Volume II – Environmental Impact Assessment Report

MIXED USE BUILD-TO-RENT & COMMERCIAL DEVELOPMENT

Former Chadwick's Builders Merchant development, South of Greenhills Road, North of the existing access road serving Greenhills Industrial Estate, Greenhills Industrial Estate, Walkinstown, Dublin 12 (Eircode's D12 HD51, D12 N523, D12 C602)

MARCH 2022

SUBMITTED ON BE Limited

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HUGHES PLANNING
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1.0 INTRODUCTION

1.1 Background

The Applicant, Steeplefield Limited has acquired the subject lands at the Former Chadwick's Builders Merchant development, South of Greenhills Road, North of the existing access road serving Greenhills Industrial Estate, Greenhills Industrial Estate, Walkinstown, Dublin 12 (Eircode's D12 HD51, D12 N523, D12 C602), with the intention of securing the optimum land use on these underutilised lands on Greenhills Road. The lands form part of an area identified for 'regeneration' in the South Dublin County Development Plan 2016-2022 and is expected to be the subject of extensive urban renewal in the coming years.

A 5-12 storey mixed-use development, comprising 633 no. Build-to-Rent residential apartments, 10 no. commercial units and a childcare facility, has been identified as the preferred development option for the subject site, having regard to the employment opportunities existing in the surrounding area, and the sites proximity to public transport services including a quality bus corridor along Greenhills Road.

The design of the subject proposal has evolved during the planning process in response to the feedback received at S247 pre-planning consultations with South Dublin County Council and SHD pre-planning consultations with An Bord Pleanála; the policies and objectives of the South Dublin County Development Plan 2016-2022; and the input of the Environmental Impact Assessment team.

1.2 Purpose of this Report

Hughes Planning and Development Consultants have been commissioned by Steeplefield Limited (referred to as the Applicants throughout), to prepare an Environmental Impact Assessment Report for a strategic housing development application for the proposed development of a mixed use residential and commercial scheme on lands located at the Former Chadwick's Site, South of Greenhills Road, North West of Brennan's Factory, North East of Key Waste, Greenhills Industrial Estate, Walkinstown, Dublin 12.

A full description of the proposed development lands together with a description of the proposed development is provided in Chapter 2.0 of this document. In summary, the proposed development comprises the construction of 633 no. build-to-rent residential units (292 no. one beds, 280 no. two beds and 61 no. three beds) in 4 no. blocks (A-D), 1 no. childcare facility at the ground floor of Block A, 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C, construction of 3 no. vehicular/pedestrian entrances; a primary entrance from the north (access from Greenhills Road) and 2 no. secondary entrances from the south for emergency access and services, 424 no. car parking spaces at surface and undercroft levels with 15 no. commercial/unloading/drop off car parking spaces (a total of 439 no. parking spaces) and 4 no. dedicated motorbike spaces, 1,035 bicycle spaces with an additional 316 visitor bicycle spaces also proposed, outdoor amenity space, internal BTR communal amenity facilities including games room, media room, lounge, work spaces etc such that over , other services and ancillary site development works necessary to facilitate the development.

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

This Environmental Impact Assessment Report has been prepared in accordance with the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (published in August 2018) and the 2017 Draft EIA Guidelines, published by the EPA in August 2017, as well as previously issued Irish and European EIA Guidelines and Guidance Documents.

We would also note that in preparing the subject Strategic Housing Development application and EIAR, the applicant and design/EIAR team have undertaken extensive pre-planning consultation with South Dublin County Council, including the Planning Authority's City Edge team and An Bord Pleanála. The feedback received from South Dublin County Council and An Bord Pleanála significantly influenced the design and layout of the proposed development, in addition to informing the EIAR. The feedback

received during these consultations and the subsequent amendments made to the scheme in response are detailed in Section 2.4.4 of the EIAR as well as in Section 3.0 of the Statement of Consistency & Planning Report, prepared by Hughes Planning and Development Consultants, which accompanies this application. The evolution the proposed development underwent during this consultation process has resulted in a high quality, high density low carbon, highly accessible modern urban residential neighbourhood specifically connected to high capacity high quality public transport infrastructure.

1.3 EIA Legislation

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

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

1.4 Definition of EIA and EIAR

The EIA Directive defines 'environmental impact assessment' (EIA) as:

> *'a process consisting of:*
>
> *a) the preparation of an Environmental Impact Assessment Report (EIAR) by the developer;*
> *b) the carrying out of consultations;*
> *c) the examination by the competent authority of the EIAR, any supplementary information provided, where necessary, by the developer and relevant information received through consultations with the public, prescribed bodies and any affected Member States*
> *d) the reasoned conclusion of the competent authority on the significant effects of the project on the environment, and*
> *e) the integration of the competent authority's reasoned conclusion into any development consent decision.'*

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

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

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

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

> *a) A description of the project comprising information on the site, design, size and any other relevant features of the project;*
> *b) A description of the likely significant effects of the project on the environment;*
> *c) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*

d) A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
e) A non-technical summary of the information referred to in points (a) to (d); and
f) Any additional information specified in Annex IV of the Directive/Schedule 6 to the 2001 Regulations, as amended, relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

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

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

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

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

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

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

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

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

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

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

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

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

The subject development is not of a type or size that would require mandatory EIA under Annex I. However, given the number of units proposed at 633 no. units on a site area of 2.79 ha, the subject proposal would constitute an "infrastructure project" with respect to Class 10 Annex II and accordingly an EIA is required under Class 10(b)(i).

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

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

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

A scoping exercise to identify the issues that are likely to be most important during the EIA process was carried out by the applicant, design team and EIAR consultants and informed the format of this EIAR.

The scoping of the EIAR has also taken into consideration the proposed development with specific reference to the surrounding environment, adjoining properties and any third-party concerns, the existing planning history pertaining to the subject lands and the surrounding area, and ensuring amenity impacts are reduced, removed or where applicable, mitigated to an appropriate level. The feedback received at S247 consultation meetings with South Dublin County Council and the SHD pre-application consultation with An Bord Pleanála has also informed the scope of the EIAR. The EIAR prepared for the scheme has endeavoured to be as thorough as possible.

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

- Project Description and Alternatives Examined;
- Planning and Development Context;
- Population and Health;
- Biodiversity;
- Land, Soils and Geology;
- Water and Hydrology;
- Noise and Vibration;
- Air Quality and Climate;
- Microclimate;
- Material Assets Utilities;
- Material Assets Waste;
- Material Assets Traffic;
- Archaeological, Architectural and Cultural Heritage;
- Landscape and Visual Amenity;
- Interaction between Environmental Factors;
- Principle Mitigation and Monitoring Measures; and
- Non-Technical Summary.

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

1.7 Competency and EIAR Project Team

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

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

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

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

The consultant firms and their inputs are set out in Table 1.1 below. Details of competency, qualifications and experience of the lead author of each chapter and contributors to the applicable are outlined in the table below.

