodate service infrastructure including earthworks, tree/hedgerow removal, earthworks/excavation and refuelling on site may result in the short-term displacement, deterioration or destruction of habitats, flora/fauna species in the absence of appropriate mitigation measures. Similarly, without mitigation, artificial light spillage from construction lighting could cause potential disturbance to bats, otters, other mammals and birds. Chapter 9 of this EIAR notes however that in the absence of mitigation the negative impact of lighting on low to moderate value foraging habitats for bats will be moderate and not significant in relation to the other fauna. The CEMP sets out appropriate mitigation measures. As detailed in EIAR Chapter 9, with the proposed mitigation measures in place, it is predicted that there will not be significant interactions between biodiversity and material assets during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (ref Appendix 9-5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Land, Soils and Geology – The proposed site excavations/groundworks, clearance and piling have the potential to result in the disturbance of existing habitats during the construction phase. However, as described in detail in EIAR Chapter 9, it is not predicted there will be significant negative impacts and interactions been ecology and Land, Soils and Geology, with the treatment of existing invasive species on the site considered a beneficial aspect.

Noise and Vibration – Noise and vibration resultant from the construction phase may result in the disturbance of local habitats. However, given the nature of the proposed development and the existing noise environment, construction activities are not expected to generate significant noise beyond the site boundary. It is noted that the surrounding landscape are already subject to high levels of disturbance from traffic and human activity.

Air Quality and Climate – As detailed in EIAR Chapter 9, dust emissions arising from demolition and earthworks during the construction phase could impact on habitats and theoretically could have impacts on associated flora and fauna. They present, therefore, a risk of ecological impacts prior to mitigation measures being adopted. It is predicted that the proposed mitigation measures identified in the CEMP including a Dust Management Plan will mitigate any significant negative interactions during construction.

15.2.6.1.3 Combined Phase 1 and Phase 2

Chapter 9 of this EIAR assesses Biodiversity impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Biodiversity impacts.

Landscape and Visual - The removal of a maximum of 64 existing trees and other vegetation during the construction phase, will result in interactions with biodiversity considerations and potential short term negative impacts on local flora/fauna species and the displacement of habitats.

Material Assets – Traffic and Transportation –. Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMPs (ref Appendix 2-1 and Appendix 2-2) which prioritise the minimisation of potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions between biodiversity and traffic and transportation impacts during the construction phase.

Material Assets – Services, Infrastructure & Utilities – During the construction phase the necessary works to accommodate service infrastructure including earthworks, tree/hedgerow removal, earthworks/excavation and refuelling on site may result in the short-term displacement, deterioration or destruction of habitats, flora/fauna species in the absence of appropriate mitigation measures. Similarly, without mitigation, artificial light spillage from construction lighting could cause potential disturbance to bats, otters, other mammals and birds. Chapter 9 of this EIAR notes however that in the absence of mitigation the negative impact of lighting on low to moderate value foraging habitats for bats will be moderate and not significant in relation to the other fauna. The CEMP sets out appropriate mitigation measures. As detailed in EIAR Chapter 9, with the proposed mitigation measures in place, it is predicted that there will not be significant interactions between biodiversity and material assets during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (ref Appendix 9-5 and Appendix 9-6) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to Natura 2000 sites (Cork Harbour SPA).

Land, Soils and Geology – The proposed site excavations/groundworks, clearance and piling have the potential to result in the disturbance of existing habitats during the construction phase. However, as described in detail in EIAR Chapter 9, it is not predicted there will be significant negative impacts and interactions been ecology and Land, Soils and Geology, with the treatment of existing invasive species on the site considered a beneficial aspect.

Noise and Vibration – Noise and vibration resultant from the construction phase may result in the disturbance of local habitats. However, given the nature of the proposed development and the existing noise environment, construction activities are not expected to generate significant noise beyond the site boundary. It is noted that the surrounding landscape are already subject to high levels of disturbance from traffic and human activity.

Air Quality and Climate – As detailed in EIAR Chapter 9, dust emissions arising from demolition and earthworks during the construction phase could impact on habitats and theoretically could have impacts on associated flora and fauna. They present, therefore, a risk of ecological impacts prior to mitigation measures being adopted. It is predicted that the proposed mitigation measures identified in the CEMP including a Dust Management Plan will mitigate any significant negative interactions during construction.

15.2.6.2 Operational Phase

15.2.6.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are.

Landscape and Visual - Once operational, the proposed replacement/mitigation planting scheme and landscape strategy will provide new opportunities for flora and fauna habitats, with the introduction of 108 new trees and significant landscape planting. The proposed planting includes herbaceous and evergreen perennial shrubs in planters along the pedestrian link and within the communal gardens, to form an under storey of vibrant seasonal colour. The careful selection and combinations of herbaceous perennials and grasses will ensure good seasonal colour and add vibrancy and animation to the courtyards. Evergreen shrubs will provide low maintenance, year-round structure and

some winter interest as well as extensive native-dominant tree planting across the site, with native Yew and Hawthorn hedges proposed on boundaries to promote a more ecologically biodiverse landscape. This will be supplemented by ten bat boxes to be erected by the Project Ecologist. In combination, the planting scheme will positively contribute to biodiversity in the long-term.

Material Assets – Services, Infrastructure & Utilities - During the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme, with lesser potential impacts identified on otters, other mammals and birds. Other potential interactions include impacts with European designated sites, resultant from the service/water infrastructure proposed and the permanent displacement, deterioration or destruction of habitats. However, it is predicted in EIAR Chapter 9 that the proposed development/servicing proposals will result in no significant negative impacts relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref Appendix 9-5) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA). Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted. Mitigation measures include the provision of appropriate public lighting conducive with bats in the vicinity of the site.

Water (Hydrology & Hydrogeology) - Restricted operational surface-water run-off associated with the site will be discharged via the existing surface water drainage network which discharges ultimately to the Douglas Estuary south of the N40. The surface water strategy for the development will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Surface water runoff directed to the SuDS features will benefit from their pollutant removal qualities. However, to ensure water quality standards are met, dedicated attenuation facilities that are sized on the basis of a design storm with 100-year return period will be installed. The proposed rate of surface water discharge from the development will be limited to that of the greenfield runoff for a 100-year storm event. Surface water design measures will ensure there is no significant impact on local water quality or on aquatic receptors within the Douglas Estuary or any other waterbodies.

Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.6.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are.

Landscape and Visual - Once operational, the proposed replacement/mitigation planting scheme and landscape strategy will provide new opportunities for flora and fauna habitats, with the introduction of 116 new trees and significant landscape planting. Of the maximum 54 no. trees that will be impacted by the development, the vast majority (40 no.) are non-native with limited biodiversity value. It is proposed that a minimum of two native trees will be planted for every existing tree impacted. The objective of these elements is to create natural, multi layered woodland habitat which will be of local ecological value and has the potential to support native flora and fauna. In addition, a native wildflower/grass mix will be utilised to provide a more diverse sward which is of higher ecological value for invertebrates and birds. In addition, the historic farmyard is reimagined as a kitchen garden. These proposal will be supplemented by eight bat boxes to be erected by the Project Ecologist. In combination, the planting scheme will positively contribute to biodiversity in the long-term.

Material Assets – Services, Infrastructure & Utilities - During the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme, with lesser potential impacts identified on otters, other mammals and birds. Other potential interactions include impacts with European designated sites, resultant from the service/water infrastructure proposed and the permanent displacement, deterioration or destruction of habitats. However, it is predicted in EIAR Chapter 9 that the proposed development/servicing proposals will result in no significant negative impacts relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref Appendix 9-6) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA). Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted. Mitigation measures include the provision of appropriate public lighting conducive with bats in the vicinity of the site.

Water (Hydrology & Hydrogeology) - Restricted operational surface-water run-off associated with the site will be discharged via the existing surface water drainage network which discharges ultimately to the Douglas Estuary south of the N40. The surface water strategy for the development will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Surface water runoff directed to the SuDS features will benefit from their pollutant removal qualities. However, to ensure water quality standards are met, dedicated attenuation facilities that are sized on the basis of a design storm with 100-year return period will be installed. The proposed rate of surface water discharge from the development will be limited to that of the greenfield runoff for a 100-year storm event. Surface water design measures will ensure there is no significant impact on local water quality or on aquatic receptors within the Douglas Estuary or any other waterbodies.

Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.6.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are.

Landscape and Visual - Once operational, the proposed replacement/mitigation planting scheme and landscape strategy will provide new opportunities for flora and fauna habitats, with the introduction of 224 new trees and significant landscape planting. Principal amongst this will be the parkland, where the objective is to create a natural, multi layered woodland habitat which will be of local ecological value and has the potential to support native flora and fauna. In addition, a native wildflower/grass mix will be utilised to provide a more diverse sward which is of higher ecological value for invertebrates and birds. The historic farmyard is reimagined as a kitchen garden and the proposed planting includes herbaceous and evergreen perennial shrubs in planters along the pedestrian link and within the communal gardens, to form an under storey of vibrant seasonal colour. The careful selection and combinations of herbaceous perennials and grasses will ensure good seasonal colour and add vibrancy and animation to the courtyards. Evergreen shrubs will provide low maintenance, year-round structure and some winter interest as well as extensive native-dominant tree planting across the site, with native Yew and Hawthorn hedges proposed on boundaries to promote a more ecologically biodiverse landscape. This will be supplemented by eighteen bat boxes to be erected by the Project Ecologist. In combination, the planting scheme will positively contribute to biodiversity in the long-term.

Material Assets – Services, Infrastructure & Utilities - During the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme, with lesser potential impacts identified on otters, other mammals and birds. Other potential interactions include impacts with European designated sites, resultant from the service/water infrastructure proposed and the permanent displacement, deterioration or destruction of habitats. However, it is predicted in EIAR Chapter 9 that the proposed development/servicing proposals will result in no significant negative impacts relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (ref Appendix 9-5 and Appendix 9-6) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA). Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted. Mitigation measures include the provision of appropriate public lighting conducive with bats in the vicinity of the site.

Water (Hydrology & Hydrogeology) - Restricted operational surface-water run-off associated with the site will be discharged via the existing surface water drainage network which discharges ultimately to the Douglas Estuary south of the N40. The surface water strategy for the development will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Surface water runoff directed to the SuDS features will benefit from their pollutant removal qualities. However, to ensure water quality standards are met, dedicated attenuation facilities that are sized on the basis of a design storm with 100-year return period will be installed. The proposed rate of surface water discharge from the development will be limited to that of the greenfield runoff for a 100-year storm event. Surface water design measures will ensure there is no significant impact on local water quality or on aquatic receptors within the Douglas Estuary or any other waterbodies.

Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.7 Noise and Vibration

15.2.7.1 Construction Phase

15.2.7.1.1 Phase 1 'The Meadows'

Chapter 10 of this EIAR assesses Noise and Vibration impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Noise and Vibration impacts.

Material Assets – Traffic and Transportation –Noise and vibration generated from plant machinery and HGV movements may give rise to nuisances impacting the amenities of residents and businesses. It is predicted that with the proposed suite of mitigation measures, including the CEMP, that the interactions between construction traffic and noise and vibration will not be significant and will be short term in nature.

Material Assets – Services, Infrastructure & Utilities – The installation of utilities and services during construction may result in some interactions with noise and vibration emissions. However, with the proposed mitigation measures enforced it is not predicted that any significant interactions will take place during construction.

Biodiversity – Noise and vibration during construction may result in disturbance of flora/fauna and existing habitats during construction working hours. It is predicted that, the proposed construction noise will be short term in nature and will not significantly add to the existing and on-going background noise levels associated with vehicular movement on the N40 road and as well as the other existing urban infrastructure associated with the wider Mahon area.

Air Quality and Climate – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Population and Human Health - Increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents. The modelled construction noise levels in Chapter 11 of this EIAR indicate that the ambient noise level at the nearest measurement location will be comfortably below the BS5228-1 limits and also will be short-term in duration.

15.2.7.1.2 Phase 2 'The Farm'

Chapter 10 of this EIAR assesses Noise and Vibration impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Noise and Vibration impacts.

Material Assets – Traffic and Transportation –Noise and vibration generated from plant machinery and HGV movements may give rise to nuisances impacting the amenities of residents and businesses. It is predicted that with the proposed suite of mitigation measures, including the CEMP, that the interactions between construction traffic and noise and vibration will not be significant and will be short term in nature.

Material Assets – Services, Infrastructure & Utilities – The installation of utilities and services during construction may result in some interactions with noise and vibration emissions. However, with the proposed mitigation measures enforced it is not predicted that any significant interactions will take place during construction.

Biodiversity – Noise and vibration during construction may result in disturbance of flora/fauna and existing habitats during construction working hours. It is predicted that, the proposed construction noise will be short term in nature and will not significantly add to the existing and on-going background noise levels associated with vehicular movement on the N40 road and as well as the other existing urban infrastructure associated with the wider Mahon area.

Air Quality and Climate – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Population and Human Health - Increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents. The modelled construction noise levels in Chapter 11 of this EIAR indicate that the ambient noise level at the nearest measurement location will be comfortably below the BS5228-1 limits and also will be short-term in duration.

15.2.7.1.3 Combined Phase 1 and Phase 2

Chapter 10 of this EIAR assesses Noise and Vibration impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Noise and Vibration impacts.

Material Assets – Traffic and Transportation –Noise and vibration generated from plant machinery and HGV movements may give rise to nuisances impacting the amenities of residents and businesses. It is predicted that with the proposed suite of mitigation measures, including the CEMP, that the interactions between construction traffic and noise and vibration will not be significant and will be short term in nature.

Material Assets – Services, Infrastructure & Utilities – The installation of utilities and services during construction may result in some interactions with noise and vibration emissions. However, with the proposed mitigation measures enforced it is not predicted that any significant interactions will take place during construction.

Biodiversity – Noise and vibration during construction may result in disturbance of flora/fauna and existing habitats during construction working hours. It is predicted that, the proposed construction noise will be short term in nature and will not significantly add to the existing and on-going background noise levels associated with vehicular movement on the N40 road and as well as the other existing urban infrastructure associated with the wider Mahon area.

Air Quality and Climate – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted

that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Population and Human Health - Increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents. The modelled construction noise levels in Chapter 11 of this EIAR indicate that the ambient noise level at the nearest measurement location will be comfortably below the BS5228-1 limits and also will be short-term in duration.

15.2.7.2 Operational Phase

15.2.7.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are.

Material Assets – Traffic and Transportation – As detailed in EIAR Chapter 11, the main potential sources of outward noise from the development during the operational phase is from additional traffic on surrounding roads, deliveries and waste collections. However, it is predicted that changes in noise level associated with the operational phase can be categorised as 'Slight' at the worst case. Due to the expected frequency of waste collection and deliveries to the proposed development, based on the number of residents, and since the proposed development has been designed to accommodate these services, deliveries and waste collection will not result in a significant noise impact on the surrounding area.

Material Assets – Services, Infrastructure & Utilities – One of the main potential sources of noise and vibration during operational phase will be general activities, landscape maintenance, cleaning, energy producing equipment etc. As confirmed in EIAR Chapter 11, based on the assessments carried out on operational noise, the predicted impact is categorised as 'Slight' at the worst case. It is predicted there will be no significant negative interactions between Noise & Vibration and Material Assets impacts during the operational phase.

Population and Human Health - It is not predicted that noise and vibrations sources from increased traffic, building services plant, deliveries and waste collections and other activities will result in significant impacts/interactions with human health impacts during the operational phase.

Potential impacts of Noise & Vibration have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.7.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are.

Material Assets – Traffic and Transportation – As detailed in EIAR Chapter 11, the main potential sources of outward noise from the development during the operational phase is from additional traffic on surrounding roads, deliveries and waste collections. However, it is predicted that changes in noise level associated with the operational phase can be categorised as 'Slight' at the worst case. Due to the expected frequency of waste collection and deliveries to the proposed development, based on the number of residents, and since the proposed development has been designed to accommodate these services, deliveries and waste collection will not result in a significant noise impact on the surrounding area.

Material Assets – Services, Infrastructure & Utilities – One of the main potential sources of noise and vibration during operational phase will be general activities, landscape maintenance, cleaning, energy producing equipment etc. As confirmed in EIAR Chapter 11, based on the assessments carried out on operational noise, the predicted impact is categorised as 'Slight' at the worst case. It is predicted there will be no significant negative interactions between Noise & Vibration and Material Assets impacts during the operational phase.

Population and Human Health - It is not predicted that noise and vibrations sources from increased traffic, building services plant, deliveries and waste collections and other activities will result in significant impacts/interactions with human health impacts during the operational phase.

Potential impacts of Noise & Vibration have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.7.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are.

Material Assets – Traffic and Transportation – As detailed in EIAR Chapter 11, the main potential sources of outward noise from the development during the operational phase is from additional traffic on surrounding roads, deliveries and waste collections. However, it is predicted that changes in noise level associated with the operational phase can be categorised as 'Slight' at the worst case. Due to the expected frequency of waste collection and deliveries to the proposed development, based on the number of residents, and since the proposed development has been designed to accommodate these services, deliveries and waste collection will not result in a significant noise impact on the surrounding area.

Material Assets – Services, Infrastructure & Utilities – One of the main potential sources of noise and vibration during operational phase will be general activities, landscape maintenance, cleaning, energy producing equipment etc. As confirmed in EIAR Chapter 11, based on the assessments carried out on operational noise, the predicted impact is categorised as 'Slight' at the worst case. It is predicted there will be no significant negative interactions between Noise & Vibration and Material Assets impacts during the operational phase.

Population and Human Health - It is not predicted that noise and vibrations sources from increased traffic, building services plant, deliveries and waste collections and other activities will result in significant impacts/interactions with human health impacts during the operational phase.

Potential impacts of Noise & Vibration have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.8 Cultural Heritage

15.2.8.1 Construction Phase

15.2.8.1.1 Phase 1 'The Meadows'

Chapter 10 of this EIAR assesses Cultural Heritage impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Cultural Heritage impacts.

Landscape and Visual - Necessary tree felling to a maximum of 13 no. trees, will result in a short-term negative impact to the wider area. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site, with the replanting proposed of 106 no. trees, which will be implemented during the construction phase. Chapter 4 of this EIAR considers the overall significance of the construction phase landscape impacts to be moderate and negative.

Land, Soils and Geology – Chapter 10 of this EIAR notes that the potential for direct negative impacts on any unrecorded, sub-surface archaeological features that may exist within the subject lands cannot be discounted and will require mitigation. As detailed in Chapter 10, it is recommended that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. In the unlikely event of archaeological discovery, the National Monuments Service and Cork City Council will be consulted to agree how the encountered archaeological remains are recorded and resolved. To ensure that, in the unlikely event of previously-unrecorded burials being encountered during site development works, such works will be monitored in accordance with the methodology outlined in Appendix 10.4 by Aidan Harte, Forensic Archaeologist.

Population and Human Health – The proposed development will include the construction of a new pedestrian/cycle bridge over the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This proposal will give rise to a direct, negative, low magnitude construction phase impact on this undesignated cultural heritage asset which is assessed as being of medium value. This direct negative impact is assessed as being slight in significance.

15.2.8.1.2 Phase 2 'The Farm'

Chapter 10 of this EIAR assesses Cultural Heritage impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Cultural Heritage impacts.

Landscape and Visual - Necessary tree felling to a maximum of 54 no. trees, will result in a short-term negative impact to the wider area. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site, with the replanting proposed of 116 no. trees, which will be implemented during the construction phase. Chapter 4 of this EIAR considers the overall significance of the construction phase landscape impacts to be moderate and negative.

Land, Soils and Geology – Chapter 10 of this EIAR notes that the potential for direct negative impacts on any unrecorded, sub-surface archaeological features that may exist within the subject lands cannot be discounted and will require mitigation. As detailed in Chapter 10, it is recommended that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. In the unlikely event of archaeological discovery, the National Monuments Service and Cork City Council will be consulted to agree how the encountered archaeological remains are recorded and resolved. To ensure that, in the unlikely event of previously-unrecorded burials being encountered during site development works, such works will be monitored in accordance with the methodology outlined in Appendix 10.4 by Aidan Harte, Forensic Archaeologist.

Population and Human Health – The proposed development will include the construction of a new pedestrian/cycle bridge over the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This proposal will give rise to a direct, negative, low magnitude construction phase impact on this undesignated cultural heritage asset which is assessed as being of medium value. This direct negative impact is assessed as being slight in significance. The demolition of Buildings D, E, F, G and H during the construction phase of the Farm development will result in a direct, negative, permanent, high magnitude impact on the architectural heritage resource. However, the buildings to be removed have been assessed as being of low quality and do not form part of the central core of the Bessborough Farm complex to the south which will be retained. The significance of this direct negative impact is, therefore, assessed as being moderate. This is offset by the direct positive, permanent impact of the return to use of the better-quality farm buildings, where the significance is considered slight. Similarly, the introduction of a pedestrian entrance in the original estate wall is considered to have a direct, positive, permanent impact of slight significance.

15.2.8.1.3 Combined Phase 1 and Phase 2

Chapter 10 of this EIAR assesses Cultural Heritage impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Cultural Heritage impacts.

Landscape and Visual - Necessary tree felling to a maximum of 64 no. trees, will result in a short-term negative impact to the wider area. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site, with the replanting proposed of 224 no. trees, which will be implemented during the construction phase. Chapter 4 of this EIAR considers the overall significance of the construction phase landscape impacts to be moderate and negative.

Land, Soils and Geology – Chapter 10 of this EIAR notes that the potential for direct negative impacts on any unrecorded, sub-surface archaeological features that may exist within the subject lands cannot be discounted and will require mitigation. As detailed in Chapter 10, it is recommended that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. In the unlikely event of archaeological discovery, the National Monuments Service and Cork City Council will be consulted to agree how the encountered archaeological remains are recorded and resolved. To ensure that, in the unlikely event of previously-unrecorded burials being encountered during site development works, such works will be monitored in accordance with the methodology outlined in Appendix 10.4 by Aidan Harte, Forensic Archaeologist.

Population and Human Health – The proposed development will include the construction of a new pedestrian/cycle bridge over the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This proposal will give rise to a direct, negative, low magnitude construction phase impact on this undesignated cultural heritage asset which is assessed as being of medium value. This direct negative impact is assessed as being slight in significance. The demolition of Buildings D, E, F, G and H during the construction phase of the Farm development will result in a direct, negative, permanent, high magnitude impact on the architectural heritage resource. However, the buildings to be removed have been assessed as being of low quality and do not form part of the central core of the Bessborough Farm complex to the south which will be retained. The significance of this direct negative impact is, therefore, assessed as being moderate. This is offset by the direct positive, permanent impact of the return to use of the better-quality farm buildings, where the significance is considered slight. Similarly, the introduction of a pedestrian entrance in the original estate wall is considered to have a direct, positive, permanent impact of slight significance.

15.2.8.2 Operational Phase

15.2.8.2.1 Phase 1 'The Meadows'

Landscape and Visual - The operational phase will result in the permanent change to the former lands of Bessborough House with 13 no. trees being removed to accommodate the development, which will represent a distinct increase in the scale and intensity of development within this area, and its immediate surrounds. However, Chapter 4 notes that such a development is to be expected in a dynamic, and ever-evolving locality as this, and will knit into the prevailing urban fabric rather than contrasting against. This assimilation will be assisted by the landscape strategy which includes the planting of 108 trees. The proposed development will result in a neighbourhood where the lands will be publicly accessible, where existing and future residents will have the opportunity to enjoy the sensitively restored historic landscape.

Population and Human Health – Once operational, the proposed development will result in permanent changes the Bessborough lands. The proposed landscape strategy includes the planting of 108 no. trees, to replace the maximum of 13 no. that will be lost during construction. The planting of additional trees/hedgerows across the site will mitigate the long-term impacts of existing tree removal. The operational phase of the development will see the opening up of the

lands, which are not currently formally publicly accessible, into a vibrant neighbourhood which is readily accessible from Mahon, by way of the pedestrian/cycle bridge. The proposed bridge and pedestrian and cycle paths will allow people to access and enjoy the lands and the historical landscape, which is currently overgrown and inaccessible. Chapter 4 of this EIAR describes the lands as currently having '*a tone of dereliction and dilapidation that is broadly inconsistent and unsupportive of the wider sense of place of the study area'.* The conversion of these lands into a vibrant, landscape-led neighbourhood is predicted to positively contribute to human health.

Potential impacts of cultural heritage and archaeology have been assessed and considered within each chapter/ discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.8.2.2 Phase 2 'The Farm'

Landscape and Visual - The operational phase will result in the permanent change to the former lands of Bessborough House with 54 no. trees being removed to accommodate the development, which will represent a distinct increase in the scale and intensity of development within this area, and its immediate surrounds. However, Chapter 4 notes that such a development is to be expected in a dynamic, and ever-evolving locality as this, and will knit into the prevailing urban fabric rather than contrasting against. This assimilation will be assisted by the landscape strategy which includes the planting of 116 trees. The proposed development will result in a neighbourhood where the lands will be publicly accessible, where existing and future residents will have the opportunity to enjoy the sensitively restored historic landscape.

Population and Human Health – Once operational, the proposed development will result in permanent changes the Bessborough lands. The proposed landscape strategy includes the planting of 116 no. trees, to replace the maximum of 54 no. that will be lost during construction. The planting of additional trees/hedgerows across the site will mitigate the long-term impacts of existing tree removal. The operational phase of the development will see the opening up of the lands, which are not currently formally publicly accessible, into a vibrant neighbourhood which is readily accessible from Mahon, by way of the pedestrian/cycle bridge. The proposed bridge and pedestrian and cycle paths will allow people to access and enjoy the lands and the historical landscape, which is inaccessible. It is predicted that the operational phase will positively contribute to human health.

Potential impacts of cultural heritage and archaeology have been assessed and considered within each chapter/ discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.8.2.3 Combined Phase 1 and Phase 2

Landscape and Visual - The operational phase will result in the permanent change to the former lands of Bessborough House with 64 no. trees being removed to accommodate the development, which will represent a distinct increase in the scale and intensity of development within this area, and its immediate surrounds. However, Chapter 4 notes that such a development is to be expected in a dynamic, and ever-evolving locality as this, and will knit into the prevailing urban fabric rather than contrasting against. This assimilation will be assisted by the landscape strategy which includes the planting of 224 trees. The proposed development will result in a neighbourhood where the lands will be publicly accessible, where existing and future residents will have the opportunity to enjoy the sensitively restored historic landscape.

Population and Human Health – Once operational, the proposed development will result in permanent changes the Bessborough lands. The proposed landscape strategy includes the planting of 224 no. trees, to replace the maximum of 64 no. that will be lost during construction. The planting of additional trees/hedgerows across the site will mitigate the long-term impacts of existing tree removal. The operational phase of the development will see the opening up of the lands, which are not currently formally publicly accessible, into a vibrant neighbourhood which is readily accessible from Mahon, by way of the pedestrian/cycle bridge. The proposed bridge and pedestrian and cycle paths will allow people to access and enjoy the lands and the historical landscape, which is currently overgrown in areas and inaccessible throughout. Chapter 4 of this EIAR describes the Phase 1 lands as currently having '*a tone of dereliction and dilapidation that is broadly inconsistent and unsupportive of the wider sense of place of the study area'.* The conversion of these lands into a vibrant, landscape-led neighbourhood is predicted to positively contribute to human health.

Potential impacts of cultural heritage and archaeology have been assessed and considered within each chapter/ discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.9 Air Quality and Climate

15.2.9.1 Construction Phase

15.2.9.1.1 Phase 1 'The Meadows'

Chapter 12 and Chapter 13 of this EIAR assesses Air Quality and Climate impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Air Quality and Climate impacts.

Material Assets – Traffic and Tansportation– Emissions and dust from vehicular traffic resultant from the construction phase may potentially result in temporary negative impacts on the local microclimate.

Land, Soils and Geology – In the absence of appropriate mitigation measures, excavation and earthworks during construction phase of the project may result in dust emissions, negatively impacting the surrounding microclimate of the area. With the appropriate mitigation/monitoring measures enforced as identified in the CEMP, it is predicted that there will be no significant interactions between air quality and Land, Soils and Geology.

Biodiversity – There is potential for interactions flora/fauna and air quality/climate during the construction phase. A reduction in air quality resultant from construction activities may result in some temporary negative impacts on existing habitats in the area.

Noise and Vibration – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Population and Human Health - Construction phase of the project may result in a negative impact on local air quality resultant from increased dust and emissions resultant from construction machinery and vehicular movements.

15.2.9.1.2 Phase 2 'The Farm'

Chapter 12 and Chapter 13 of this EIAR assesses Air Quality and Climate impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Air Quality and Climate impacts.

Material Assets – Traffic and Transportation – Emissions and dust from vehicular traffic resultant from the construction phase may potentially result in temporary negative impacts on the local microclimate.

Land, Soils and Geology – In the absence of appropriate mitigation measures, excavation and earthworks during construction phase of the project may result in dust emissions, negatively impacting the surrounding microclimate of the area. With the appropriate mitigation/monitoring measures enforced as identified in the CEMP, it is predicted that there will be no significant interactions between air quality and Land, Soils and Geology.

Biodiversity – There is potential for interactions flora/fauna and air quality/climate during the construction phase. A reduction in air quality resultant from construction activities may result in some temporary negative impacts on existing habitats in the area.

Noise and Vibration – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Population and Human Health - Construction phase of the project may result in a negative impact on local air quality resultant from increased dust and emissions resultant from construction machinery and vehicular movements.

15.2.9.1.3 Combined Phase 1 and Phase 2

Chapter 12 and Chapter 13 of this EIAR assesses Air Quality and Climate impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Air Quality and Climate impacts.

Material Assets – Traffic and Transportation– Emissions and dust from vehicular traffic resultant from the construction phase may potentially result in temporary negative impacts on the local microclimate.

Land, Soils and Geology – In the absence of appropriate mitigation measures, excavation and earthworks during construction phase of the project may result in dust emissions, negatively impacting the surrounding microclimate of the area. With the appropriate mitigation/monitoring measures enforced as identified in the CEMP, it is predicted that there will be no significant interactions between air quality and Land, Soils and Geology.

Biodiversity – There is potential for interactions flora/fauna and air quality/climate during the construction phase. A reduction in air quality resultant from construction activities may result in some temporary negative impacts on existing habitats in the area.

Noise and Vibration – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Population and Human Health - Construction phase of the project may result in a negative impact on local air quality resultant from increased dust and emissions resultant from construction machinery and vehicular movements.

15.2.9.2 Operational Phase

15.2.9.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are.

Population and Human Health /Material Assets – Traffic and Transportation – The operational phase of the development will result additional vehicular traffic in the area potentially resulting in an increase in emissions and negative impact on local air quality.

Potential impacts on Air Quality and Climate have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.9.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are.

Population and Human Health /Material Assets – Traffic and Transportation– The operational phase of the development will result additional vehicular traffic in the area potentially resulting in an increase in emissions and negative impact on local air quality.

Potential impacts on Air Quality and Climate have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.9.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are.

Population and Human Health /Material Assets – Traffic and Transportation– The operational phase of the development will result additional vehicular traffic in the area potentially resulting in an increase in emissions and negative impact on local air quality.

Potential impacts on Air Quality and Climate have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.10 Population and Human Health

15.2.10.1 Construction Phase

15.2.10.1.1 Phase 1 'The Meadows'

Chapter 14 of this EIAR assesses Population and Human Health impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Population and Human Health impacts.

Landscape and Visual – The construction phase of the project will result in the evolution of the local landscape and the existing visual character of the area. However, Chapter 4 of this EIAR notes that the area is not currently publicly accessible, nor does it provide any public open space, but is, instead, secured/cordoned off from the public, minimising any impact on the local population's enjoyment of the existing landscape. The 24 months construction stage impacts on landscape/townscape character are considered 'short-term', within an urban fabric where the construction of multi-storey buildings has been long established. The magnitude of construction stage landscape/townscape impacts is deemed to be Medium. When combined with the Medium-low sensitivity of the receiving landscape, the overall significance of construction stage landscape/townscape impacts is considered to be Moderate. In addition, the proposed planting of 108 no. new trees within the site, in compensation for the removal of 13 no. existing trees, as part of the proposed landscape scheme which will be implemented during the construction phase, will mitigate any long-term visual impacts of the loss of the 13 no. existing trees.