Organisation	Lead Consultant	Topics/Inputs
Hughes Planning and Development Consultants 85 Merrion Square Dublin 2, D02 FX60 T: 01 539 0711 E: info@hpdc.ie, anne.mcelligott@hpdc.ie, or christopher.browne@hpdc.ie	Mr Kevin Hughes - Director, Hughes Planning and Development Consultants – BA in in Sociology and MA in Regional and Urban Planning Ms. Anne McElligott – Associate, Hughes Planning and Development Consultants – BA in Geography and Legal Science and MA in Planning and Sustainable Development Mr. Christopher Browne – Executive Planner – BA in Geography and History and Masters in Urban Design and Planning	• Introduction and Methodology; • Project Description and Alternatives Examined; • Planning and Development Context • Population and Health • Interactions of the Foregoing; • Principle Mitigation and Monitoring Measures; and • Non-Technical Summary.
Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN T: 01 5654730 E: satkinson@enviroguide.ie	Ms. Siobhán Aktkinson - Senior Ecologist - B.Sc. (Hons) in Environmental Biology and a Ph.D. in Freshwater Biology from University College Dublin	• Biodiversity
AWN Consulting Limited The Tecpro Building Clonshaugh Business & Technology Park Dublin 17 T: 01 847 4220 E: marcelo.allende@awnconsulting.com	Mr. Marcelo Allende (BSc BEng) - Environmental Consultant Mr. Liam Bruen (BSc) - Environmental Consultant Ms. Teri Hayes (BSc MSc PGeol EurGeol) - Hydrogeologist	• Land and Soils
AWN Consulting Limited The Tecpro Building Clonshaugh Business & Technology Park Dublin 17 T: 01 847 4220 E: marcelo.allende@awnconsulting.com	Mr. Marcelo Allende (BSc BEng) - Environmental Consultant Mr. Liam Bruen (BSc) - Environmental Consultant	• Water

	Ms. Teri Hayes (BSc MSc PGeol EurGeol) - Hydrogeologist	
AWN Consulting Limited The Tecpro Building Clonshaugh Business & Technology Park Dublin 17 T: 01 847 4220 E: leo.williams@awnconsulting.com	Mr. Leo Williams BAI MAI PgDip AMIOA, Acoustic Consultant	• Noise & Vibration
AWN Consulting Limited The Tecpro Building Clonshaugh Business & Technology Park Dublin 17 T: 01 847 4220 E: niamh.nolan@awnconsulting.com	Ms. Niamh Nolan, BSocSci (Hons) in Social Policy and Geography from University College Dublin – Environmental Consultant	• Air Quality
AWN Consulting Limited The Tecpro Building Clonshaugh Business & Technology Park Dublin 17 T: 01 847 4220 E: fergal.callaghan@awnconsulting.com	Mr. Fergal Callaghan – Environmental Consultant	• Microclimate
AWN Consulting Limited The Tecpro Building Clonshaugh Business & Technology Park Dublin 17 T: 01 847 4220 E: fergal.callaghan@awnconsulting.com	Mr. David Doran – MSc in Environmental and Energy Management - Environmental Consultant	• Material Assets Utilities
AWN Consulting Limited The Tecpro Building Clonshaugh Business & Technology Park Dublin 17 T: 01 847 4220 E: David.doran@awnconsulting.com	Mr. David Doran – MSc in Environmental and Energy Management - Environmental Consultant	• Material Assets Waste
Martin Rogers Consulting and Lohan and Donnelly Consulting Engineers 13 Gardiner Place, Mountjoy Square, Dublin 1 T: 01 878 7770 E: edvinasValadka@lohan-donnelly.com	Mr. Martin Rogers - Martin Rogers, BA, BE, M.EngSc, PhD, CEng, TPP MICE, MRTPI, MTPS, Transport Planning Professional, Chartered Civil Engineer and Chartered Town Planner. Mr. Edvinas Valadka- Engineer – B. ENg, M.I.E.I	• Material Assets Waste
Byrne Mullins & Associates 7 Croc Na Greine Square, Kilcullen, Co. Kildare T: 045 480688 E: martinbyrne1063@gmail.com	Mr. Martin Byrne,– BA (UCC) in Archaeology and History and an MA (UCC) in Archaeology, together with a Diploma in EIA Management (UCD) - Archaeologist	• Archaeology, Architectural and Cultural Heritage

Parkhood Landscape Architect 6-9 Trinity Street Dublin 2 T: 01 6950005 E: andrewbunbury@parkhood.com	Mr. Andrew Bunbury- BA DipLA CMLI. Director at Park Hood, who is a fully qualified Landscape Architect and Chartered Member of the Landscape Institute	• Landscape and Visual Impact

Table 1.1 EIAR Specialist Consultants

1.8 Structure of Environmental Impact Assessment Report

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

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

Volume II is presented as 17 no. chapters as outlined in the Table 1.2 below.

Chapter	Chapter Title	Chapter Description
1	Introduction and Methodology	Sets out the purpose, methodology and scope of the document.
2	Project Description and Alternatives Examined	Sets out the description of the site, design and scale of development, considers all relevant phases from construction through to existence and operation together with a description and evaluation of the reasonable alternatives studied by the developer including alternative locations, designs and processes considered; and a justification for the option chosen taking into account the effects of the project on the environment.
3	Planning and Development Context	Describes the site context, the planning history of the subject site and the surrounding site and the local, regional and national policies that the proposed development will be assessed against.
4	Population and Health	Describes the demographic and socio-economic profile of the receiving environment and potential impact of the proposed development on population, i.e. human beings, and human health.
5	Biodiversity	Describes the existing ecology on site and in the surrounding catchment, and assesses the potential impact of the proposed development and mitigation measures incorporated into the design of the scheme.
6	Land, Soils and Geology	Provides an overview of the baseline position, the potential impact of the proposed development on the site's soil and geology and impacts in relation to land take and recommends mitigation measures.
7	Water and Hydrology	Provides an overview of the baseline position, the potential impact of the proposed development on water quality and quantity and recommends mitigation measures.
8	Noise and Vibration	Provides an overview of the baseline noise environment, the potential impact of the proposed development and recommends mitigation measures.
9	Air Quality and Climate	Provides an overview of the baseline air quality and climatic environment, the potential impact of the proposed development, the vulnerability of the project to climate change, and recommends mitigation measures.
10	Micro Climate	This chapter assesses the baseline conditions currently existing on site and in its immediate surrounds and likely impacts on the microclimate of the completed buildings and open spaces

11	Material Assets Utilities	Describes the services and infrastructural requirements of the proposed development and the likely impact of the proposed development on material assets.
12	Material Assets Waste	Describes the existing waste management infrastructural requirements of the proposed development and the likely impact of the proposed development on material assets.
13	Material Assets Traffic	Describes the traffic and transport infrastructural requirements of the proposed development and the likely impact of the proposed development on material assets.
14	Archaeological, Architectural and Cultural Heritage	Provides an assessment of the site, and considers the potential impact of the proposed development on the local archaeology, architectural and cultural heritage; and recommends mitigation measures.
15	Landscape and Visual Impact	Provides an overview of the baseline position, the potential impact of the proposed development on the landscape appearance and character and visual environment, and recommends mitigation measures.
16	Interactions between Environmental Factors	Describes the potential interactions and interrelationships between the various environmental factors discussed in the above chapters.
17	Principle Mitigation and Monitoring Measures	Sets out the key mitigation and monitoring measures included in the EIAR document for ease of reference.