Material Assets – Traffic and Transportation –Construction traffic has potential to result in temporary negative impacts on local residents, businesses, services and other uses in area by way of construction traffic volumes. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significant for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

Material Assets – Services, Infrastructure & Utilities - Potential negative impacts on the existing population may arise in relation to provision of services such as surface water/foul sewer and potable water infrastructure resultant from the connection of the proposed development to existing local services. Chapter 6 considers that brief adverse impact events have the potential to occur over a short-term duration and range from imperceptible to slight. The installation of power, gas and telecommunications infrastructure may result in a potential temporary loss of connection to the gas, electricity and telecommunications networks. The likely adverse impact is characterised in Chapter 6 as short-term and ranging from imperceptible to moderate, the latter in the case of gas and ESB connections.

Land, Soils and Geology - In the absence of appropriate mitigation measure, human health risks could be associated with the risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination. It is predicted that the potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

Water (Hydrology and Hydrogeology) – Potential health effects are associated with contamination of water or groundwater with pollutants associated with construction activity. However, with the proposed site design and mitigation measures outlined in EIAR Chapter 8 and the CEMP, it is predicted that the potential for impacts on groundwater or surface water (ie the Douglas River) from excavation activities, accidental spillage, concrete wash water and waste are considered to be temporary, negligible in magnitude and imperceptible in significance. Other potential health effects are associated with flooding.

Air Quality and Climate/Noise and Vibration – In the absence of appropriate mitigation measures the construction phase of the proposed development may result in some temporary negative impacts on air quality and microclimate including noise, vibrations, dust and emissions from the use of heavy plant and machinery, site excavation, piling and HGV movements. It is considered that the proposed mitigation measures detailed in this EIAR and the project CEMP will ensure that these impacts will not be significant.

Cultural Heritage - The proposed construction of a new pedestrian/cycle bridge will give rise to an impact on the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This direct negative impact is assessed as being slight in significance. This assessment predicted an indirect negative impact on Bessborough House and Farm, an Icehouse and Folly, however, this impact was considered temporary, of low to negligible magnitude and of slight significance. In view of the legacy of the former Mother and Baby Homes that operated from Bessborough House, Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented, as considered appropriate by the project Consultant Forensic Archaeologist.

15.2.10.1.2 Phase 2 'The Farm'

Chapter 14 of this EIAR assesses Population and Human Health impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Population and Human Health impacts.

Landscape and Visual – The construction phase of the project will result in the evolution of the local landscape and the existing visual character of the area. However, Chapter 4 of this EIAR notes that the area is not currently publicly accessible, nor does it provide any public open space, but is, instead, secured/cordoned off from the public, minimising any impact on the local population's enjoyment of the existing landscape. Demolition works are proposed, however, the Landscape and Visual Chapter emphasises that none of the impacted structures are deemed to be of architectural or heritage value. The construction phase will also entail the felling of 54 no. trees, 9 no. of which are dead or of poor quality and will be removed to protect and enhance the overall woodland (3 no. of these are to facilitate the construction of the pedestrian bridge). A total of 116 no. new tree planting is proposed. Based on this the significance of the construction stage in terms of landscape/townscape impact is considered to be short-term and moderate when viewed in the context of the medium sensitivity of the receiving environment within an urban fabric where the construction of multi-storey buildings has been long established.

Material Assets – Traffic and Transportation –Construction traffic has potential to result in temporary negative impacts on local residents, businesses, services and other uses in area by way of construction traffic volumes. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significant for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

Material Assets – Services, Infrastructure & Utilities - Potential negative impacts on the existing population may arise in relation to provision of services such as surface water/foul sewer and potable water infrastructure resultant from the connection of the proposed development to existing local services. Chapter 6 considers that brief adverse impact events have the potential to occur over a short-term duration and range from imperceptible to slight. The installation of power, gas and telecommunications infrastructure may result in a potential temporary loss of connection to the gas, electricity and telecommunications networks. The likely adverse impact is characterised in Chapter 6 as short-term and ranging from imperceptible to moderate, the latter in the case of gas and ESB connections.

Land, Soils and Geology - In the absence of appropriate mitigation measure, human health risks could be associated with the risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination. It is predicted that the potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

Water (Hydrology and Hydrogeology) – Potential health effects are associated with contamination of water or groundwater with pollutants associated with construction activity. However, with the proposed site design and mitigation measures outlined in EIAR Chapter 8 and the CEMP, it is predicted that the potential for impacts on groundwater or surface water (ie the Douglas River) from excavation activities, accidental spillage, concrete wash water and waste are considered to be temporary, negligible in magnitude and imperceptible in significance. Other potential health effects are associated with flooding.

Air Quality and Climate/Noise and Vibration – In the absence of appropriate mitigation measures the construction phase of the proposed development may result in some temporary negative impacts on air quality and microclimate including noise, vibrations, dust and emissions from demolition and the use of heavy plant and machinery, site excavation, piling and HGV movements. It is considered that the proposed mitigation measures detailed in this EIAR and the project CEMP will ensure that these impacts will not be significant.

Cultural Heritage - The proposed demolition of structures and farm buildings of poor quality to the north of the central core of Bessorough Farm (NIAH 20872006) would not result in any significant loss of cultural heritage value. The direct negative impact is, therefore, assessed as being moderate. This is counter-balanced by the proposed retention, conservation and adaption into new uses of the better quality historic buildings within the subject area, which is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance. The proposed creation of a pedestrian entrance in the original estate wall is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance.

The proposed construction of a new pedestrian/cycle bridge will give rise to an impact on the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This direct negative impact is assessed as being slight in significance. This assessment predicted an indirect negative impact on Bessborough House and Farm, an Icehouse and Folly, however, this impact was considered temporary, of low to negligible magnitude and of slight significance. In view of the legacy of the former Mother and Baby Homes that operated from Bessborough House, Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented, as considered appropriate by the project Consultant Forensic Archaeologist.

15.2.10.1.3 Combined Phase 1 and Phase 2

Chapter 14 of this EIAR assesses Population and Human Health impacts resultant from the proposed development. The construction works for Phase 1 'The Meadows' and Phase 2 'The Farm' are planned to be undertaken sequentially. It should be noted that if both phases proceed a number of the construction impacts of Phase 2 'The Farm' may be reduced in extent as some of the works will have already been completed in Phase 1 'The Meadows'. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Population and Human Health impacts.

Landscape and Visual – The construction phase of the project will result in the evolution of the local landscape and the existing visual character of the area. However, Chapter 4 of this EIAR notes that the area is not currently publicly accessible, nor does it provide any public open space, but is, instead, secured/cordoned off from the public, minimising any impact on the local population's enjoyment of the existing landscape. Demolition works are proposed, however, the Landscape and Visual Chapter emphasises that none of the impacted structures are deemed to be of architectural or heritage value. The construction phase will also entail the felling of 64 no. trees, a number of which are dead or of poor quality and will be removed to protect and enhance the overall woodland (3 no. of these are to facilitate the construction of the pedestrian bridge). A total of 224 no. new tree planting is proposed. Based on this the significance of the construction stage in terms of landscape/townscape impact is considered to be short-term and moderate when viewed in the context of the medium sensitivity of the receiving environment within an urban fabric where the construction of multi-storey buildings has been long established.

Material Assets – Traffic and Transportation –Construction traffic has potential to result in temporary negative impacts on local residents, businesses, services and other uses in area by way of construction traffic volumes. The proposed construction of a new pedestrian/cycle bridge over the adjoining Passage West Greenway to the west, connecting into the existing down ramp from Mahon will require the temporary closure of the access ramp for a short period. The impacts on the use of the greenway will be brief/temporary, limited in extent and significant for this stage of the works. Road Closures may be required for a short period to enable the tower crane to be transported to/from site. The impacts on the local road users will be temporary, short-term, limited in extent for this stage of the works.

Material Assets – Services, Infrastructure & Utilities - Potential negative impacts on the existing population may arise in relation to provision of services such as surface water/foul sewer and potable water infrastructure resultant from the connection of the proposed development to existing local services. Chapter 6 considers that brief adverse impact events have the potential to occur over a short-term duration and range from imperceptible to slight. The installation of power, gas and telecommunications infrastructure may result in a potential temporary loss of connection to the gas, electricity and telecommunications networks. The likely adverse impact is characterised in Chapter 6 as short-term and ranging from imperceptible to moderate, the latter in the case of gas and ESB connections.

Land, Soils and Geology - In the absence of appropriate mitigation measure, human health risks could be associated with the risk of leakage and accidental spillage from construction machinery and materials at the site which results in soil contamination. It is predicted that the potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

Water (Hydrology and Hydrogeology) – Potential health effects are associated with contamination of water or groundwater with pollutants associated with construction activity. However, with the proposed site design and mitigation measures outlined in EIAR Chapter 8 and the CEMP, it is predicted that the potential for impacts on groundwater or surface water (ie the Douglas River) from excavation activities, accidental spillage, concrete wash water and waste are considered to be temporary, negligible in magnitude and imperceptible in significance. Other potential health effects are associated with flooding.

Air Quality and Climate/Noise and Vibration – In the absence of appropriate mitigation measures the construction phase of the proposed development may result in some temporary negative impacts on air quality and microclimate including noise, vibrations, dust and emissions from demolition and the use of heavy plant and machinery, site excavation, piling and HGV movements. It is considered that the proposed mitigation measures detailed in this EIAR and the project CEMP will ensure that these impacts will not be significant.

Cultural Heritage - The proposed demolition of structures and farm buildings of poor quality to the north of the central core of Bessorough Farm (NIAH 20872006) would not result in any significant loss of cultural heritage value. The direct negative impact is, therefore, assessed as being moderate. This is counter-balanced by the proposed retention, conservation and adaption into new uses of the better quality historic buildings within the subject area, which is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance. The proposed creation of a pedestrian entrance in the original estate wall is assessed as resulting in a direct, positive, permanent, low magnitude impact which is slight in significance.

The proposed construction of a new pedestrian/cycle bridge will give rise to an impact on the line of the Cork, Blackrock and Passage Railway which is an undesignated feature now in use as a public walkway. This direct negative impact is assessed as being slight in significance. This assessment predicted an indirect negative impact on Bessborough House and Farm, an Icehouse and Folly, however, this impact was considered temporary, of low to negligible magnitude and of slight significance. In view of the legacy of the former Mother and Baby Homes that operated from Bessborough House, Appendix 10.4 outlines the proposed ground works monitoring methodology that will be implemented, as considered appropriate by the project Consultant Forensic Archaeologist.

15.2.10.2 Operational Phase

15.2.10.2.1 Phase 1 'The Meadows'

During the operational phase of the development potential interactions are.

Landscape and Visual – The most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 4 no blocks ranging from 1 to 10 storeys in height. This is, however, considered to be compatible with the townscape fabric and character of the wider Mahon area, and the presence of adjacent treelines will soften the vertical scale resulting in a landscape/townscape impact of medium-low magnitude. The proposed planting of new trees and shrubs throughout the site will enrich its existing verdant character which is likely to be strengthened, rather than weakened, by the proposed development.

Material Assets – Traffic and Transportation - The proposed mixed-use development will result in increased vehicular trips accessing the site. Chapter 5 of this EIAR predicts this will result in slight negative impacts to the local road network. A Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and the greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents. The proposed population uplift will contribute towards the achievement of the critical mass required to support the provision of enhanced public transport services, in particular the proposed Light Rail Transit. The proposed scheme will deliver public health and safety benefits arising from the

enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations**.**

Material Assets – Services, Infrastructure & Utilities – The proposed development will result in additional demand for local water and services infrastructure. However, with the adoption of the proposed mitigation measures, it is predicted that the residual impacts impacting the local population will be slight during the operational phase. Similarly, any potential adverse impacts on electricity, gas or telecommunications networks are considered to be permanent and slight. The potential impacts on human health from groundwater contamination arising from damaged foul sewers and drains is considered to be temporary and slight.

Land, Soils and Geology - Chapter 7 considers the possibility of soil contamination from localised hydrocarbon or foul sewage leaks and spillages from storage tanks, vehicles along access roads, loading bays and parking spaces or sewers. It is anticipated that no impacts will occur following the proposed mitigation measures.

Water (Hydrology and Hydrogeology) - Chapter 8 of this EIAR notes that the replacement of the greenfield area with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. However, Chapter 8 concludes that the proposed implementation of SuDS measures will mitigate the risk of flooding outside of the development site so that any potential for impacts on the water environment relating to human health are imperceptible and neutral.

Air Quality and Climate/Noise and Vibration – During the operational phase the proposed residential, café and creche uses may result in impacts on local noise and air quality arising from additional traffic in the area and an increase of population. Due to the site's location adjacent to the District Centre of Mahon and the variety of existing land-uses in the sites immediate vicinity, it is not considered that these impacts will be significant and are typical of a growing urban settlement.

Cultural Heritage – Chapter 10 does anticipate a slight operational negative indirect impact on the historic estate and some of its attendant features including the Icehouse and the setting of the folly as a result of a slight peripheral visual change. The proposed greenway pedestrian bridge is predicted to have a slight negative indirect impact on the undesignated cultural heritage that is the Passage West Greenway.

Potential impacts on Population and Human Health have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.10.2.2 Phase 2 'The Farm'

During the operational phase of the development potential interactions are.

Landscape and Visual – The most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 5 no blocks ranging from 1 to 5 storeys in height. This is, however, considered to be compatible with the existing cluster of buildings to the south and with the townscape fabric and character of the wider Mahon area. In addition, the impact is softened by the presence of adjacent treelines, with canopies of similar height, with Chapter 4 concluding that the high-quality architectural design being likely to prove a long-term asset to the landscape character of the area. The proposed design and planting of new trees and shrubs throughout the site is respectful of the site's context and in line with the SE4 Bessboro House Landscape Preservation Zone specific objectives. Therefore, the magnitude of the resulting landscape/townscape impact is considered to be medium-low.

Material Assets – Traffic and Transportation - The proposed mixed-use development will result in increased vehicular trips accessing the site. Chapter 5 of this EIAR predicts this will result in slight negative impacts to the local road network. A Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and the greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents. The proposed population uplift will contribute towards the achievement of the critical mass required to support the provision of enhanced public transport services, in particular the proposed Light Rail Transit. The proposed scheme will deliver public health and safety benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations**.**

Material Assets – Services, Infrastructure & Utilities – The proposed development will result in additional demand for local water and services infrastructure. However, with the adoption of the proposed mitigation measures, it is predicted that the residual impacts impacting the local population will be slight during the operational phase. Similarly, any potential adverse impacts on electricity, gas or telecommunications networks are considered to be permanent and slight. The potential impacts on human health from groundwater contamination arising from damaged foul sewers and drains is considered to be temporary and slight.

Land, Soils and Geology - Chapter 7 considers the possibility of soil contamination from localised hydrocarbon or foul sewage leaks and spillages from storage tanks, vehicles along access roads, loading bays and parking spaces or sewers. It is anticipated that no impacts will occur following the proposed mitigation measures.

Water (Hydrology and Hydrogeology) - Chapter 8 of this EIAR notes that the replacement of the greenfield area with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. However, Chapter 8 concludes that the proposed implementation of SuDS measures will mitigate the risk of flooding outside of the development site so that any potential for impacts on the water environment relating to human health are imperceptible and neutral.

Air Quality and Climate/Noise and Vibration – During the operational phase the proposed residential and creche uses may result in impacts on local noise and air quality arising from additional traffic in the area and an increase of population. Due to the site's location adjacent to the District Centre of Mahon and the variety of existing land-uses in the sites immediate vicinity, it is not considered that these impacts will be significant and are typical of a growing urban settlement.

Cultural Heritage – Chapter considers that the proposed layout seeks to retain and enhance the landscape setting by providing wider community access to parkland that is currently publicly inaccessible. It also proposes to reinstate historic routes to the parkland and will not impact on the historic entrance avenue or the visual primacy of the front façade of Bessborough House or its views of the parkland setting to the south. It does anticipate a slight negative indirect impact on the historic estate and some of its attendant features including the Icehouse and the setting of the folly as a result of a slight peripheral visual change. The proposed greenway pedestrian bridge is predicted to have a slight negative indirect impact on the undesignated cultural heritage that is the Passage West Greenway. The indirect impact on the Bessborough Farm is considered to be moderate.

Potential impacts on Population and Human Health have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

15.2.10.2.3 Combined Phase 1 and Phase 2

During the operational phase of the development potential interactions are.

Landscape and Visual – The most notable operational phase landscape/townscape impact of the proposed development will result from the permanent addition of 9 no blocks ranging from 1 to 10 storeys in height. This is,

however, considered to be compatible with the existing cluster of buildings to the south and with the townscape fabric and character of the wider Mahon area. In addition, the impact is softened by the presence of adjacent treelines, with Chapter 4 concluding that the high-quality architectural design being likely to prove a long-term asset to the landscape character of the area. The proposed design and planting of new trees and shrubs throughout the site is respectful of the site's context and in line with the SE4 Bessboro House Landscape Preservation Zone specific objectives. Therefore, the overall magnitude of the resulting landscape/townscape impact is considered to be medium-low.