Table 1.2 EIAR Chapter Outline

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

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

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

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

1.9 Cumulative Projects

A review of the planning register on South Dublin County Council's website has indicated that there are no large development projects abutting the subject lands that have been recently granted permission for development. There are several existing planning permissions on record in the area ranging from small-scale extensions and alterations to existing residential properties to some larger-scale developments. A review of the South Dublin County Council and An Bord Pleanála's planning registers found the following planning applications relating to large infill sites within the surrounding area and within the nearby Cookstown Industrial Estate, which are also zoned for regeneration.

ABP Ref. ABP-309658-21 Permission granted by An Bord Pleanála for development at CHM Premises, Ballymount Road Lower, Walkinstown, Dublin 12, on 23rd June 2021 for demolition of an existing warehouse/factory building and ancillary outbuildings/structures and the construction of a residential development of 171 apartments with supporting tenant amenity

facilities (gym, lounges and meeting room), café, creche, landscaping, public realm improvements, and all ancillary site development works. The proposed development will consist of 2 x studio apartments, 59 x 1-bedroom apartments, 103 x 2-bedroom apartments and 7 x 3-bedroom apartments contained in two apartment blocks ranging in height from 1 to 8 storeys. The proposed development provides for outdoor amenity areas, landscaping, under-podium car parking, bicycle racks, bin stores, ancillary plant, and roof mounted solar panels.

ABP Ref. ABP-304686-19

Permission was granted by An Bord Pleanála on lands immediately on 18th September 2019 for a Strategic Housing Development at Lands immediately east of the Assumption National School, Long Mile Road, Walkinstown, Dublin 12. In summary, the development involved construction of 153 no. residential units (comprising of 15 no. Duplex/Maisonettes and 138 no. apartments) and associated site works. Of particular note, the development will have 129 no. car parking spaces, 5 no. motorbike parking spaces 198 no. secure bike parking spaces, the majority of which will be at undercroft level, with 2 no. disabled car parking spaces and 4 no. car parking spaces at grade to the front of the development along with some visitor cycle parking spaces.

DCC Reg. Ref. 3940/17

Permission was granted by Dublin City Council at Carraiglea Industrial Estate, Naas Road, Dublin 12 for amendments to a previously permitted development of 306 units, which comprises of a development of 5 to 7 storeys in height. The description of development was as follows: amendments to previously permitted residential development, Reg. Ref. 4244/15 and Reg. Ref. 2438/17. The proposed amendments comprise of: (i) the provision of an additional floor on permitted Block AC (Reg. Ref. 2438/17) increasing the height of the block from 6 no. storeys with a 7 no. storey pop up corner element to 7 no. storeys on the north-west elevation (ii) the provision of 2 no. additional floors on Block D and L, increasing the height of the Blocks from 5 no. storeys to 7 no. storeys. (iii) the reconfiguration of permitted basement increasing the car parking provision from 316 no. to 346 no. car parking spaces and 545 no. to 552 no. cycle parking spaces, (iv) Revised hard and soft landscaping masterplan, (v) provision of new balconies to serve each of the proposed 32 no. units; together with all necessary site development work to facilitate the proposed development. The proposed amendments will provide for 12 no. additional units in Block D (8 no. 2 bed, 4 no. 3 bed units), 12 no. additional units in Block L (10 no. 2 bed, 2 no. 3 bed units) and 8 no. additional units in Block AC (1 no. 1 bed, 6 no. 2 bed, 1 no. 3 bed units), increasing the total provision within the development from 306 to 338 no. units comprising of (55 no. 1 bed, 222 no. 2 bed, 61 no. 3 bed units).

ABP Ref. ABP- 304383-19

Permission was granted by An Bord Pleanála on lands at the former Concorde Industrial Estate, Naas road, Walkinstown, Dublin 12 on 15th August 2019 for a for a mixed-use development comprising of a Build to Rent Residential Development and commercial units including the construction of 492 residential units (104 no. studios, 136 no. 1 bed units and 252 no. 2 bed units), ranging in height from 4 no. storeys (12 m) to 8 no. storeys (24.1 m) over basement level.

DCC Ref. 4684/19

Permission was granted by Dublin City Council on 14th February 2020 for the development will consist of demolition of existing single storey house and replace with 3 no. terraced houses with 2 no. rooflights to

the front. The first two houses are 2 storeys with attic conversions and 3 no. bedrooms. The end of terrace house is 2 storeys with 2 no. bedrooms. The existing driveway opening will be widened from 2.76 metres to 3.96 metres with 3 no. parking bays, electric car charging point and timber frame bicycle shed with solar panels on roof. New perimeter walls, permeable paving and associated site works.

SDCC Ref. SD17A/0391

Permission was granted by South Dublin County Council on 30th May 2018 at 22 Greenhills Road, Walkinstown, Dublin 12 for the demolition of the existing house, motor sales office and sheds, the change of use from existing car sales outlet with residential to a mixed retail and residential use and the construction of development as follows: Block A - five 3 storey, 3 bed terrace houses and Block B - 1 three storey mixed use building comprising of 2 retail units, two 2 bed apartments and two 1 bed apartments. The development also includes all associated site development and infrastructural works, surface car parking and landscaping, all on a site area of 0.16ha.

However, these recent approvals do not immediately abut the subject site as set out in Figure 1.1. Given the spatial separation between the subject proposal and the approved Strategic Housing Developments in the wider area, it is assessed that they are not considered sufficiently proximate to generate significant cumulative effects.

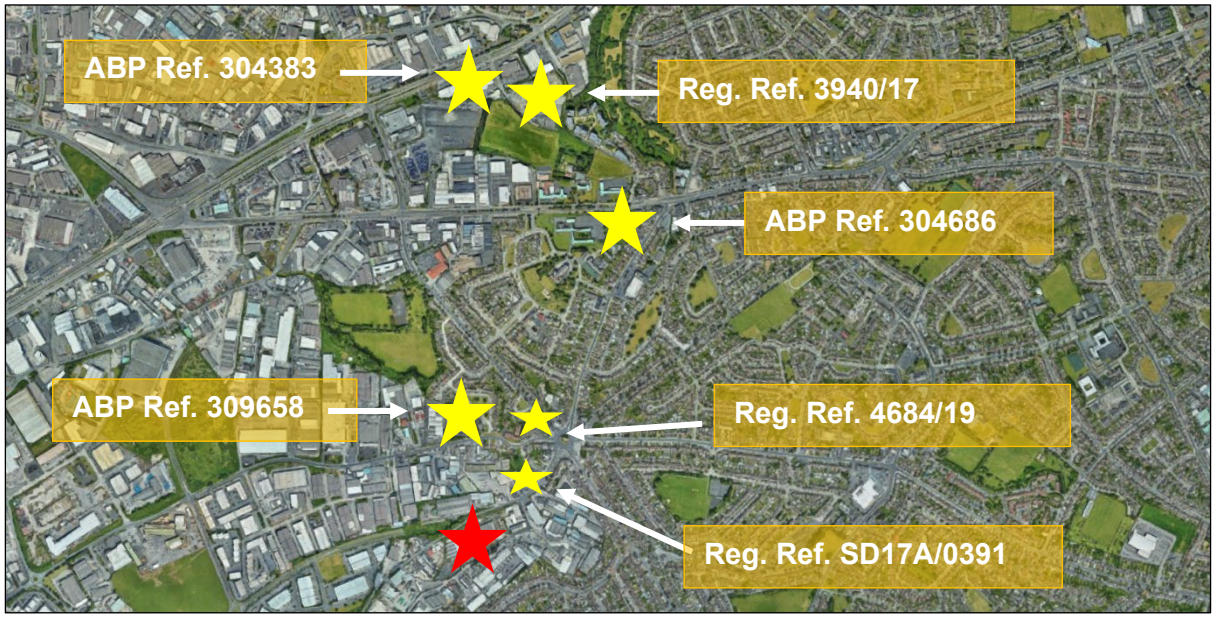

Figure 1.1 Locations of SHD applications (yellow stars) in relation to the subject site (red star) in Dublin 12.

1.10 Consultation

In preparing the subject Strategic Housing Development application and EIAR, the applicant and design/EIAR team have undertaken extensive pre-planning consultation with South Dublin County Council and An Bord Pleanála. Meetings were also held with the City Edge Project Team. Guidance received during these consultations was integrated into the design and in turn is assessed in this EIAR. The feedback received during these consultations and the subsequent amendments made to the scheme in response are detailed in Section 2.4.4 of the EIAR as well as in Section 3.0 of the Statement of Consistency & Planning Report, prepared by Hughes Planning and Development Consultants, which accompanies this application.

Further to the above, the Notice of Pre-Application Consultation Opinion, issued by An Bord Pleanála (under ABP. Ref ABP-310421-21), detailed specific information required for inclusion with any subsequent application for permission, pursuant to article 285(5)(b) of the Planning and Development

Regulations 2001 (as amended). The Statement of Response to Pre-application Consultation Opinion, prepared by Hughes Planning and Development Consultants, which accompanies this application outlines how this aspect of the Board's Notice of Pre-Application Consultation Opinion has been satisfied.

Where relevant specialists engaged with prescribed bodies and the details of advice received is provided in the individual chapters of this EIAR. The Notice of Pre-Application Consultation Opinion received from An Bord Pleanála following the pre-application consultation meeting contained details of the prescribed bodies to be notified of the making of this application. We can confirm that the following prescribed bodies have received a copy of the application including the EIAR:

- The Department of Culture, Heritage and the Gaeltacht
- Irish Water;
- Transport Infrastructure Ireland;
- National Transport Authority;
- South Dublin County Childcare Committee; and
- Dublin City Council Planning Department.

Additionally, prior to lodging this application, the required information has been issued to the Department of Housing, Planning and Local Government's EIA Portal. The purpose of this tool is to inform the public, in a timely manner, of applications that are accompanied by an EIAR. The portal provides a URL link to a dedicated website for this proposed development and a copy of the EIAR is available on this website. The website address is as follows: www.greenvaleshd.com. This website is publicly accessible and will allow members of the public to review the application material and EIAR.

Subsequent consultation with the public on the application and accompanying EIAR will be facilitated following the lodgement of the application to An Bord Pleanála. Pursuant to the requirements of the Planning and Development Act, 2000 (as amended), site notices have been erected on site and a newspaper notice has been published in the Irish Daily Mail. Both the site and newspaper notices erected/published advise members of the public that a Strategic Housing Development application accompanied by an EIAR has been lodged with An Bord Pleanála and provides details on how that can make an observation on the same should they see fit. Details of the website address feature on the site notices erected on site and the newspaper notice published as well as on An Bord Pleanála's website.

1.11 Statement of Difficulties Encountered

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

Every effort has been made to ensure that the EIAR is error free and accurate. However, there may be instances within the document where typographical errors or minor errors may occur. Any such cases are unlikely to have any material impact on the overall and final findings contained in the EIAR.

1.12 References

A reference list detailing the sources used for the descriptions and assessment has been included with each chapter, where and if necessary.

2.0 DESCRIPTION OF PROPOSED DEVELOPMENT AND ALTERNATIVES CONSIDERED

2.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants, in conjunction with C+W O'Brien Architects. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, Ms. Anne McElligott, Associate Director, and Mr. Christopher Browne, Executive Planner, with Hughes Planning and Development Consultants.

Mr. Kevin Hughes of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Regional and Urban Planning (MRUP) in 2002, having previously completed a Bachelor of Arts Degree in Sociology from National University of Ireland in 1999. Kevin has over 19 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Kevin is currently the Director of Hughes Planning and Development Consultants.

Ms. Anne McElligott of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in planning and Sustainable Development (MPLAN) in 2011, having previously completed a Bachelor of Arts Degree in Geography and Irish from University College Cork in 2011. Anne has 10 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Anne is currently Associate Director in the Practice of Hughes Planning and Development Consultants.

Mr. Christopher Browne of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Urban Design and Planning in 2018, having previously completed a Bachelor of Arts Degree in Geography and History from Dublin City University in 2012. Christopher has 3 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Christopher is currently an Executive Planner in the Practice of Hughes Planning and Development Consultants.

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

2.2 Site Location and Context

The application site, comprises a total area of 2.79 hectares, involves the Former Chadwick's site which is located south of Greenhills Road, Walkinstown, Dublin 12. The subject site forms part of the Greenhill Industrial Estate. There are existing low-rise disused warehouse units featuring on the subject site which are proposed for demolition as part of the subject proposal. The site is currently accessed off a road within the Greenhill Industrial Estate, with 3 no. vehicular accesses featuring along the site's southern boundary. A very strong feature of the site includes a level difference that exists between the Greenhills Road interface and the subject site's southern boundary.

The site is located within an area comprising industrial land use immediately surrounding the site on all sides. The industrial land immediately surrounding the site to the southeast and west is known as the Greenhills Industrial Estate. The industrial land immediately north of the subject site forms part of the Ballymount Industrial Estate. The Greenhills Industrial Estate is expected to be the subject of extensive urban renewal in the coming years, with existing industrial buildings being replaced with higher density development. As illustrated in Figure 2.1 below, a Quality Bus Corridor is also proposed to run along Greenhills Road, north of the site. The Greenhills Road Quality Bus Corridor forms part of the QBC Network linking Tallaght town centre to the city centre and it will also join the South Clondalkin QBC at the Walkinstown Road/Long Mile Road junction.

Walkinstown is the closet village to the subject site and offers a range of amenities and services including super markets, restaurants, pubs, chemist's shop, hairdresser among other services. The Ashlef shopping centre is located c. 1.2km from the subject site.