Material Assets – Traffic and Transportation - The proposed mixed-use development will result in increased vehicular trips accessing the site. Chapter 5 of this EIAR predicts this will result in slight negative impacts to the local road network. A Mobility Management Plan prepared by MHL (Appendix 5.2) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and the greenway to the east, west and south will promote sustainable and active modes of travel, benefitting human health of future residents. The proposed population uplift will contribute towards the achievement of the critical mass required to support the provision of enhanced public transport services, in particular the proposed Light Rail Transit. The proposed scheme will deliver public health and safety benefits arising from the enhanced pedestrian and cyclist connectivity through the site via the proposed pedestrian/cycle bridge over the adjoining Passage West Greenway connecting with proposed pedestrian/cycle paths through the site. This will improve the permeability and accessibility of the site and establish direct local linkages between employment, residential, recreation and retail destinations**.**

Material Assets – Services, Infrastructure & Utilities – The proposed development will result in additional demand for local water and services infrastructure. However, with the adoption of the proposed mitigation measures, it is predicted that the residual impacts impacting the local population will be slight during the operational phase. Similarly, any potential adverse impacts on electricity, gas or telecommunications networks are considered to be permanent and slight. The potential impacts on human health from groundwater contamination arising from damaged foul sewers and drains is considered to be temporary and slight.

Land, Soils and Geology - Chapter 7 considers the possibility of soil contamination from localised hydrocarbon or foul sewage leaks and spillages from storage tanks, vehicles along access roads, loading bays and parking spaces or sewers. It is anticipated that no impacts will occur following the proposed mitigation measures.

Water (Hydrology and Hydrogeology) - Chapter 8 of this EIAR notes that the replacement of the greenfield area with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. However, Chapter 8 concludes that the proposed implementation of SuDS measures will mitigate the risk of flooding outside of the development site so that any potential for impacts on the water environment relating to human health are imperceptible and neutral.

Air Quality and Climate/Noise and Vibration – During the operational phase the proposed residential, café and 2 no. creche uses may result in impacts on local noise and air quality arising from additional traffic in the area and an increase of population. Due to the site's location adjacent to the District Centre of Mahon and the variety of existing land-uses in the sites immediate vicinity, it is not considered that these impacts will be significant and are typical of a growing urban settlement.

Cultural Heritage – Chapter 10 of this EIAR, prepared by John Cronin & Associates considers that given the absence of any architectural heritage structures or known archaeological sites within the boundary of the Phase 1 'The Meadows' lands and the levels of impacts predicted for both locations, it is concluded that Phase 1 and Phase 2 will not combine to result in any predicted significant impacts on the cultural heritage resource during the operation phase.

Potential impacts on Population and Human Health have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

Interaction	Landscape & Visual	Material Assets – Traffic & Transport	Material Assets – Services, Infrastructure & Utilities, Infrastructure & Utilities	Land, Soils & Geology	Water (Hydrology & Hydrogeology)	Biodiversity	Noise & -Vibration	Cultural Heritage	Air Quality & Climate	Population & Human Beings
Landscape & Visual		Op	Con & Op	Con & Op	Con & Op	Con & Op	-	Con & Op	-	Con & Op
Material Assets – Traffic & Transport	Op		Con	Con	Con & Op	Con	Con & Op		Con & Op	Con & Op
Material Assets – Services, Infrastructure & Utilities, Infrastructure & Utilities	Con & Op	Con		Con	Con & Op	Con & Op	Con & Op	Con	Con	Con & Op
Land, Soils & Geology	Con & Op	Con	Con		Con & Op	Con & Op	Con	Con	Con	Con
Water (Hydrology & Hydrogeology)	Op		Con & Op	Con		Con & Op	-	-	-	Con & Op
Biodiversity	Con & Op	Con	Con & Op	Con	Op		Con & Op	-	Con	-
Noise & Vibration		Con & Op	Con & Op	-	-	Con		-	Con	Con & Op
Cultural Heritage	Con & Op	-	-	Con	-	-	-		-	Con & Op
Air Quality and Climate	-	Con & Op		Con	-	Con	Con	-		Con & Op
Population and Human Beings	Con & Op	Con & Op	Con & Op	Con & Op	Con & Op	-	Con & Op	Con & Op	Con & Op	

Table 15.1: Potential Interaction of Effects Matrix for Phase 1 'The Meadows', Phase 2 'The Farm' and Combined Phase 1 and Phase 2

(Con = Construction, Op= Operational. If there is considered to be no potential for an effect, the box is left blank.)

BESSBOROUGH, CORK

CHAPTER 16

Summary of Mitigation Measures

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BESSBOROUGH, CORK

CHAPTER 16

Summary of Mitigation Measures

CHAPTER 16

16 Summary of Mitigation Measures

16.1 Introduction

16.1.1 Chapter Context

The 2017 Draft EPA Guidelines regarding information to be contained in EIAR's identifies the following strategies for the mitigation of effects.

Mitigation by Avoidance: Avoidance usually refers to strategic issues, such as site selection, site configuration or selection of process technology. This may be the fastest, cheapest and most effective form of effect mitigation. In some cases mitigation by avoidance may also be considered as part of the "consideration of alternatives".

Mitigation by Prevention: This usually refers to technical measures. Where a potential exists for unacceptable significant effects to occur (such as noise or emissions) then measures are put in place to limit the source of effects to a permissible and acceptable level.

Mitigation by Reduction: This is a very common strategy for dealing with effects which cannot be avoided. It tends to concentrate on the emissions and effects and seeks to limit the exposure of the receptor. This is regarded as a less sustainable, though still effective, approach, implemented through reducing the effect and/or reducing exposure to the effects.

Mitigation by Remedy/Offsetting: This is a strategy used for dealing with adverse effects which cannot be prevented or reduced. Remedy is compensating for or counteracting adverse effects. Examples include increased planting of specific trees/shrubs to replace unavoidable loss of vegetation, or provision of a new amenity area to compensate for the unavoidable loss of access to the grounds of an old house. Examples of Offsetting include reinstating buildings, walls or features, or the introduction of tunnels to enable wildlife to access other comparable habitats.

16.2 Mitigation Measures Proposed – Phase 1 'The Meadows'

16.2.1 Landscape and Visual

16.2.1.1 Design Stage - Mitigation Measures

- The layout design has been landscape-led to minimise the requirement for tree removal. The dense, mature treelined buffer along the eastern boundary has been predominantly retained to safeguard the sylvan character of the Passage West Greenway.
- A full tree survey was undertaken prior to detailed design, to inform the design and minimise the impact of the proposed development on native, higher quality trees.
- The proposed building footprints have been set back from the dripline of the trees along the eastern boundary to protect the retained trees.
- The area along the southern and eastern boundary will be landscaped to create a simple park utilizing the existing, mature trees.
- Building heights range across the scheme from 1 -10 storeys. The northern block represents the tallest building with a maximum of 10 storey. This is considered appropriate given its furthest location from the sensitive views and protected structure of Bessborough House to the west
- Where tree-removal is required to accommodate the proposed new pedestrian/cycle bridge over the greenway, the siting of the bridge has been carefully selected to reduce the quantity of trees impacted to 3 no.
- New tree planting of 108 no trees is proposed to compensate for the maximum 13 no. trees that have been identified for removal
- The design includes variation in materials to breakup each block and further descale the composition, with higher elements in muted darker colours.

16.2.1.2 Construction Phase - Mitigation Measures

- During construction, site security fencing and solid hoarding will be used where appropriate to restrict visibility, minimise noise pollution and restrict visibility into the site, minimising the temporary landscape and visual impacts.
- A suitable set back from the existing trees in the treeline along the site's eastern boundary will be put in place, to prevent any potential root or crown damage to any of the retained trees. In addition, it is proposed to plant 108 new trees within the site, as part of the proposed landscape works.
- There is a significant area of existing vegetation/trees to the south and east of the site and along the routes of foul and surface-water outfall/connections. Trees to be retained shall be fenced off at the commencement of construction to avoid inadvertent felling or use of the ground under canopies for construction purposes.
- The CEMP (Appendix 2.1) identifies the following mitigation measures to be implemented to minimise the impact on any trees/vegetation:
  - Although the removal of some trees will be required for the construction of the pedestrian/cycle bridge and the trenching and construction of watermains, foul and surface-water drainage, this will be kept to a minimum and all other trees will be retained.
  - All mitigation measures to be put in place to protect such trees and vegetation shall be prepared in consultation with a qualified Arborist, who shall supervise works for which an Arboriculture Method Statement is required.

- The specific Arboriculture Method Statement shall be prepared for any works within the root protection area of any tree to be retained and the measures outlined shall be strictly enforced on site.
- Trees will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction. Recommendations and any further agreed procedures.
- The construction works for the new ped/cycle bridge shall be fenced off with solid hoarding and protected from the public. Cork City Council will be liaised with in relation to the co-ordination of these works.
- Reinstatement of trees and vegetation will be undertaken by a suitably qualified landscape contractor.

- Topsoil stockpiles will be located in a location so as not to necessitate double handling and topsoil. Stockpiles will be seeded to promote grass growth and reduce dust.
- Where possible, excavated topsoil will be reused on site for landscaping

16.2.2 Material Assets – Traffic and Transportation

16.2.2.1 Construction Phase - Mitigation Measures

Chapter 5 of this EIAR proposes a number of mitigation measures to minimise the impact of this increase in HGV traffic on the existing roads network during the construction stage:

- The re-use of excavated materials generated on-site will reduce the total volume of imported material thereby reducing traffic generation.
- Adequate storage space on site will be provided to accommodate all cut material.
- Defining delivery times to site will avoid background traffic peak periods. Trucks will be equipped with dust covers when carrying dust producing materials to reduce the environmental impact of this activity.
- Construction stage site staff starting before the morning peak and finishing after the evening peak.
- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems will be put in place.
- Specific haulage routes will be identified and agreed with the Local Authority prior to commencement of construction.
- A Construction Traffic Management Plan will be developed and will be implemented when appropriate, ie during the delivery of materials or the exportation of surplus material from site.
- Warning Signs and Advanced Warning Signs will be installed at appropriate locations in advance of the construction works.
- All site staff parking will be accommodated within the designated parking area. No parking of site vehicles will be facilitated on the public road.
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will be suitable for vulnerable users including mobility impaired persons.
- All site vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site. It will be ensured that all vehicles delivering to the site are suitably licensed to use the public road and equipped for this activity

The CEMP (Appendix 2.1) includes the following mitigation measures in relation to construction related traffic movement. It notes that a competent traffic co-ordinator and banksmen will be appointed to oversee the following control measures which will be implemented as part of the final CTMP to reduce the risks associated with construction traffic. Some of the following measures also tie in with mitigation measures for dust and noise.

- A detailed site plan/layout of the construction site will be developed to identify locations for site offices/storage areas/waste management areas etc.
- Entrances and exits – separate entry and exit gateways will be provided for pedestrians and vehicles with a gate attendant employed to interface with the traffic and public to facilitate safe access and egress of vehicles.
- Where employees will need to cross the carriageway, a clearly signed and lit crossing point will be provided where drivers and pedestrians can see each other clearly.
- Visibility – the site operator will ensure that drivers driving out onto the public road have the appropriate visibility splays.
- All public and private walkways will be maintained free of obstructions
- All operators of construction machinery and vehicles will be trained and competent and have valid CSCS cards.
- All site staff will be made aware that there are residents and employees in the surrounding areas using the access road.
- Approach signage with good sightlines will be provided at the site access route and site entrance.
- Traffic management procedures will be communicated to suppliers and workers.
- Deliveries to site will be planned to arrive during working hours only, save for exceptional loads for which a detailed plan will be agreed with the Local Authority.
- The access route to the construction site entrance and internal site routes will be kept in good condition and clear of obstructions.
- Measures will be put in place to mitigate any excessive noise for nearby properties that may be created during construction activities.
- Internal trafficked areas will be watered twice daily on dry days to reduce dust, if required. Vehicles delivering or collecting material with dust potential will be covered with tarpaulin at all times to restrict the escape of dust.
- A stringent ‘clean as you go’ policy will be implemented on site to ensure no loose material is left on the ground within the construction access road and the public road.
- Vehicle wheel washing facilities will be in place for vehicles leaving the construction site area.
- A road sweep will be deployed if necessary to ensure the site access route between the site access and the Skehard Road junction will be kept clean at all times.
- Construction materials or equipment will not be stored outside the site boundary.
- Pedestrian/vehicular routes, crossing points, parking, loading and vehicle only areas will be clearly marked, signposted and segregated as appropriate.
- Where required site vehicles will be fitted with appropriate audible and visual devices.
- Loading and unloading will be carried out in a designated area within the construction site boundary and reversing activities will be kept to a minimum.
- Loads will be checked prior to unloading and loads will be adequately secured for travel.
- Visitors to site will be accompanied and a safe area will be provided for visiting drivers during loading and unloading.
- Speed limits signage will be used to control speeds on the access route and within the construction site.
- Construction vehicles and machinery will be maintained in good condition by a competent person as per the manufacturer’s instructions. A dedicated area for maintenance work will be provided within the construction site area.
- All operators will wear personal protective equipment on-site and seat belts where fitted by the manufacturer will be worn when operating equipment.

16.2.2.2 Construction Phase - Monitoring Measures

Chapter 5 of this EIAR proposes the following construction monitoring measure:

- There will be on-going monitoring of the impact of construction traffic on the wider roads network to ensure prompt action is taken in the event of an issue arising.

16.2.2.3 Operational Phase – Mitigation Measures

Chapter 5 of this EIAR proposes the following operational mitigation measures:

- Traffic signal timings and phases should be modified to cater for a change in directional flow at each of the modelled junctions.
- For the Design Year scenario (2039) an adjustment to the storage provided at right turn lanes would improve the capacity of the Junctions in question.
- Continued funding in sustainable transport solutions should mitigate the growth in traffic volumes. If successful, then the future year modelled network would more resemble the 2024 model in terms of KPI's.
- Future year models were constructed to determine the extent of signal timing adjustment that could be made to the modelled network and are show in the following table.

Junction Location	Signal Timing Cycle	Year
Junction1 Church Rd	110 seconds	2026
Junction 2 Bessborough	110 seconds	2026
Junction 3 Mahon Link	120 seconds	2028

16.2.3 Material Assets – Services, Infrastructure & Utilities

16.2.3.1 Construction Phase - Mitigation Measures

Chapter 6 of this EIAR identifies the following mitigation measures in relation to the drainage, water, power and telecommunications services infrastructure for the proposed development:

- A "Construction and Environmental Management Plan" CEMP has been prepared and will be further developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the "Construction Management Plan".
- 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 before being brought into operation.
- 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.
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.
- The permanent connection to serve the development, will be carried out under an agreed methodology and with full notification to existing Irish Water customers who will be affected by the short-term interruptions to water supply which will occur while making these connections.
- 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.
- Connections to the existing gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.
- The storm sewer network is designed to flow under public roads and open spaces to ensure unimpeded access is available to the pipe network (including hydrocarbon interceptors and silt traps) at all times to allow for monitoring and maintenance.
- With appropriate mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the construction phase of the development.

The CEMP (Appendix 2.1) includes the following mitigation measures in relation to water and wastewater controls:

- Surface water runoff during site clearance and construction stage can be potentially contaminated. The most likely forms of contamination are 'siltation' and spillage. Siltation occurs when soil and particulate matter are washed away in rainfall events by rainwater. Siltation will be mitigated on the project using stilling basins and strainers within the site to prevent silt being lost to the drainage network.
- Excavation, Erosion and Sediment Control
  - Measures will be implemented to capture and treat sediment laden water run off (e.g. silt traps; siltbuster)
  - The area of exposed ground will be minimised and as much vegetation as possible will be retained for as long as is practical
  - Delay clearing and topsoil stripping of each area until work is ready to proceed.
  - Close and backfill trenches as soon as practically possible
  - Any earthworks temporary stockpile areas will require silt fencing to be installed.
  - Any on-site settlement areas are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.
  - Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, at the lower, south west end of the site, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
  - Surface water discharge points during the construction phase are to be agreed Cork City Council's Environment Section prior to commencing works on site.
- As fuels and oils are required during construction stage, it is necessary to mitigate the possibility of there being an accidental leakage of these liquids. All fuels stored on site will be bunded and all chemicals will be stored in an appropriate tank. Should any spillage occur on site during construction, it is likely that there will be a localised moderate impact in the short term on the environment.
- Accidental Spills and Leaks
  - All oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand (impervious) area
  - Refuelling and servicing of construction machinery will take place in a designated hard stand area which is also remote from any surface water inlets.
  - A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available and construction staff will be familiar with the emergency procedures and use of equipment.