Figure 2.1 Aerial photo of the immediate locational context of the subject site (site outlined in red)

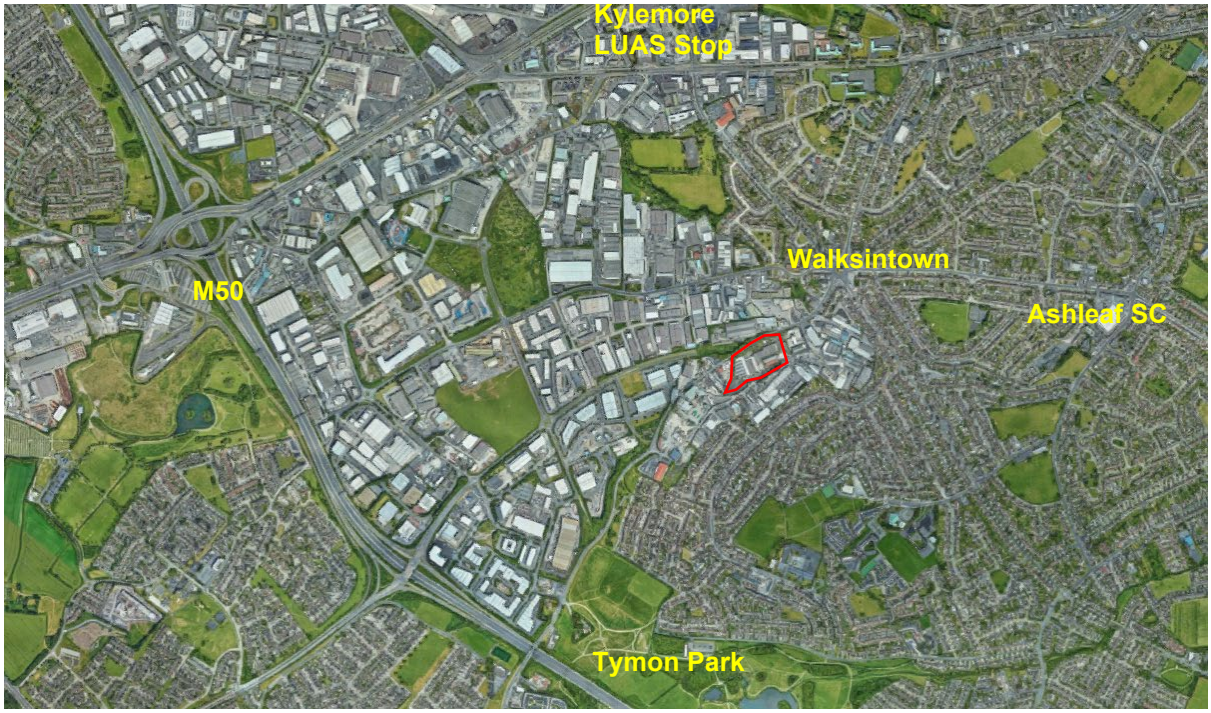

Figure 2.2 Aerial photo of the wider locational context of the subject site (site outlined in red)

Figure 2.3 Streetview of the subject site as viewed from Greenhills Road looking south-west

Figure 2.4 Streetview of the subject site as viewed from Greenhills Road looking south-east

Figure 2.5 Streetview of the subject site as viewed from the estate road abutting the site's southern boundary looking north-west

Figure 2.6 Streetview of the subject site as viewed from the estate road abutting the site's southern boundary looking north-east

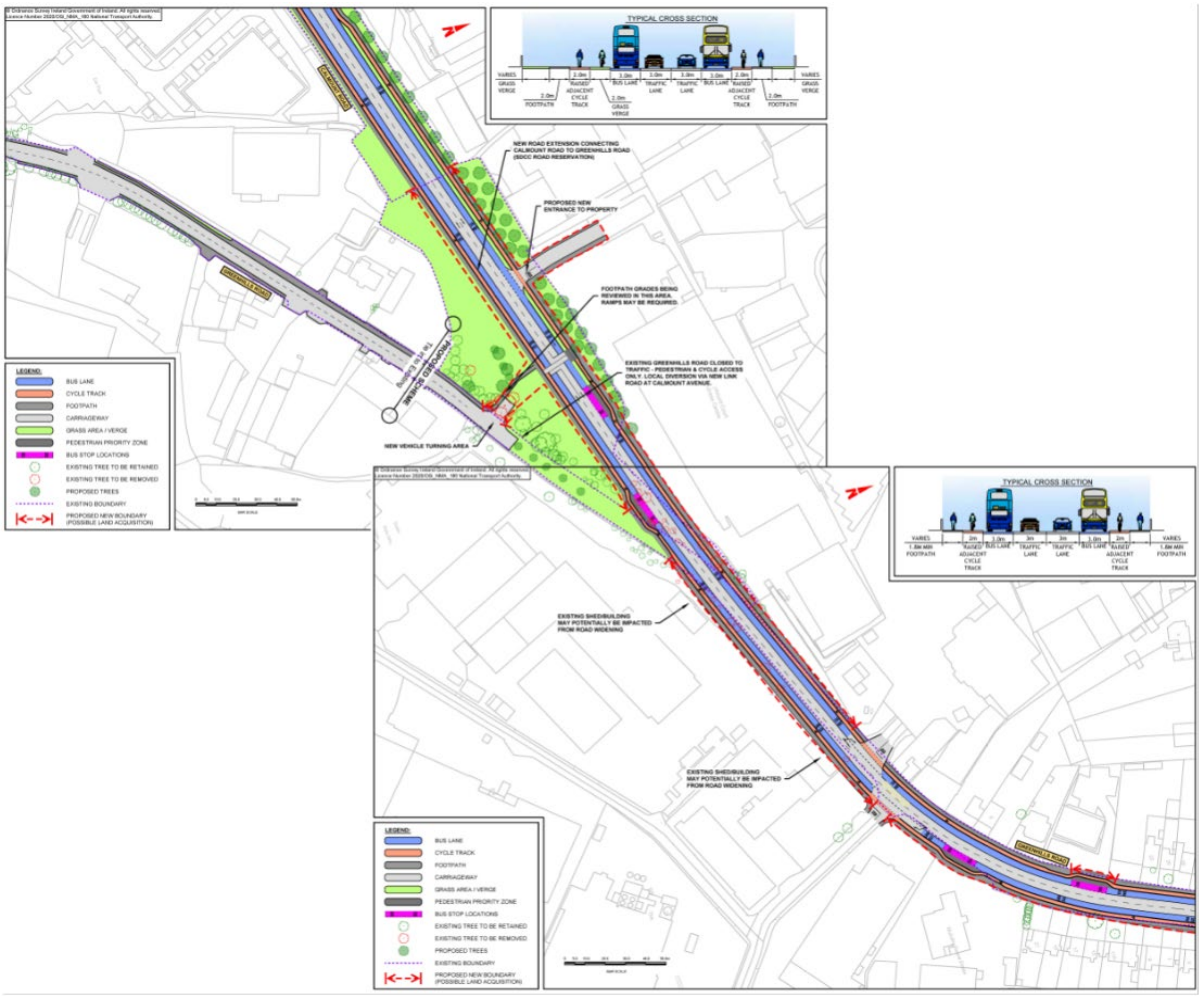

Figure 2.7 Drawing illustrating the proposed Greenhills Road Quality Bus Corridor which will run along the site's northern boundary.