- Concrete
  - Concrete batching will take place on-site and offsite. Wash down and wash out of concrete trucks will take place off site and any excess concrete will not be disposed of on site.
  - Pumped concrete will be monitored to ensure there is no accidental discharge.
  - Mixer washings are not to be discharged into surface water drains and will be directed to settlement areas.
- Wheel Wash Areas
  - Discharge from any vehicle wheel wash areas is to be directed to onsite settlement areas, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility.

16.2.3.2 Construction Phase - Monitoring Measures

The CEMP (Appendix 2.1) includes the following monitoring measures in relation to water and wastewater controls:

Through consultation with the Site Manager (SM) /Site Environmental Manager (SEM), a schedule for surface water quality monitoring will be drawn up. This will be finalised prior to the start of construction. Where monitoring parameters are found to exceed the standards laid down, the SM/SEM will initiate and report corrective actions. This may necessitate the alteration of the environmental control measures and in turn the relevant construction method statement.

It is proposed to implement a programme for monitoring water quality at the outfall tie-in as part of the construction of this development, in agreement with the Planning Authority. This programme and sampling requirements will be agreed with Cork City Council.

16.2.3.3 Operational Phase – Mitigation Measures

Chapter 6 of this EIAR includes the following operational mitigation measures:

- All new drainage lines (foul and surface water) will be pressure-tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational.
- Regular maintenance of the drainage network including the petrol interceptor, flow control and surface water attenuation system will ensure that they are operating correctly.
- It is envisaged that the development will take place and be occupied on a phased basis and therefore the downstream foul sewerage system (foul sewer network and wastewater treatment facility) will be loaded gradually and incrementally.
- Water conservation methods such as the use of low flush toilets and low flow taps will be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development. Such water conservation methods will reduce the loading on the foul sewer network and the treatment works at Carrigrennan WWTP.
- On completion of the construction phase no further mitigation measures are proposed in relation to the electrical, gas and telecommunications infrastructure.
- With mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the operational phase of the development.

16.2.4 Land, Soils & Geology

16.2.4.1 Construction Phase - Mitigation Measures

Chapter 7 of this EIAR sets out the following construction mitigation measures in relation to land, soil and geology:

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. Keeping the surface area of exposed soils in the construction areas to a minimum is the most effective way of preventing the release of dust in dry weather and suspended sediments in wet conditions. Potential impacts are therefore avoided.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil will be re-used where possible in new landscaped areas. Soft materials and surplus soils that are excavated will be reused, for bunds, landscaping etc.
- Disturbed subsoil layers will be stabilised as soon as practicable. Therefore, backfilling of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping, will all be carried out promptly to minimise the duration that subsoil layers are exposed to weather effects.
- Similar to the storage of the stripped topsoil, stockpiles of excavated subsoil will be protected for the duration of the work. Stockpiles of subsoil material will be located separately from topsoil stockpiles.
- Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site. This will help reduce the surface area of disturbed ground which will limit the potential for soil compaction, sediment runoff or dust generation.
- Refuelling and servicing of construction machinery will take place in a designated hardstanding area. Care and attention will be taken during refuelling and maintenance operations. All potentially harmful substances (e.g., oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds. All oils, fuels, paints, and other chemicals will be stored in bunded tanks with the provision of a retention capacity of 110% of the stored material.
- Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996 (as amended).

The CEMP includes the following mitigation measures in relation to Excavation, Erosion and Sediment Control:

- Measures will be implemented to capture and treat sediment laden water run off (e.g. silt traps; siltbuster)
- The area of exposed ground will be minimised and as much vegetation as possible will be retained for as long as is practical
- Delay clearing and topsoil stripping of each area until work is ready to proceed.
- Close and backfill trenches as soon as practically possible
- Any earthworks temporary stockpile areas will require silt fencing to be installed.
- Any on-site settlement areas are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.
- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, at the lower, south west end of the site, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Surface water discharge points during the construction phase are to be agreed Cork City Council's
- Environment Section prior to commencing works on site.

- As fuels and oils are required during construction stage, it is necessary to mitigate the possibility of there being an accidental leakage of these liquids. All fuels stored on site will be bunded and all chemicals will be stored in an appropriate tank. Should any spillage occur on site during construction, it is likely that there will be a localised moderate impact in the short term on the environment.

16.2.4.2 Construction Phase - Monitoring Measures

Chapter 7 sets out the following construction monitoring measures in relation to land, soil and geology:

- Inspection of fuel / oil storage areas. Petrol interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.
- Monitoring of stockpile management (e.g., protection of excavated material to be reused as fill, protection of soils for removal from site from contamination).

16.2.4.3 Operational Phase - Mitigation Measures

Chapter 7 sets out the following operational mitigation measures in relation to land, soil and geology:

- On completion of the construction phase no further mitigation measures are proposed as there will be no further impact on soils and the geological environment.
- Management of hydrocarbon interceptors on stormwater outfalls will continue under Management Company control.
- Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

16.2.5 Water (Hydrology & Hydrogeology)

16.2.5.1 Construction Phase - Mitigation Measures

Chapter 8 of this EIAR sets out mitigation measures in relation to maintaining a high quality of surface water runoff from the development and groundwater protection to ensure that the status of both surface water and groundwater bodies in the vicinity of the site will be at least maintained (see WFD water body status and objectives) regardless of their existing status. The following Best Practice Guidance relating to water control will be adhered to at all stages of construction. CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006) and CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

The following mitigation measures will be put in place to minimise and mitigate the potential impacts to the ground and surface water at the site:

- The excavated soil will be temporarily stockpiled and stored away from the any ditch or surface water drainage network to prevent any suspended solids from entering it.
- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored, and disposed of in accordance with recognized standards and manufacturer's guidance. Hazardous construction materials shall be stored appropriately to prevent contamination of watercourses or groundwater.
- All batching and mixing activities will be located in areas away from watercourses and drains. Designated impermeable fuelling areas will be constructed. Fuels, oils, solvents, and other chemicals used during construction will be stored within temporary bunded storage in designated areas of the site. Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996 (as amended).
- Refuelling of construction vehicles and hydraulic oils or lubricants to vehicles will take place off-site or in designated hardstanding areas away from surface water drainage in order to minimise the potential contamination of the water environment. Spill kits and drip trays will be kept in the designated areas in the events of spillage during refuelling of the construction vehicles and machineries. All relevant personnel will be fully trained in the use of this equipment. Attention and care to be taken during the refuelling and maintenance operation.
- Concrete batching and concrete wash down or wash out of concrete trucks will take place off site or in a designated area with an impermeable surface and appropriate drainage/interception/collection measures in place. Spills of concrete, cement, grout, or similar materials will not be hosed into drains.
- Discharge from any vehicle wheel wash areas is to be directed to onsite settlement areas, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility.

16.2.5.2 Construction Phase – Monitoring Measures

Chapter 8 also sets out the following construction monitoring measures:

- Regular inspection of surface water run-off and any sediment control measures e.g. silt traps will be carried out during the Construction Phase.
- Regular auditing of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc.

16.2.5.3 Operational Phase – Mitigation Measures

Chapter 7 notes that with the introduction of these mitigation measures, the significance of the potential operational impacts identified earlier are considered to reduce since they either remove or significantly minimise the source of potential impact and/or place barriers to the pathways for such impact events.

- The Site will be predominantly covered in hardstanding. The impermeable surface will minimise the potential influx of any contaminants into soils and underlying groundwater.
- Surface water runoff arising on site during the operational phase will be directed to the surface drainage system via an appropriate designed system such as petrol or hydrocarbon interceptor and silt traps that removes the contaminants prior to discharge to the soakaways.
- Any accidental leak drainage from car parks or road areas will be discharged will be discharged through appropriate oil interceptor to the drainage system.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies and petrol interceptor will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.
- Attenuation will be provided by underground tanks to ensure that the discharge rate is maintained at greenfield runoff rate. The attenuation facility will accommodate rainfall events up to, and including, the 1-in-100-year storm event. 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 Hydro brake

flow control devices, with underground attenuation tanks, provided to store runoff from a 1 in 100-year return period event.

- The area of hardstanding on the proposed development site will be increased as a result of the proposed development and will incorporate SuDs requirements. Due to a variety of measures such as the design of the attenuation system with hydrocarbon interception and the design of the wider drainage system in line with SuDS the likelihood of any spills entering the water environment is negligible.
- No future surface water monitoring is proposed as part of the proposed Project due to the low hazard potential at the development.
- Oil interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions.
- Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

16.2.5.4 Operational Phase – Monitoring Measures

Chapter 8 also sets out the following operational monitoring measures:

- The performance of all Suds features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed Hydro brake and gullies will be required to prevent contamination and increased runoff from the site.

16.2.6 Biodiversity

16.2.6.1 Construction Phase – Mitigation Measures

Chapter 8 includes mitigation measures which have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts. The following mitigation measures will be implemented.

A Construction Environmental Management Plan (CEMP) has been prepared for Phase 1 'The Meadows' (included in Appendix 2-1). This CEMP contain the construction mitigation measures, which are set out in this EIAR and the NIS. This will have particular emphasis on the protection of valuable habitats which adjoin the site as well as the Cork Harbour SPA. It is essential that all construction staff, including all sub-contracted workers, be notified of valuable habitats and be made aware that no construction waste of any kind (rubble, soil, etc.) is to be deposited in these areas and that care must be taken with liquids or other materials to avoid spillage.

Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA. Masters-Williams et al (2001)
- Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA. Murnane, et al. (2006)

All personnel involved with the proposed development will receive an onsite induction relating to construction and operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

All staff and subcontractors have the responsibility to:

- Understand the importance of avoiding pollution onsite, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the project manager and the project ecologist;
- Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and
- Co-operate as required, with site inspections.

As part of the assessment of the required construction mitigation, best practice construction measures which will be implemented for the Proposed Development were considered. A summary of the measures relevant to hydrology are provided as follows and are in accordance with Construction Industry Research and Information Association (CIRIA) guidance – *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors* (Masters-Williams et al. 2001).

Water Quality

Details of water quality mitigation measures are included in Chapter 8 – Water (Hydrology and Hydrogeology) and in the CEMP included in Appendix 2-1.

Noise

The employment of good construction management practice, as described in the CEMP and in Chapter 11 Noise and Vibration, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.

Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimised. The preferred approach for controlling construction noise is to reduce source levels where possible, but with due regard to practicality.

The CEMP will be updated, prior to construction, to include any specific conditions attached to the approval and other specific construction information, but will at a minimum, include the measures described in Chapter 11, Noise and Vibration.

Lighting

Lighting associated with the site works could cause disturbance/displacement of fauna. If of sufficient intensity and duration, there could be impacts on reproductive success.

Construction works will take place during normal daytime hours. Where site lighting is required, this will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. Lighting mitigation measures will follow Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers (Bat Conservation Ireland, 2010). The following measures will be applied in relation to construction works lighting:

- Lighting will be provided with the minimum luminosity necessary for safety and security purposes.
- The construction phase lighting scheme will be designed to minimise light spillage nuisance on retained/new wildlife corridors by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates).

- The primary area of concern is the potential impact at the treeline along the Blackrock-Passage Greenway. No light spillage will occur in relation to the tree-dominated eastern boundary. This will benefit bats as well as other fauna active/resting at night.

Protection of Habitats and Flora Species

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1 March to the 31 August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. If works are carried out during the breeding season, a pre-construction survey will be carried out by the project ecologist and if birds are detected appropriate mitigation measures will be implemented.

Although the removal of a small number of trees will be required for the construction of the footbridge and the trenching and construction of watermains, foul and surface-water drainage, this will be kept to a minimum and all other trees will be retained.

All mitigation measures to be put in place to protect such trees and vegetation shall be prepared in consultation with a qualified Arborist, who shall supervise works for which an Arboriculture Method Statement is required.

The specific Arboriculture Method Statement shall be prepared for any works within the root protection area of any tree to be retained and the measures outlined shall be strictly enforced on site.

Trees will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction. Recommendations and any further agreed procedures.

Reinstatement of trees and vegetation will be undertaken by a suitably qualified landscape contractor

Bee Orchid was located within the redline boundary and this species has a localised distribution. The current distribution of this species is indicated on Figure 9.6. The following mitigation measures will be implemented to ensure that this species remains extant within the site post construction. When considering the relocation of plants the following general guidelines (The Scottish Code for Conservation Translocations - Best Practice Guidelines for Conservation Translocations in Scotland, 2014) apply:

- Work out whether translocation is the best option: could other conservation actions provide a lower-risk and lower-cost solution;
- Where translocation is the best option, develop a clear plan to deliver a well-defined conservation benefit;
- Obtain all necessary permissions and licences;
- Maximise the chances of success by understanding the biological needs of the species;
- Take great care to protect the species being moved, the habitat it is being released into, and avoid the spread of invasive species, pests and diseases;
- Monitor the translocation and respond to any issues that arise and
- Keep people informed and share information about the translocation to guide future projects

The area of habitat which supports Bee Orchid will be permanently removed and thus translocation of the plants from within the development area is recommended. It is noted that this plant may not be present on the site at the time of construction due to ongoing encroachment of scrub. Therefore, the site will be surveyed by the project ecologist prior to the commencement of site works to determine if this species is present and to assess current distribution.

If this species is present, it will be carefully moved by tracked machine and stored on site until the translocation site is prepared. It will be stored in a fenced area to prevent inadvertent damage during construction and will be watered appropriately

A small area within the southern section of the study area will be prepared under the supervision of the project ecologist who will specify requirements for the size of the translocation area based on up to date survey data, soil type and fertility, shade/light levels, ongoing management and access and usage of this area post construction.

Ongoing monitoring is a key element in the translocation process and the project ecologist will carry out an annual survey for three years to assess the success translocation process and to modify management of same where required. Requirements for further monitoring will be assessed at the end of the three-year period by the project ecologist in consultation with the client.

Bats

During the site works, general mitigation measures for bats will follow the National Road Authority's 'Guidelines for the Treatment of Bats during the Construction of National Road Schemes' NRA (2005c) and 'Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25' (Kelleher, C. & Marnell, F. (2006)). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats, or prevent avoidable effects resulting from significant alterations to the immediate landscape.

No bat roosts were recorded within the site boundary. However, the presence of occasional roosting bats cannot be altogether ruled out. Mitigation measures will be agreed with the National Parks and Wildlife Service prior to any tree removal and will include the following:

A number of trees will be removed prior to construction. The following precautionary measures will be implemented.

- The bat specialist will be appointed to ensure that the loss of trees is minimised and that trees earmarked for retention are adequately protected.
- Prior to construction a survey of bat use of trees at appropriate times of the year, within and adjacent to the Phase 1 'The Meadows' site, as well the wider study area, shall be carried out by the project ecologist, to determine the use of trees by bat species, and following best-practice in tree bat surveys (Collins 2016). A report of the results shall be complied and forwarded to the planning authority and the NPWS.
- Tree-felling will ideally be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- No 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.

- It is proposed that ten bat boxes will be located within the Phase 1 'The Meadows' (https://www.wildcare.co.uk/vincent-pro-bat-box-10651.html for box proposed or similar). The boxes will be erected by the Project ecologist taking into account landscape plans, vehicle movements and lighting.
- Monitoring of the use of the Phase 1 'The Meadows' development site and adjacent part of the study area by bats shall be carried out during construction, and for two years after construction is complete. Monitoring reports will be forwarded each year to the NPWS.

As noted above, lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010).

All mitigation measures including detailed method statements will be agreed with the NPWS prior to commencement of works, which could affect any bat populations on site.

Birds

As noted above where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the study area boundary.

As a biodiversity enhancement measure ten bird nesting boxes (various types including open fronted and entrance hole) will be located within the site boundary of Phase 1 'The Meadows' at locations specified by the Project ecologist.

It is proposed that ten Swift boxes will be placed on the Phase 1 'The Meadows' buildings. These will be located on the northern side of the buildings in areas free from overhanging vegetation, ledges and/or glazing. These will be built into the walls of the structure using Schwegler 17A (or similar see https://www.nhbs.com/no-17a- schwegler-swift-nest-box-triple-cavity). The location of these nest boxes will be specified by the Project ecologist.

It is noted that provision of woodland planting and the use of more diverse grassland planting will provide additional nesting and feeding sites for birds, particularly as these habitats mature.

Biodiversity and Landscaping plans

Details of the landscaping plan for the proposed development are included in the landscape plan which created by Ilsa Rutgers Landscape Architecture and submitted with this application (Ref. Appendix 2.5) This includes provisions for planting of native trees or local provenance and includes the planting of a hedgerow or Irish Yew.

Five insect nesting boxes suitable for Hymenoptera spp. (bees and wasps) will be put in place within the site boundary as a biodiversity enhancement measure.

Log piles in woodland area to north to allow sites for Hedgehog and Pygmy Shrew.

Invasive species

Prior to the commencement of construction works an invasive species survey will be undertaken within the proposed development boundary by a competent ecologist to determine if invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 have established in other areas in the period between pre-planning and post consent.

An invasive species management plan has been drawn up as part of the application (Appendix 9-2) and provides details on the current distribution of high-risk invasive species and guidelines/recommendations for treatment including methods of treatment, site hygiene and follow up treatment and monitoring. In particular the plan specified outline methodologies for the treatment of the high-risk species Japanese and Himalayan Knotweed via mechanical and chemical treatment. The method for the elimination of these species on the site will be implemented with reference to the relevant codes of practice and guidelines.

No significant impediments to the successful implementation of these control measures have been identified and it is expected that the treatment programme will successfully eradicate these species from the applicant's landholding. The exact treatment details will be outlined in a detailed management plan prepared by the treatment contractor and project ecologist and which will be finalised prior to the commencement of treatment and based on up-to-date surveys.

16.2.6.2 Operational Phase – Mitigation Measures

Lighting during operation

The primary mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night time lighting. It is noted that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as Otter and Hedgehog. The mature treeline/woodland habitat and scrub which runs adjacent to the Blackrock-Passage Greenway has moderate suitability as a foraging/commuting route, to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. The external lighting design was therefore designed to minimise light spillage into these areas within Phase 1 'The Meadows'. Based on the design/ mitigation measures specific below, light spillage onto the boundary treeline will be from zero to less than 0.1lx during the operational phase.

- The lighting scheme has taken into account best practice, as published by the UK Bat Conservation Trust and Bat Conservation Ireland (Bat Conservation Ireland 2010, Stone 2013), in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations.
- Asymmetric diffusers will be applied to the proposed pole top light on the Eastern boundary as opposed to symmetric ones and orientated so that the glass of the luminaries is positioned parallel to the eastern boundary ground as recommended. This will ensure that the light is cast in a downward direction and avoids horizontal spillage of the light.
- The use of LED lighting with no/low UV component due to the phosphors within an LED lamp converting UV to white light will also play a great part to keep disruption to a low level.
- The light fittings also have a dimming capability for a possible night tome mode subject to the Local Authority's approval.
- Height of the columns have been minimised to 4 metres to further reduce light spill or trespass.

Lighting types that emit a narrow spectrum with no / little UV attract relatively less insects than broad spectrum types with high UV Therefore, the narrow spectrum lights have a relatively lower impact on bats, by preventing invertebrate prey from congregating around the lit areas. The use of directional lighting and luminaire accessories (shield, louvre) are also very successful approaches to reducing light spillage nuisance into the surrounding environment in relation to bats. Where artificial lighting is managed and/or designed to avoid light spillage into the wider environment, potential effects on foraging/commuting bats would be considered neutral imperceptible. In this case, this would include avoiding light spillage onto the existing tree areas on the eastern boundary of the Phase 1 'The Meadows' site.

16.2.7 Cultural Heritage

16.2.7.1 Construction Phase – Mitigation Measures

It is recommended that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. In the unlikely event of archaeological discovery, the National Monuments Service and Cork City Council will be consulted to agree how the encountered archaeological remains are recorded and resolved.

To ensure that, in the unlikely event of previously-unrecorded burials being encountered during site development works, such works will be monitored in accordance with the methodology outlined in Appendix 10.4 by Aidan Harte, Forensic Archaeologist.

16.2.7.2 Operational Phase – Mitigation Measures

The operational phase of the proposed development will not give rise to any ongoing direct or indirect impacts on the cultural heritage resource which will require mitigation.

16.2.8 Noise & Vibration

16.2.8.1 Construction Phase – Mitigation Measures

Chapter 11 of this EAIR sets out mitigation measures that will be employed in order to control construction noise at its source include the following:

- Ensure that the Local Authority guidelines or planning directives to noise levels and operational times are adhered to.
- Prepare a construction phase operational plan with regards to limiting noise nuisance.
- Ensure all construction vehicles and plant are regularly maintained including any noise control measures such as attenuators, filters etc.
- Limit any construction noise spreading to neighbouring site by erecting temporary noise barriers (site boundary hoarding).
- Schedule particular high-level noise activities for times when increased noise levels are less sensitive or notify neighbouring residents or any sensitive sites.
- Using a closed site perimeter screen.
- Piling is assumed to be bored. Driven piling is to be avoided.

16.2.8.2 Construction Phase – Monitoring Measures

No noise monitoring is deemed necessary for the operational phase however noise monitoring will most likely be a requirement as directed by the Local Authority for the construction phase based on the Local Authority's imposed limits on the hours of operation and noise limits. No vibration monitoring is deemed necessary for both the operational and construction phase

16.2.8.3 Operational Phase – Monitoring Measures

- Ensure that the Local Authority guidelines or planning directives to noise levels and operational times are adhered to.
- Maintain any acoustic/sound control measures applied post construction.
- Ensure that the commercial outlets adhere Local Authority guidelines or other directives to noise levels and
- operational times.

16.2.9 Air Quality & Climate

16.2.9.1 Construction Phase – Mitigation Measures

- Full details of the dust management plan can be found in Appendix 12.1. At all times, the procedures within the plan will be monitored and assessed. Summary of mitigation measures include:

  - Avoid unnecessary vehicle movements and limit speeds on site so as to minimise the generation of airborne dust.
  - Use of rubble chutes and receptor skips during construction activities
  - Site roads shall be regularly cleaned and maintained as appropriate, especially during dry and/or windy conditions. Any unsurfaced roads shall be restricted to essential site traffic only.
  - A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site.
  - The overloading of tipper trucks exiting the site shall not be permitted and aggregates will be transported to and from the site in covered trucks.
  - Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind, stockpiles holding fine or dusty elements including top soils shall be covered with tarpaulins. Water misting or sprays will be used as needed if particularly dusty activities are necessary during dry or windy periods.
  - Where drilling or pavement cutting operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers.
  - All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
  - A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

16.2.9.2 Operational Phase – Mitigation Measures

No additional mitigation measures are required as the operational phase of the proposed development as it is predicted the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality. The operational phase includes mitigation by design measures to minimise the impact of the development on air quality are as follows:

- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity of public transport (Bus Eireann) through the proposed bridge structure will reduce private vehicle use.

16.2.10 Climate

16.2.10.1 Construction Phase – Mitigation Measures

There are no particular mitigation measures other than implementing the recommended reduction measures although for the greater part the reduction measure are mandatory and are to be certified under the requirements of the national authority (SEIA) or the European union.

16.2.10.2 Construction Phase – Monitoring Measures

No CO2 monitoring is deemed necessary for the construction phase as the current and future mandatory CO2 reduction requirement are a secure process to ensure compliance.

16.2.10.3 Operational Phase – Mitigation Measures

There are no particular mitigation measures other than implementing the recommended reduction measures although for the greater part the reduction measure are mandatory and are to be certified under the requirements of the national authority (SEIA) or the European union.

16.2.10.4 Construction Phase – Monitoring Measures

No CO2 monitoring is deemed necessary for the operational phase as the current and future mandatory CO2 reduction requirement (BER) are a secure process to ensure compliance.

16.2.11 Population & Human Health

16.2.11.1 Construction Phase – Mitigation Measures

- The construction phase will be in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- In addition to the CEMP, any employed subcontractors will also be required to adhere to all safety reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) has been appointed as part of the design stage. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction. A Project Supervisor for the Construction Stage (PSCS) will be appointed as part of the construction stage.
- Protective barriers will be installed around trees to be retained prior to commencement of works on site which shall remain in place for the duration of construction works.
- Site hoarding and barriers will prevent unauthorised access to the each works area.
- In order to mitigate any impact of construction activities there will be, coordination of deliveries to site within working hours and scheduling of noisier activities at earlier times of the day Noise and vibration mitigation measures will be adopted as outlined in the CEMP. The delivery of materials to the site during the construction phase shall be organised so that deliveries are minimised and do not cause traffic hazard. Deliveries will not permitted a peak times of traffic 8.00am to 9.00am and 5.00pm to 6.00pm and all construction vehicles are parked within the site.
- A Dust Management Plan will be implemented.

16.2.11.2 Construction Phase – Monitoring Measures

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.

16.2.11.3 Operational Phase – Mitigation Measures

The site layout responds to the site's cultural and landscape sensitivities within the historic Bessborough Estate and the evolving development context of Mahon. The proposed landscape and planting strategy will mitigate the minimal tree loss required to accommodate the proposed pedestrian/cyclist bridge over the greenway and water infrastructure connection through the site.

The pedestrian/cyclist routes through the proposed development will result in significant positive and permanent impacts to pedestrian and cyclist mobility in the wider Mahon neighbourhood and will deliver the long-standing Council objective of addressing severance and increasing the integration between the Bessborough Estate and Mahon. By promoting the usage of public transport as a viable means of commuting to nearby District Centre and other employment and education destinations, the proposed development will result in a positive impact on the private car based inward commuter flows into Mahon identified in the 2016 Census. The proposed public open spaces and creche will all significantly positively and permanently contribute to the communal and public facilities in Mahon.

16.3 Mitigation Measures Proposed – Phase 2 'The Farm'

16.3.1 Landscape and Visual

16.3.1.1 Design Stage - Mitigation Measures

- An Arboricultural Assessment was prepared by Arbo Care for this area (refer Appendix 3.3), in conjunction an Historic Landscape Assessment Report prepared by Forestbird Design (refer Appendix 3.4). Both of these studies informed the design teams consideration on the level, scale and locations of potential development within the application boundary.
- Arising from this analysis 'The Farm' area was identified as an appropriate location for development and in consultation with John Cronin & Associates, Heritage Consultants, buildings were weighted on the basis of their historic and fabric value for retention and conservation.
- The buildings to the east will be retained with new development immediately to the west of the farm area reflecting the original enclosure and function as a clearly defined boundary to 'The Park', area to the west.
- The traditional form of the farmyard courtyard will be retained as a kitchen garden to evoke the historic use of this space as a working farmyard.
- 'The Park' area was assessed in terms of sensitivity and capacity to absorb development, in line with the historic landscape assessment report. The final layout design has been optimised to retain the significant numbers of graded trees and ensure low visual impact to the wider estate.
- Proposed building heights range across the scheme from 1 -5 storeys, with Buildings C, the only building located in 'The Park' area reduced to 3-storey. There are several existing 3-storey buildings clustered within the heart of the Bessborough estate, approx. 100m to the south of the proposed buildings. Furthermore, several of the proposed buildings will be at a similar height to the mature tree canopy in its immediate vicinity.
- The proposed Primary Planting Plan by Ilsa Rutgers Landscape Architecture (ref. Appendix 2.6) sets out to reverse landscape alterations made in the 1990s and introduce new appropriate species of trees to ensure that this

historic landscape is maintained and supplemented for future generations to enjoy.

- The proposed development makes provision for the treatment of the hitherto private parkland as public open space, with enhanced permeability throughout the site.
- New tree planting of 116 no trees is proposed to compensate for the maximum 54 no. trees that have been identified for removal (of which 40 no. are non-native species). Where tree-removal is required to accommodate the proposed new pedestrian/cycle bridge over the greenway, the siting of the bridge has been carefully selected to reduce the quantity of trees impacted to 3 no.

16.3.1.2 Construction Phase - Mitigation Measures

The CEMP (ref Appendix 2.2) includes the following landscape mitigation measures for the construction stage:

- During construction, site security fencing and solid hoarding will be used where appropriate to restrict visibility, minimise noise pollution and restrict visibility into the site, minimising the temporary landscape and visual impacts.
- There is a significant area of existing vegetation/trees to the south and east of the site and along the routes of foul and surface-water outfall/connections. These areas will require protection measures to be employed during construction works, particularly during the construction of the bridge and foul and storm drainage outfalls.
- The CEMP identifies the following mitigation measures to be implemented to minimise the impact on any trees/ vegetation:
  - Although the removal of some trees will be required for the construction of the pedestrian/cycle bridge and the trenching and construction of watermains, foul and surface-water drainage, this will be kept to a minimum and all other trees will be retained.
  - All mitigation measures to be put in place to protect such trees and vegetation shall be prepared in consultation with a qualified Arborist, who shall supervise works for which an Arboriculture Method Statement is required.
  - The specific Arboriculture Method Statement shall be prepared for any works within the root protection area of any tree to be retained and the measures outlined shall be strictly enforced on site.
  - Trees will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction. Recommendations and any further agreed procedures.
  - The construction works for the new ped/cycle bridge shall be fenced off with solid hoarding and protected from the public. Cork City Council will be liaised with in relation to the co-ordination of these works.
  - Reinstatement of trees and vegetation will be undertaken by a suitably qualified landscape contractor.
- Topsoil stockpiles will be located in a location so as not to necessitate double handling and topsoil. Stockpiles will be seeded to promote grass growth and reduce dust.
- Where possible, excavated topsoil will be reused on site for landscaping

16.3.2 Material Assets – Traffic and Transportation

16.3.2.1 Construction Phase - Mitigation Measures

Chapter 5 of this EIAR proposes a number of mitigation measures to minimise the impact of this increase in HGV traffic on the existing roads network during the construction stage:

- The re-use of excavated materials generated on-site will reduce the total volume of imported material thereby reducing traffic generation.
- Adequate storage space on site will be provided to accommodate all cut material.
- Defining delivery times to site will avoid background traffic peak periods. Trucks will be equipped with dust covers when carrying dust producing materials to reduce the environmental impact of this activity.
- Construction stage site staff starting before the morning peak and finishing after the evening peak.
- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems will be put in place.
- Specific haulage routes will be identified and agreed with the Local Authority prior to commencement of construction.
- A Construction Traffic Management Plan will be developed and will be implemented when appropriate, ie during the delivery of materials or the exportation of surplus material from site.
- Warning Signs and Advanced Warning Signs will be installed at appropriate locations in advance of the construction works.
- All site staff parking will be accommodated within the designated parking area. No parking of site vehicles will be facilitated on the public road.
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will be suitable for vulnerable users including mobility impaired persons.
- All site vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site. It will be ensured that all vehicles delivering to the site are suitably licensed to use the public road and equipped for this activity

The CEMP (Appendix 2.2) includes the following mitigation measures in relation to construction related traffic movement. It notes that a competent traffic co-ordinator and banksmen will be appointed to oversee the following control measures which will be implemented as part of the final CTMP to reduce the risks associated with construction traffic. Some of the following measures also tie in with mitigation measures for dust and noise.

- A detailed site plan/layout of the construction site will be developed to identify locations for site offices/storage areas/waste management areas etc.
- Entrances and exits – separate entry and exit gateways will be provided for pedestrians and vehicles with a gate attendant employed to interface with the traffic and public to facilitate safe access and egress of vehicles.
- Where employees will need to cross the carriageway, a clearly signed and lit crossing point will be provided where drivers and pedestrians can see each other clearly.
- Visibility – the site operator will ensure that drivers driving out onto the public road have the appropriate visibility splays.
- All public and private walkways will be maintained free of obstructions
- All operators of construction machinery and vehicles will be trained and competent and have valid CSCS cards.
- All site staff will be made aware that there are residents and employees in the surrounding areas using the access road.
- Approach signage with good sightlines will be provided at the site access route and site entrance.
- Traffic management procedures will be communicated to suppliers and workers.
- Deliveries to site will be planned to arrive during working hours only, save for exceptional loads for which a detailed plan will be agreed with the Local Authority.
- The access route to the construction site entrance and internal site routes will be kept in good condition and clear of obstructions.