More broadly, Tallaght's Town Centre is situated south of the subject site. Tallaght's Town Centre is characterised by high rise, high-density mixed-use development, with building heights ranging between

two and twelve storeys. The mix of uses are predominantly residential over ground floor retail/commercial use. Crumlin, Terenure and Kimmage are also in close proximity to the site. Crumlin Children's Hospital is situated approximately a 28-minute walk to the north west of the subject site. Tallaght Institute of Technology is situated to the south of the subject site.

A strong feature of the site is its proximity to the Greenhills / Mulcahy Keane Estate bus stop, 2 minutes' walk away from the application site, offering a good public transport service with direct links to Jobstown, Clare Hall, Dublin City and the Dublin Docklands, Citywest Campus and Tallaght. It should also be noted that the LUAS red line stop is situated just a 20-minute walk away from the site.

2.3 Nature and Extent of Proposed Development

In summary, the Applicant is applying to An Bord Pleanála, under the Strategic Housing Development process, for the following (as per the public notices):

(i) The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3 m – 9.9 m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;

(ii) the construction of a mixed-use Build-to-Rent residential and commercial development comprising 633 no. build-to-rent apartment units (292 no. one-beds, 280 no. two-beds and 61 no. three-beds), 1 no. childcare facility and 10 no. commercial units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:

(a) Block A comprises 209 no. apartments (102 no. 1 bed-units, 106 no. 2 bed-units and 1 no. 3-bed units) measuring 5 - 10 storeys in height. (b) Block B comprises 121 no. apartments (53 no. 1 bed-units, 45 no. 2 bed-units and 23 no. 3 bed-units) measuring 8 - 10 storeys in height. (c) Block C comprises 130 no. apartments (38 no. 1-bed units, 71 no. 2-bed units and 21 no. 3-bed units) measuring 8 - 12 storeys in height. (d) Block D comprises 173 no. apartments (99 no. 1 bed-units, 58 no. 2 bed-units and 16 no. 3 bed-units) measuring 6 - 10 storeys in height. All apartments will be provided with private balconies/terraces;

(iii) provision of indoor communal residential amenity/management facilities including a co-working space, communal meeting room/ work space, foyer, toilets at ground floor of Block A; gym, changing rooms, toilets, resident's lounge, studio, laundry room, communal meeting room/ work space, multi-function space with kitchen at ground floor of Block B; games room with kitchenette, media room, co-working space, resident's lounge, communal meeting room/ work space, reception area, management office with ancillary staff room and toilets, toilets, parcel room at ground floor of Block C;

(iv) the construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block A;

(v) the construction of 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C as follows: Block A has 3 no. units at ground floor comprising 79.46 sq.m., 90.23 sq.m., and 121.39 sq.m., Block B has 1 no. unit at ground floor comprising 127.03 sq.m., Block C has two units at second floor comprising 120.85 sq.m. and 125.45 sq.m., and Block D has 4 no. units at ground floor comprising 84.45 sq.m., 149.77 sq.m., 155.48 sq.m. and 275.59 sq.m.;

(vi) the construction of 3 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 2 no. secondary entrances from the south for emergency access and services (access from existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

(vii) provision of 424 no. car parking spaces comprising 398 no. standard spaces, 21 no. mobility spaces and 5 no. car club spaces located at ground floor level car park located within Block A and accessed via the proposed entrance at Greenhills Road, a two-storey car park located within Blocks C and D also accessed from the proposed entrance at Greenhills Road and on-street parking at ground floor level adjacent to Blocks A and C. Provision of an additional 15 no. commercial/ unloading/ drop-off on-street parking spaces at ground floor level (providing for an overall total of 439 car parking spaces). Provision of 4 no. dedicated motorcycle spaces at ground floor level parking area within Blocks C and D;

(viii) provision of 1363 no. bicycle parking spaces comprising 1035 no. residents' bicycle spaces, 5 no. accessible bicycle spaces and 7 no. cargo bicycle spaces in 9 no. bicycle storerooms in ground and first floor parking areas within Blocks A, C and D, and 316 no. visitors' bicycle spaces located externally at ground floor level throughout the development;

(ix) provision of outdoor communal amenity space (5,020 sq.m.) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting, and scented gardens located on podiums at first and second floor levels; provision of a communal amenity roof garden in Block C with seating area and planting (176 sq.m.); and inclusion of centrally located public open space (3,380 sq.m.) adjacent to Blocks B and C comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space; and incidental open space/public realm;

(x) development also includes landscaping and infrastructural works, foul and surface water drainage, bin storage, ESB substations, plant rooms, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development.

This application is accompanied by an Environmental Impact Assessment Report (EIAR).

The layout of the proposed development has been informed by the topography of the subject site, its proximity to public transport on Greenhills Road and Walkinstown, the feedback received from South Dublin County Council, the City Edge Team, and An Bord Pleanála at pre-planning stage, the policies and objectives set out for the subject site and surrounding area in the South Dublin County Development Plan 2016-2022 and the Draft South Dublin County Development Plan 2022-2028, as well as the inputs from the EIAR consultants.

The proposed development comprises the demolition of a number of existing low-rise disused industrial units on site and the construction of a mixed-use residential Strategic Housing Development on the site. More specifically, the development will comprise of 4 no. 5-12 storey blocks accommodating 633 no. Build-to-Rent apartments, a 360sqm childcare facility, 1330sqm of commercial space and internal communal amenity space to serve residents of the development.

The 633 no. apartments proposed will be 'Build-to-Rent' and will comprise the following mix: 292 no. 1-bed apartments, 25 no. 2-bed (3P) apartments, 255 no. 2-bed (4P) apartments, and 61 no. 3-bed apartments. Residents of the development will also have access to 5,520sqm of external communal amenity space as well as a centrally located public park located between Block's B and C.

The primary vehicular access will be provided off Greenhills Road to the northeast, and secondary access for emergency vehicles and services will be provided off the road to the south of the subject site via newly created vehicular entrances. These entrances will also provide access to undercroft car parking areas accommodating 398 no. car parking spaces, 21 no. mobility car parking spaces, 5 no. go-car spaces, and 15 no. commercial/unloading/resident parking spaces. Bicycle parking for 1,035 no. bicycles will be provided in secure parking facilities located within the undercroft parking areas for residents with an additional 316 no. bicycle parking spaces provided for visitors at ground/street level.

The proposed scheme has a housing density of 226.88 dwellings per Ha, a plot ratio of 2.61 and a site coverage of 52% including undercroft parking areas. The proposed development has been designed having regard to the topography of the subject site, a watermain which features in the north-eastern

corner of the site, the possible future extension of Calmont Road and the redevelopment of the surrounding industrial estate.