- Measures will be put in place to mitigate any excessive noise for nearby properties that may be created during construction activities.
- Internal trafficked areas will be watered twice daily on dry days to reduce dust, if required. Vehicles delivering or collecting material with dust potential will be covered with tarpaulin at all times to restrict the escape of dust.
- A stringent 'clean as you go' policy will be implemented on site to ensure no loose material is left on the ground within the construction access road and the public road.
- Vehicle wheel washing facilities will be in place for vehicles leaving the construction site area.
- A road sweep will be deployed if necessary to ensure the site access route between the site access and the Skehard Road junction will be kept clean at all times.
- Construction materials or equipment will not be stored outside the site boundary.
- Pedestrian/vehicular routes, crossing points, parking, loading and vehicle only areas will be clearly marked, signposted and segregated as appropriate.
- Where required site vehicles will be fitted with appropriate audible and visual devices.
- Loading and unloading will be carried out in a designated area within the construction site boundary and reversing activities will be kept to a minimum.
- Loads will be checked prior to unloading and loads will be adequately secured for travel.
- Visitors to site will be accompanied and a safe area will be provided for visiting drivers during loading and unloading.
- Speed limits signage will be used to control speeds on the access route and within the construction site.
- Construction vehicles and machinery will be maintained in good condition by a competent person as per the manufacturer's instructions. A dedicated area for maintenance work will be provided within the construction site area.
- All operators will wear personal protective equipment on-site and seat belts where fitted by the manufacturer will be worn when operating equipment.

16.3.2.2 Construction Phase - Monitoring Measures

Chapter 5 of this EIAR proposes the following construction monitoring measure:

- There will be on-going monitoring of the impact of construction traffic on the wider roads network to ensure prompt action is taken in the event of an issue arising.

16.3.2.3 Operational Phase – Mitigation Measures

Chapter 5 of this EIAR proposes the following operational mitigation measures:

- Traffic signal timings and phases should be modified to cater for a change in directional flow at each of the modelled junctions.
- For the Design Year scenario (2039) an adjustment to the storage provided at right turn lanes would improve the capacity of the Junctions in question.
- Continued funding in sustainable transport solutions should mitigate the growth in traffic volumes. If successful, then the future year modelled network would more resemble the 2024 model in terms of KPI's.
- Future year models were constructed to determine the extent of signal timing adjustment that could be made to the modelled network and are show in the following table.

Junction Location	Signal Timing Cycle	Year
Junction1 Church Rd	110 seconds	2026
Junction 2 Bessborough	110 seconds	2026
Junction 3 Mahon Link	120 seconds	2028

16.3.3 Material Assets – Services, Infrastructure & Utilities

16.3.3.1 Construction Phase - Mitigation Measures

Chapter 6 of this EIAR identifies the following mitigation measures in relation to the drainage, water, power and telecommunications services infrastructure for the proposed development:

- A "Construction and Environmental Management Plan" CEMP has been prepared and will be further developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the CEMP.
- 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 before being brought into operation.
- 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.
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.
- The permanent connection to serve the development, will be carried out under an agreed methodology and with full notification to existing Irish Water customers who will be affected by the short-term interruptions to water supply which will occur while making these connections.
- 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.
- Connections to the existing gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.
- The storm sewer network is designed to flow under public roads and open spaces to ensure unimpeded access is available to the pipe network (including hydrocarbon interceptors and silt traps) at all times to allow for monitoring and maintenance.
- With appropriate mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the construction phase of the development.

The CEMP (Appendix 2.2) includes the following mitigation measures in relation to water and wastewater controls:

- Surface water runoff during site clearance and construction stage can be potentially contaminated. The most likely forms of contamination are 'siltation' and spillage. Siltation occurs when soil and particulate matter are washed away in rainfall events by rainwater. Siltation will be mitigated on the project using stilling basins and strainers within the site to prevent silt being lost to the drainage network.

- Excavation, Erosion and Sediment Control
  - Measures will be implemented to capture and treat sediment laden water run off (e.g. silt traps; siltbuster)
  - The area of exposed ground will be minimised and as much vegetation as possible will be retained for as long as is practical
  - Delay clearing and topsoil stripping of each area until work is ready to proceed.
  - Close and backfill trenches as soon as practically possible
  - Any earthworks temporary stockpile areas will require silt fencing to be installed.
  - Any on-site settlement areas are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.
  - Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, at the lower, south west end of the site, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
  - Surface water discharge points during the construction phase are to be agreed Cork City Council's Environment Section prior to commencing works on site.

As fuels and oils are required during construction stage, it is necessary to mitigate the possibility of there being an accidental leakage of these liquids. All fuels stored on site will be bunded and all chemicals will be stored in an appropriate tank. Should any spillage occur on site during construction, it is likely that there will be a localised moderate impact in the short term on the environment.

- Accidental Spills and Leaks
  - All oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand (impervious) area
  - Refuelling and servicing of construction machinery will take place in a designated hard stand area which is also remote from any surface water inlets.
  - A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available and construction staff will be familiar with the emergency procedures and use of equipment.
- Concrete
  - Concrete batching will take place on-site and offsite. Wash down and wash out of concrete trucks will take place off site and any excess concrete will not be disposed of on site.
  - Pumped concrete will be monitored to ensure there is no accidental discharge.
  - Mixer washings are not to be discharged into surface water drains and will be directed to settlement areas.
- Wheel Wash Areas
  - Discharge from any vehicle wheel wash areas is to be directed to onsite settlement areas, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility.

16.3.3.2 Construction Phase - Monitoring Measures

The CEMP (Appendix 2.2) includes the following monitoring measures in relation to water and wastewater controls:

Through consultation with the Site Manager (SM) /Site Environmental Manager (SEM), a schedule for surface water quality monitoring will be drawn up. This will be finalised prior to the start of construction. Where monitoring parameters are found to exceed the standards laid down, the SM/SEM will initiate and report corrective actions. This may necessitate the alteration of the environmental control measures and in turn the relevant construction method statement.

It is proposed to implement a programme for monitoring water quality at the outfall tie-in as part of the construction of this development, in agreement with the Planning Authority. This programme and sampling requirements will be agreed with Cork City Council.

16.3.3.3 Operational Phase – Mitigation Measures

Chapter 6 of this EIAR includes the following operational mitigation measures:

- All new drainage lines (foul and surface water) will be pressure-tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational.
- Regular maintenance of the drainage network including the petrol interceptor, flow control and surface water attenuation system will ensure that they are operating correctly.

It is envisaged that the development will take place and be occupied on a phased basis and therefore the downstream foul sewerage system (foul sewer network and wastewater treatment facility) will be loaded gradually and incrementally.

Water conservation methods such as the use of low flush toilets and low flow taps will be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development. Such water conservation methods will reduce the loading on the foul sewer network and the treatment works at Carrigrennan WWTP.

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical, gas and telecommunications infrastructure.

With mitigation measures in place, no significant negative impacts on material assets are predicted as a consequence of the operational phase of the development.

16.3.4 Land, Soils & Geology

16.3.4.1 Construction Phase - Mitigation Measures

Chapter 7 of this EIAR sets out the following construction mitigation measures in relation to land, soil and geology:

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. Keeping the surface area of exposed soils in the construction areas to a minimum is the most effective way of preventing the release of dust in dry weather and suspended sediments in wet conditions. Potential impacts are therefore avoided.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil will be re-used where possible in new landscaped areas. Soft materials and surplus soils that are excavated will be reused, for bunds, landscaping etc.

- Disturbed subsoil layers will be stabilised as soon as practicable. Therefore, backfilling of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping, will all be carried out promptly to minimise the duration that subsoil layers are exposed to weather effects.
- Similar to the storage of the stripped topsoil, stockpiles of excavated subsoil will be protected for the duration of the work. Stockpiles of subsoil material will be located separately from topsoil stockpiles.
- Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site. This will help reduce the surface area of disturbed ground which will limit the potential for soil compaction, sediment runoff or dust generation.
- Refuelling and servicing of construction machinery will take place in a designated hardstanding area. Care and attention will be taken during refuelling and maintenance operations. All potentially harmful substances (e.g., oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds. All oils, fuels, paints, and other chemicals will be stored in bunded tanks with the provision of a retention capacity of 110% of the stored material.
- Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996 (as amended).

The CEMP includes the following mitigation measures in relation to Excavation, Erosion and Sediment Control:

- Measures will be implemented to capture and treat sediment laden water run off (e.g. silt traps; siltbuster)
- The area of exposed ground will be minimised and as much vegetation as possible will be retained for as long as is practical
- Delay clearing and topsoil stripping of each area until work is ready to proceed.
- Close and backfill trenches as soon as practically possible
- Any earthworks temporary stockpile areas will require silt fencing to be installed.
- Any on-site settlement areas are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.
- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, at the lower, south west end of the site, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Surface water discharge points during the construction phase are to be agreed Cork City Council's
- Environment Section prior to commencing works on site.
- As fuels and oils are required during construction stage, it is necessary to mitigate the possibility of there being an accidental leakage of these liquids. All fuels stored on site will be bunded and all chemicals will be stored in an appropriate tank. Should any spillage occur on site during construction, it is likely that there will be a localised moderate impact in the short term on the environment.

16.3.4.2 Construction Phase - Monitoring Measures

Chapter 7 sets out the following construction monitoring measures in relation to land, soil and geology:

- Inspection of fuel / oil storage areas. Petrol interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.
- Monitoring of stockpile management (e.g., protection of excavated material to be reused as fill, protection of soils for removal from site from contamination).

16.3.4.3 Operational Phase - Mitigation Measures

Chapter 7 sets out the following operational mitigation measures in relation to land, soil and geology:

- On completion of the construction phase no further mitigation measures are proposed as there will be no further impact on soils and the geological environment.
- Management of hydrocarbon interceptors on stormwater outfalls will continue under Management Company control.
- Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

16.3.5 Water (Hydrology & Hydrogeology)

16.3.5.1 Construction Phase - Mitigation Measures

Chapter 8 of this EIAR sets out mitigation measures in relation to maintaining a high quality of surface water runoff from the development and groundwater protection to ensure that the status of both surface water and groundwater bodies in the vicinity of the site will be at least maintained (see WFD water body status and objectives) regardless of their existing status. The following Best Practice Guidance relating to water control will be adhered to at all stages of construction. CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006) and CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

The following mitigation measures will be put in place to minimise and mitigate the potential impacts to the ground and surface water at the site:

- The excavated soil will be temporarily stockpiled and stored away from the any ditch or surface water drainage network to prevent any suspended solids from entering it.
- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement areas, where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored, and disposed of in accordance with recognized standards and manufacturer's guidance. Hazardous construction materials shall be stored appropriately to prevent contamination of watercourses or groundwater.
- All batching and mixing activities will be located in areas away from watercourses and drains. Designated impermeable fuelling areas will be constructed. Fuels, oils, solvents, and other chemicals used during construction will be stored within temporary bunded storage in designated areas of the site. Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996 (as amended).
- Refuelling of construction vehicles and hydraulic oils or lubricants to vehicles will take place off-site or in designated hardstanding areas away from surface water drainage in order to minimise the potential contamination of the water environment. Spill kits and drip trays will be kept in the designated areas in the events of spillage during refuelling of the construction vehicles and machineries. All relevant personnel will be fully trained in the use of this equipment. Attention and care to be taken during the refuelling and maintenance operation.
- Concrete batching and concrete wash down or wash out of concrete trucks will take place off site or in a designated area with an impermeable surface and appropriate drainage/interception/collection measures in place. Spills of concrete, cement, grout, or similar materials will not be hosed into drains.

- Discharge from any vehicle wheel wash areas is to be directed to onsite settlement areas, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility.

16.3.5.2 Construction Phase – Monitoring Measures

Chapter 8 also sets out the following construction monitoring measures:

- Regular inspection of surface water run-off and any sediment control measures e.g. silt traps will be carried out during the Construction Phase.
- Regular auditing of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc.

16.3.5.3 Operational Phase – Mitigation Measures

Chapter 7 notes that with the introduction of these mitigation measures, the significance of the potential operational impacts identified earlier are considered to reduce since they either remove or significantly minimise the source of potential impact and/or place barriers to the pathways for such impact events.

- The Site will be predominantly covered in hardstanding. The impermeable surface will minimise the potential influx of any contaminants into soils and underlying groundwater.
- Surface water runoff arising on site during the operational phase will be directed to the surface drainage system via an appropriate designed system such as petrol or hydrocarbon interceptor and silt traps that removes the contaminants prior to discharge to the soakaways.
- Any accidental leak drainage from car parks or road areas will be discharged will be discharged through appropriate oil interceptor to the drainage system.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies and petrol interceptor will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.
- Attenuation will be provided by underground tanks to ensure that the discharge rate is maintained at greenfield runoff rate. The attenuation facility will accommodate rainfall events up to, and including, the 1-in-100-year storm event. 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 Hydro brake flow control devices, with underground attenuation tanks, provided to store runoff from a 1 in 100-year return period event.
- The area of hardstanding on the proposed development site will be increased as a result of the proposed development and will incorporate SuDs requirements. Due to a variety of measures such as the design of the attenuation system with hydrocarbon interception and the design of the wider drainage system in line with SuDS the likelihood of any spills entering the water environment is negligible.
- No future surface water monitoring is proposed as part of the proposed Project due to the low hazard potential at the development.
- Oil interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions.
- Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

16.3.5.4 Operational Phase – Monitoring Measures

Chapter 8 also sets out the following operational monitoring measures:

- The performance of all Suds features will be monitored by the relevant authorities during the life of the development.

Monitoring of the installed Hydro brake and gullies will be required to prevent contamination and increased runoff from the site.

16.3.6 Biodiversity

16.3.6.1 Construction Phase – Mitigation Measures

Chapter 8 includes mitigation measures which have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts. The following mitigation measures will be implemented.

A CEMP has been prepared which contains the construction mitigation measures, which are set out in Chapter. This will have particular emphasis on the protection of valuable habitats which adjoin the site as well as the Cork Harbour SPA. It is essential that all construction staff, including all sub-contracted workers, be notified of valuable habitats and be made aware that no construction waste of any kind (rubble, soil, etc.) is to be deposited in these areas and that care must be taken with liquids or other materials to avoid spillage.

Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA. Masters-Williams et al (2001)
- Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA. Murnane, et al. (2006)

All personnel involved with the proposed development will receive an onsite induction relating to construction and operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

All staff and subcontractors have the responsibility to:

- Understand the importance of avoiding pollution onsite, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the project manager and the project ecologist;
- Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and
- Co-operate as required, with site inspections.

As part of the assessment of the required construction mitigation, best practice construction measures which will be implemented for the Proposed Development were considered. A summary of the measures relevant to hydrology are provided as follows and are in accordance with Construction Industry Research and Information Association (CIRIA) guidance – *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors* (Masters-Williams et al. 2001).

Water Quality

Details of water quality mitigation measures are included in Chapter 8 – Water (Hydrology and Hydrogeology) and in the CEMP included in Appendix 2-2.

Noise

The employment of good construction management practice, as described in the CEMP and in Chapter 11 Noise and Vibration, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.

Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimised. The preferred approach for controlling construction noise is to reduce source levels where possible, but with due regard to practicality.

The CEMP will be updated, prior to construction, to include any specific conditions attached to the approval and other specific construction information, but will at a minimum, include the measures described in Chapter 11, Noise and Vibration.

Lighting

Lighting associated with the site works could cause disturbance/displacement of fauna. If of sufficient intensity and duration, there could be impacts on reproductive success.

Construction works will take place during normal daytime hours. Where site lighting is required, this will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. Lighting mitigation measures will follow Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers (Bat Conservation Ireland, 2010). The following measures will be applied in relation to construction works lighting:

- Lighting will be provided with the minimum luminosity necessary for safety and security purposes.
- The construction phase lighting scheme will be designed to minimise light spillage nuisance on retained/new wildlife corridors by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates).
- The primary area of concern is the potential impact on retained treelines/trees within the formal garden and the woodland on the western boundary of the Phase 2 'The Farm'.

Protection of Habitats and Flora Species

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1 March to the 31 August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. If works are carried out during the breeding season, a pre-construction survey will be carried out by the project ecologist and if birds are detected appropriate mitigation measures will be implemented.

Removal of trees will be required for the construction phase. All mitigation measures to be put in place to protect such trees and vegetation shall be prepared in consultation with a qualified Arborist, who shall supervise works for which an Arboriculture Method Statement is required.

The specific Arboriculture Method Statement shall be prepared for any works within the root protection area of any tree to be retained and the measures outlined shall be strictly enforced on site.