Figure 2.8 Site layout plan of proposed mixed-use development

Figure 2.9 Ground and first floor landscape masterplan for the proposed development

2.3.1 Demolition

The proposal includes the demolition of the existing industrial units/buildings featuring on site (totalling 11,120sq.m).

Figure 2.10 Existing Buildings on site proposed to be demolished

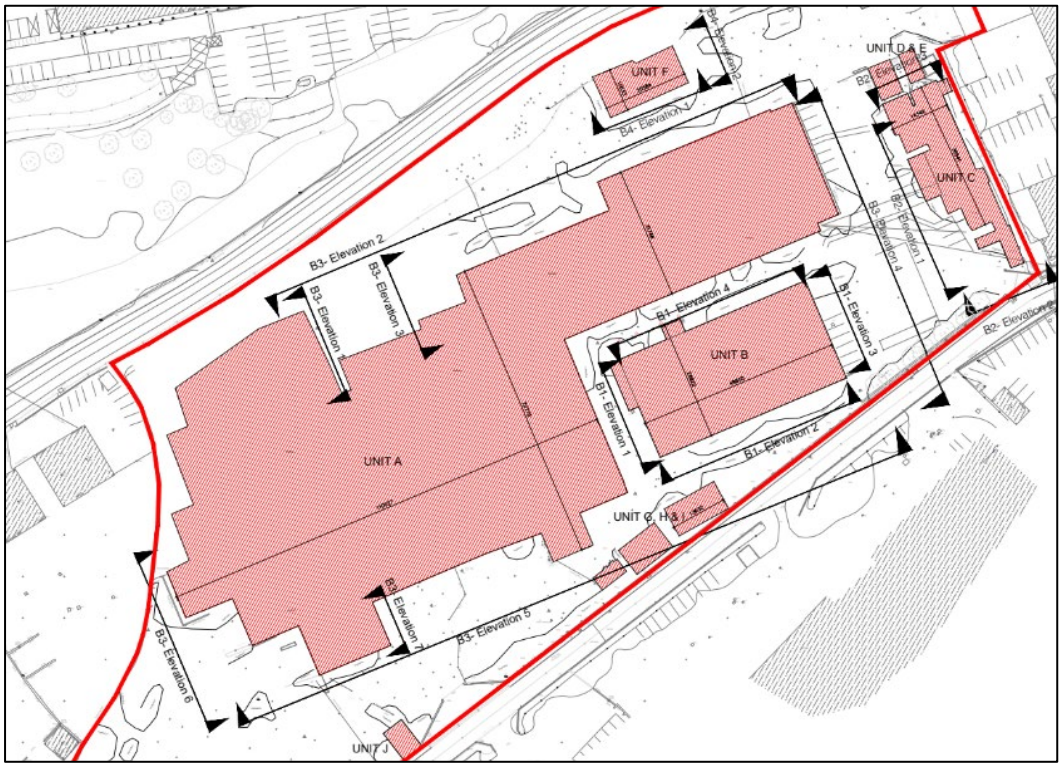

Figure 2.11 Proposed site demolition plan

2.3.2 Proposed Mixed-use Development

The development proposal will include the construction of a mixed-use development, featuring 633 no. Build-to-Rent apartments (292 no. 1-bed apartments, 280 no. 2-bed apartments, and 61 no. 3-bed apartments), 10 no. commercial units (totalling 1,330 sq.m), and a 360sqm crèche/childcare facility in 4 no. blocks varying in height from five to twelve storeys (totalling 72,924sq.m including podium areas and 60,842 sq.m. excluding podium area).

More specifically, the proposed 4 no. blocks can be described as follows:

Block A

Block A is U-shaped block which ranges in heights from 5 to 10 storeys comprising 209 no. apartments (102 no. 1-bed, 106 no. 2-bed, and 1 no. 3-bed unit). Each apartment will have a kitchen/dining/living area, bedrooms, bathroom and storage space. Private amenity space will be provided in the form of a balcony of terrace.

Block A will also house a creche at ground floor level comprising 360 sqm. The creche will front the road to the south of the subject site. Communal amenity spaces will be located at ground floor level on the northern facade of the block and commercial space located along the western facade, providing passive surveillance and activity along the connecting street through the site. All balconies and terraces will overlook communal outdoor space, which is provided at podium level, thus providing passive surveillance and improving safety and security on the site.