Trees will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction. Recommendations and any further agreed procedures.

Reinstatement of trees and vegetation will be undertaken by a suitably qualified landscape contractor

Bee Orchid was located within the redline boundary and this species has a localised distribution. The current distribution of this species is indicated on Figure 9.6. The following mitigation measures will be implemented to ensure that this species remains extant within the site post construction. When considering the relocation of plants the following general guidelines (The Scottish Code for Conservation Translocations - Best Practice Guidelines for Conservation Translocations in Scotland, 2014) apply:

- Work out whether translocation is the best option: could other conservation actions provide a lower-risk and lower-cost solution;
- Where translocation is the best option, develop a clear plan to deliver a well-defined conservation benefit;
- Obtain all necessary permissions and licences;
- Maximise the chances of success by understanding the biological needs of the species;
- Take great care to protect the species being moved, the habitat it is being released into, and avoid the spread of invasive species, pests and diseases;
- Monitor the translocation and respond to any issues that arise and
- Keep people informed and share information about the translocation to guide future projects

The area of habitat which supports Bee Orchid will be permanently removed and thus translocation of the plants from within the development area is recommended. It is noted that this plant may not be present on the site at the time of construction due to ongoing encroachment of scrub. Therefore, the site will be surveyed by the project ecologist prior to the commencement of site works to determine if this species is present and to assess current distribution.

If this species is present, it will be carefully moved by tracked machine and stored on site until the translocation site is prepared. It will be stored in a fenced area to prevent inadvertent damage during construction and will be watered appropriately

A small area within the southern section of the study area will be prepared under the supervision of the project ecologist who will specify requirements for the size of the translocation area based on up to date survey data, soil type and fertility, shade/light levels, ongoing management and access and usage of this area post construction.

Ongoing monitoring is a key element in the translocation process and the project ecologist will carry out an annual survey for three years to assess the success translocation process and to modify management of same where required. Requirements for further monitoring will be assessed at the end of the three-year period by the project ecologist in consultation with the client.

Bats

During the site works, general mitigation measures for bats will follow the National Road Authority's 'Guidelines for the Treatment of Bats during the Construction of National Road Schemes' NRA (2005c) and 'Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25' (Kelleher, C. & Marnell, F. (2006)). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats, or prevent avoidable effects resulting from significant alterations to the immediate landscape.

Ten buildings within the site will be demolished and two buildings retained and repurposed as part of the development. No signs of bats were recorded within these buildings and they have a low potential as roosting habitat. However, as a precautionary measure, the following measures will be implemented prior to and/or during demolition. Mitigation measures will be agreed with the National Parks and Wildlife Service prior to any demolition works:

- Ideally work on buildings will take place outside the summer season between and October March inclusive when bats will be hibernating as the buildings to be removed have negligible potential as winter hibernation sites.
- In all cases immediately in advance of demolition a bat specialist will undertake an examination of the building. Emergence surveys will be carried out if buildings are affected during the April to September period. If bats are present at the time of examination it is essential to determine the nature of the roost (i.e. number, species, whether it is a breeding population) as well as its exact location.
- If bats are recorded in buildings earmarked for demolition, special mitigation measures to protect bats will be put in place and a license to derogate from the conservation legislation will be sought from the NPWS.
- The contractor will take all required measures to ensure works do not harm individuals by altering working methods or timing to avoid bats, if necessary.
- If roosting habitat for bats is removed, replacement habitat will be provided.

Mature trees will be removed as part of the Phase 2 'The Farm' development. It is noted that no signs of bats or roosting habitat was recorded within these trees. Although mature trees with the potential of be of value as bat roosts are absent from the site, the following precautionary measures will be implemented.

- The bat specialist will be appointed to ensure that the loss of trees is minimised and that trees earmarked for retention are adequately protected.
- Prior to construction a survey of bat use of trees at appropriate times of the year, within and adjacent to the Phase 2 'The Farm' site, as well the wider study area, shall be carried out by the project ecologist, to determine the use of trees by bat species, and following best-practice in tree bat surveys (Collins 2016). A report of the results shall be complied and forwarded to the planning authority and the NPWS.
- Tree-felling will ideally be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- No 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.
- It is proposed that eight bat boxes will be located within the Phase 2 'The Farm' site (https://www.wildcare.co.uk/vincent-pro-bat-box-10651.html for box proposed or similar). The boxes will be erected by the Project ecologist taking into account landscape plans, vehicle movements and lighting.
- Monitoring of the use of the Phase 2 'The Farm' development site and adjacent part of the study area by bats shall be carried out during construction, and for two years after construction is complete. Monitoring reports will be forwarded each year to the NPWS.

As noted above, lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010).

All mitigation measures including detailed method statements will be agreed with the NPWS prior to commencement of works, which could affect any bat populations on site.

Birds

Swallows were recorded nesting within buildings in the Phase 2 'The Farm' site (See Figure 9.11). Prior to demolition buildings will be checked for nesting Swallows (and other birds). If nesting birds are recorded, all demolition operations will be carried out between October and March, when birds have finished breeding. Alternatively, if buildings are to be demolished during the breeding season and where Swallow nests are present windows and doors will be sealed to prevent birds from accessing the building prior to the breeding season. This work will be carried out prior to the commencement of the nesting season between October and March.

As above where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the study area boundary.

As a biodiversity enhancement measure ten bird nesting boxes (various types) will be located within the Phase 2 'The Farm' site boundary at locations specified by the Project ecologist. It is noted that provision of woodland planting and the use of more diverse grassland planting will provide additional nesting and feeding sites for birds, particularly as these habitats mature.

It is noted that provision of woodland planting and the use of more diverse grassland planting will provide additional nesting and feeding sites for birds, particularly as these habitats mature.

Biodiversity and Landscaping plans

Details of the landscaping plan for the proposed development are included in the landscape plan which created by Ilsa Rutgers Landscape Architecture and submitted with this application (Ref. Appendix 2.6). The woodland planting mix will be dominated by species including Quercus robur, Quercus petrea and Pyrius avium. The objective of these elements is to create natural, multi-layered woodland habitat which will be of local ecological value and has the potential to support native flora and fauna. Linear tree planting will help to maintain connectivity between habitats in the wider landscape.

As detailed in Appendix 2.6 a more diverse rough grassland sward which is of higher ecological value for invertebrates and birds will be allowed to develop. Perennial Rye Grass or other vigorous amenity/agricultural grass species will not be utilised as they tend to over-dominate the sward and reduce overall biodiversity. The final grassland/wildflower mix for same will be specified by the Project ecologist based on final ground conditions including alkalinity, fertility and moisture levels.

Based on the seed mix utilised and on prevailing ground conditions, the Project ecologist will specify the management regime, including weed control and mowing regime, necessary to maximise biodiversity and habitat value.

Five insect nesting boxes suitable for Hymenoptera spp. (bees and wasps) will be put in place within the site boundary as a biodiversity enhancement measure.

Log piles in woodland area to north to allow sites for Hedgehog and Pygmy Shrew.

A narrow section of habitat which will be disturbed in the western treeline along the wayleave. Excavated soil within the woodland should be carefully stockpiled and used to cover the excavation, when complete. The use of commercial grass seed mixture is not recommended.

Invasive species

Prior to the commencement of construction works an invasive species survey will be undertaken within the proposed development boundary by a competent ecologist to determine if invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 have established in other areas in the period between pre-planning and post consent.

An invasive species management plan has been drawn up as part of the application (Appendix 9-2) and provides details on the current distribution of high-risk invasive species and guidelines/recommendations for treatment including methods of treatment, site hygiene and follow up treatment and monitoring. In particular the plan specified outline methodologies for the treatment of the high-risk species Japanese and Himalayan Knotweed via mechanical and chemical treatment. The method for the elimination of these species on the site will be implemented with reference to the relevant codes of practice and guidelines.

No significant impediments to the successful implementation of these control measures have been identified and it is expected that the treatment programme will successfully eradicate these species from the applicant's landholding. The exact treatment details will be outlined in a detailed management plan prepared by the treatment contractor and project ecologist and which will be finalised prior to the commencement of treatment and based on up-to-date surveys.

16.3.6.2 Operational Phase – Mitigation Measures

Lighting during operation

The primary mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night time lighting. It is noted that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as Otter and Hedgehog. The treeline which ordered to the entrance road along the western boundary of the Phase 2 'The Farm' site. This area has moderate suitability as a foraging/commuting route, to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. The external lighting design was therefore designed to minimise light spillage into these areas within Phase 2 'The Farm. Based on the design/mitigation measures specific below, light spillage onto the boundary treeline will be from zero to less than 0.1lx during the operational phase.'

- The lighting scheme has taken into account best practice, as published by the UK Bat Conservation Trust and Bat Conservation Ireland (Bat Conservation Ireland 2010, Stone 2013), in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations.
- Asymmetric diffusers will be applied to the proposed pole top light on/near identified bat foraging areas as opposed to symmetric ones and orientated so that the glass of the luminaries is positioned parallel to boundary habitats as recommended. This will ensure that the light is cast in a downward direction and avoids horizontal spillage of the light.
- The use of LED lighting with no/low UV component due to the phosphors within an LED lamp converting UV to white light will also play a great part to keep disruption to a low level.
- The light fittings also have a dimming capability for a possible night tome mode subject to the Local Authority's approval.
- Height of the columns have been minimised to 4 metres to further reduce light spill or trespass.

Lighting types that emit a narrow spectrum with no / little UV attract relatively less insects than broad spectrum types with high UV. Therefore, the narrow spectrum lights have a relatively lower impact on bats, by preventing invertebrate prey from congregating around the lit areas. The use of directional lighting and luminaire accessories (shield, louvre) are also very successful approaches to reducing light spillage nuisance into the surrounding environment in relation to bats. Where artificial lighting is managed and/or designed to avoid light spillage into the wider environment, potential effects on foraging/commuting bats would be considered neutral imperceptible. In this case, this would include avoiding light spillage onto the existing tree areas on the eastern boundary of the Phase 2 'The Farm site.

16.3.7 Cultural Heritage

16.3.7.1 Construction Phase – Mitigation Measures

It is recommended that a programme of archaeological supervision/monitoring of all ground works be undertaken by a suitably-qualified archaeologist. In the unlikely event of archaeological discovery, the National Monuments Service and Cork City Council will be consulted to agree how the encountered archaeological remains are recorded and resolved.

The buildings to be removed (see Appendix 10.3) have been fully recorded. Prior to their demolition, a full building record, consisting of written description, photographic record, and scaled drawings (plans and elevations) shall be submitted to Cork City Council and the Irish Architectural Archive prior to commencement of development works.

To ensure that, in the unlikely event of previously-unrecorded burials being encountered during site development works, such works will be monitored in accordance with the methodology outlined in Appendix 10.4 by Aidan Harte, Forensic Archaeologist.

16.3.7.2 Operational Phase – Mitigation Measures

The operational phase of the proposed development will not give rise to any ongoing direct or indirect impacts on the cultural heritage resource which will require mitigation.

16.3.8 Noise & Vibration

16.3.8.1 Construction Phase – Mitigation Measures

Chapter 11 of this EAIR sets out mitigation measures that will be employed in order to control construction noise at its source include the following:

- Ensure that the Local Authority guidelines or planning directives to noise levels and operational times are adhered to.
- Prepare a construction phase operational plan with regards to limiting noise nuisance.
- Ensure all construction vehicles and plant are regularly maintained including any noise control measures such as attenuators, filters etc.
- Limit any construction noise spreading to neighbouring site by erecting temporary noise barriers (site boundary hoarding).
- Schedule particular high-level noise activities for times when increased noise levels are less sensitive or notify neighbouring residents or any sensitive sites.
- Using a closed site perimeter screen.
- Piling is assumed to be bored. Driven piling is to be avoided.

16.3.8.2 Construction Phase – Monitoring Measures

No noise monitoring is deemed necessary for the operational phase however noise monitoring will most likely be a requirement as directed by the Local Authority for the construction phase based on the Local Authority's imposed limits on the hours of operation and noise limits. No vibration monitoring is deemed necessary for both the operational and construction phase

16.3.8.3 Operational Phase – Monitoring Measures

- Ensure that the Local Authority guidelines or planning directives to noise levels and operational times are adhered to.
- Maintain any acoustic/sound control measures applied post construction.
- Ensure that the commercial outlets adhere Local Authority guidelines or other directives to noise levels and operational times.

16.3.9 Air Quality

16.3.9.1 Construction Phase – Mitigation Measures

Full details of the dust management plan can be found in Appendix 12.1. At all times, the procedures within the plan will be monitored and assessed. Summary of mitigation measures include:

- Avoid unnecessary vehicle movements and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities
- Site roads shall be regularly cleaned and maintained as appropriate, especially during dry and/or windy conditions. Any unsurfaced roads shall be restricted to essential site traffic only.
- A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site.
- The overloading of tipper trucks exiting the site shall not be permitted and aggregates will be transported to and from the site in covered trucks.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind, stockpiles holding fine or dusty elements including top soils shall be covered with tarpaulins. Water misting or sprays will be used as needed if particularly dusty activities are necessary during dry or windy periods.
- Where drilling or pavement cutting operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers.
- All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

16.3.9.2 Operational Phase – Mitigation Measures

No additional mitigation measures are required as the operational phase of the proposed development as it is predicted the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality. The operational phase includes mitigation by design measures to minimise the impact of the development on air quality are as follows:

- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity of public transport (Bus Eireann) through the proposed bridge structure will reduce private vehicle use.

16.3.10 Climate

16.3.10.1 Construction Phase – Mitigation Measures

There are no particular mitigation measures other than implementing the recommended reduction measures although for the greater part the reduction measure are mandatory and are to be certified under the requirements of the national authority (SEIA) or the European union.

16.3.10.2 Construction Phase – Monitoring Measures

No CO2 monitoring is deemed necessary for the construction phase as the current and future mandatory CO2 reduction requirement are a secure process to ensure compliance.

16.3.10.3 Operational Phase – Mitigation Measures

There are no particular mitigation measures other than implementing the recommended reduction measures although for the greater part the reduction measure are mandatory and are to be certified under the requirements of the national authority (SEIA) or the European union.

16.3.10.4 Construction Phase – Monitoring Measures

No CO2 monitoring is deemed necessary for the operational phase as the current and future mandatory CO2 reduction requirement (BER) are a secure process to ensure compliance.

16.3.11 Population & Human Health

16.3.11.1 Construction Phase – Mitigation Measures

- The construction phase will be in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- In addition to the CEMP any employed subcontractors will also be required to adhere to all safety reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) has been appointed as part of the design stage. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction. A Project Supervisor for the Construction Stage (PSCS) will be appointed as part of the construction stage.
- Protective barriers will be installed around trees to be retained prior to commencement of works on site which shall remain in place for the duration of construction works.
- Site hoarding and barriers will prevent unauthorised access to the each works area.
- In order to mitigate any impact of construction activities there will be, coordination of deliveries to site within working hours and scheduling of noisier activities at earlier times of the day Noise and vibration mitigation measures will be adopted as outlined in the CEMP. The delivery of materials to the site during the construction phase shall be organised so that deliveries are minimised and do not cause traffic hazard. Deliveries will not permitted a peak times of traffic 8.00am to 9.00am and 5.00pm to 6.00pm and all construction vehicles are parked within the site.
- A Dust Management Plan will be implemented.

16.3.11.2 Construction Phase – Monitoring Measures

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.

16.3.11.3 Operational Phase – Mitigation Measures

The site layout responds to the site's cultural and landscape sensitivities within the historic Bessborough Estate and the evolving development context of Mahon. The proposed landscape and planting strategy will mitigate the tree loss required to accommodate the proposed development, the proposed pedestrian/cyclist bridge over the greenway and water infrastructure connection through the site. Critically, the landscape plan focussed on re-instating the historic landscape character and features where feasible. The opening up of the currently publicly inaccessible parkland into a public amenity space will have a significant positive impact on the population of Mahon and the wider city.

The pedestrian/cyclist routes through the proposed development will also result in significant positive and permanent impacts to pedestrian and cyclist mobility in the wider Mahon neighbourhood and will deliver the long-standing Council objective of addressing severance and increasing the integration between the Bessborough Estate and Mahon. By promoting the usage of public transport as a viable means of commuting to nearby District Centre and other employment and education destinations, the proposed development will result in a positive impact on the private car based inward commuter flows into Mahon identified in the 2016 Census. The proposed public open spaces and creche will all significantly positively and permanently contribute to the communal and public facilities in Mahon.