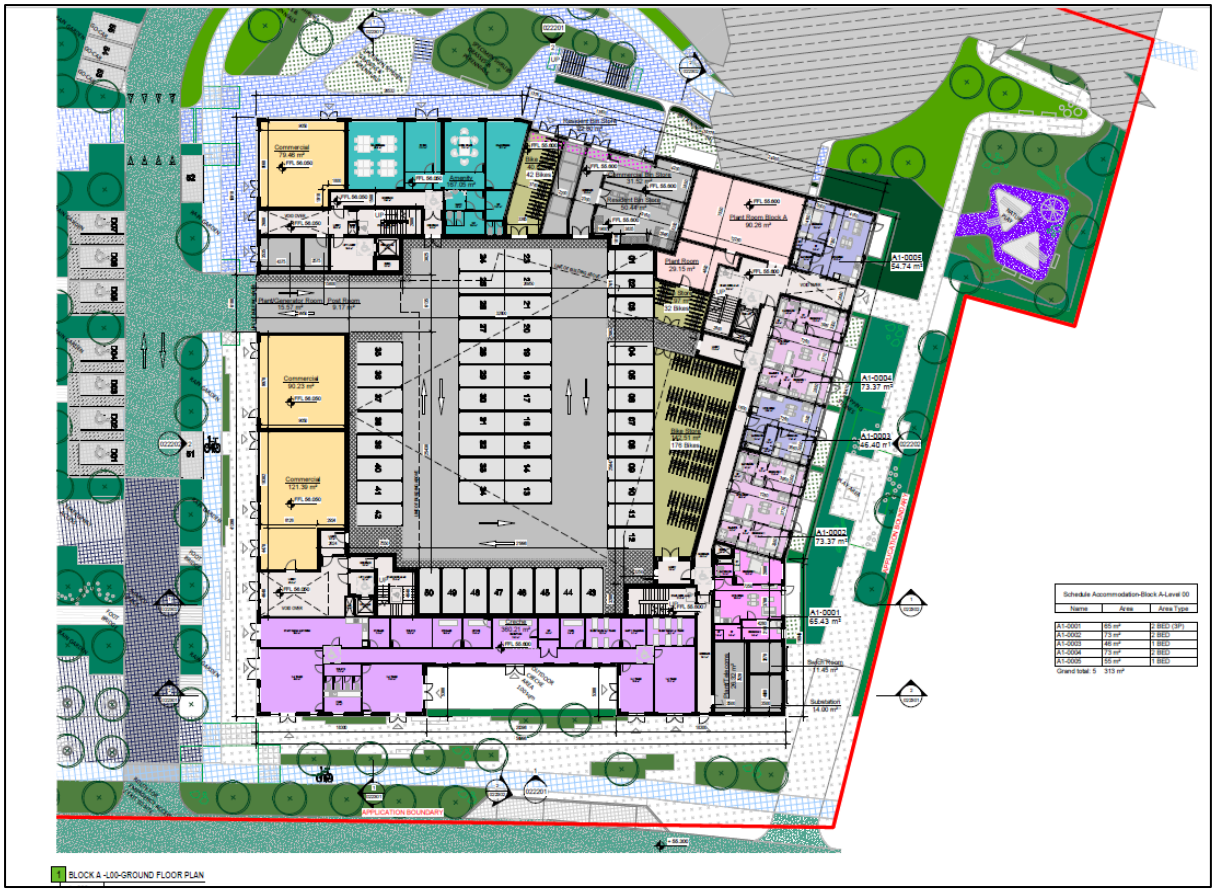

Figure 2.12 Proposed Ground Floor Plan Block A

Figure 2.13 Proposed First Floor Plan Block A

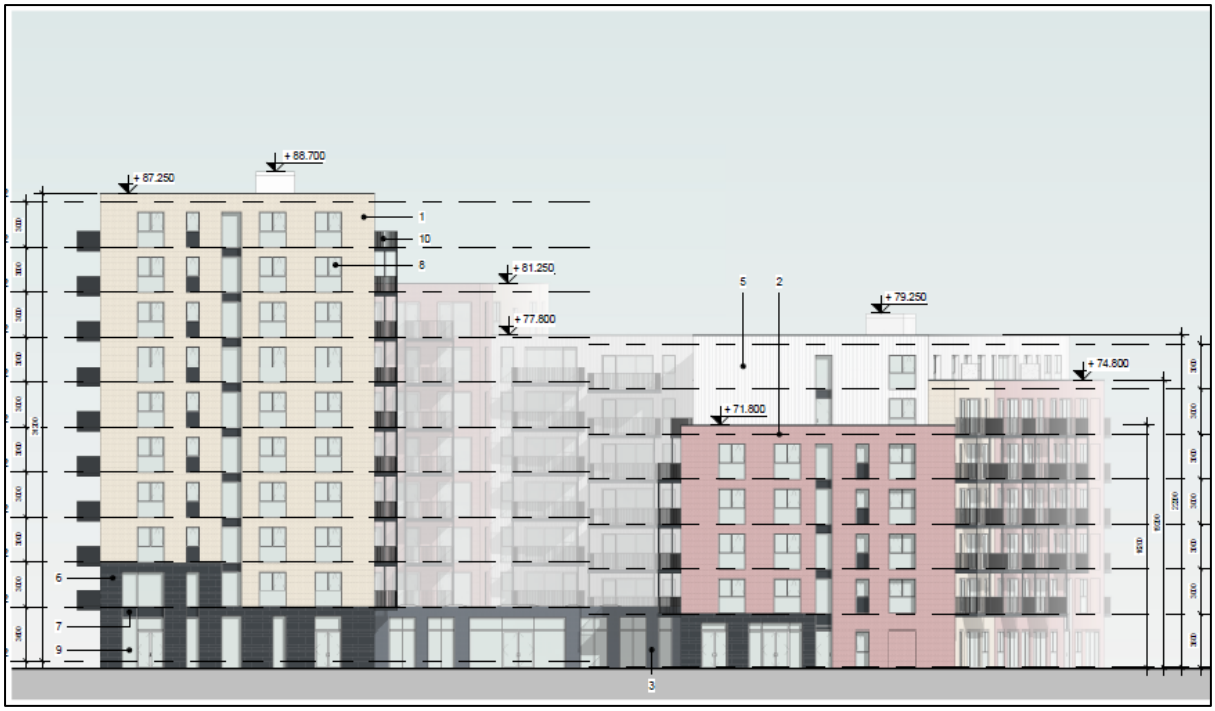

Figure 2.14 Proposed South Elevation Block A

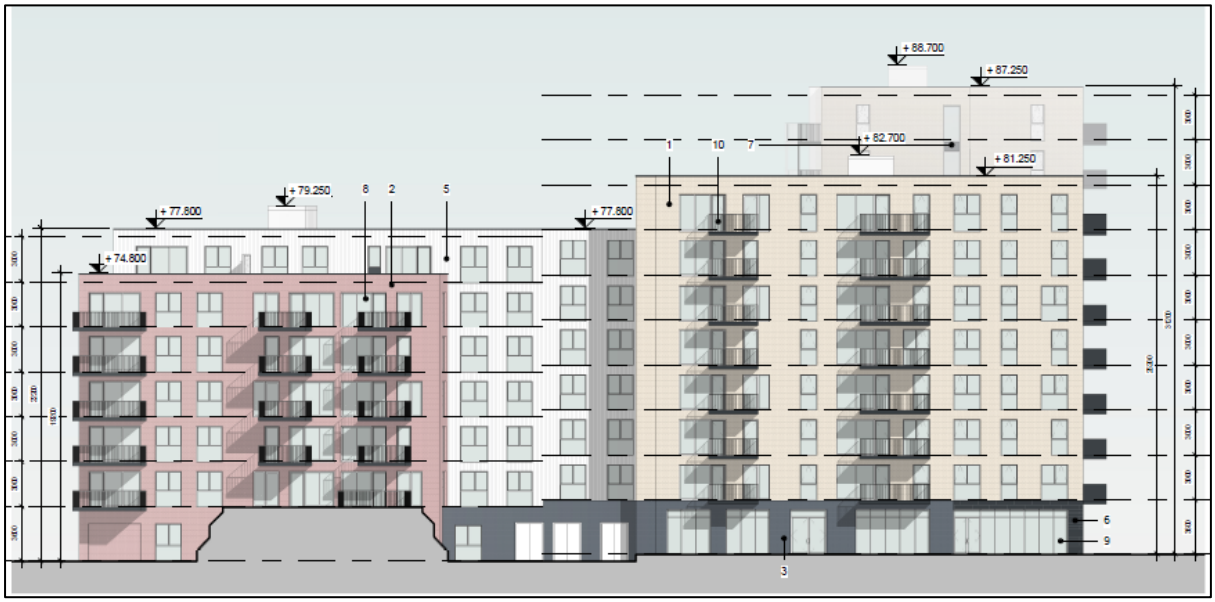

Figure 2.15 Proposed North Elevation Block A

Block B

Block B is an L-shaped block which ranges in heights from 8 to 10 storeys comprising 121 no. apartments (53 no. 1 bed units, 45 no. 2 bed units and 23 no. 3 bed units). Block B fronts the southern boundary of the site and is bound to the north by the public open space. Each apartment will have a kitchen/dining/living area, bedrooms, bathroom and storage space. Private amenity space will be provided in the form of a balcony of terrace. Bicycle and car parking will be provided in a two-storey undercroft car park. Communal amenity spaces will be located at ground floor level, providing passive surveillance and activity along all frontages. All balconies and terraces will overlook communal outdoor space thus providing passive surveillance and improving safety and security on the site. A commercial unit will be provided fronting the road to the south of the development.

Figure 2.16 Proposed Ground Floor Plan Block B

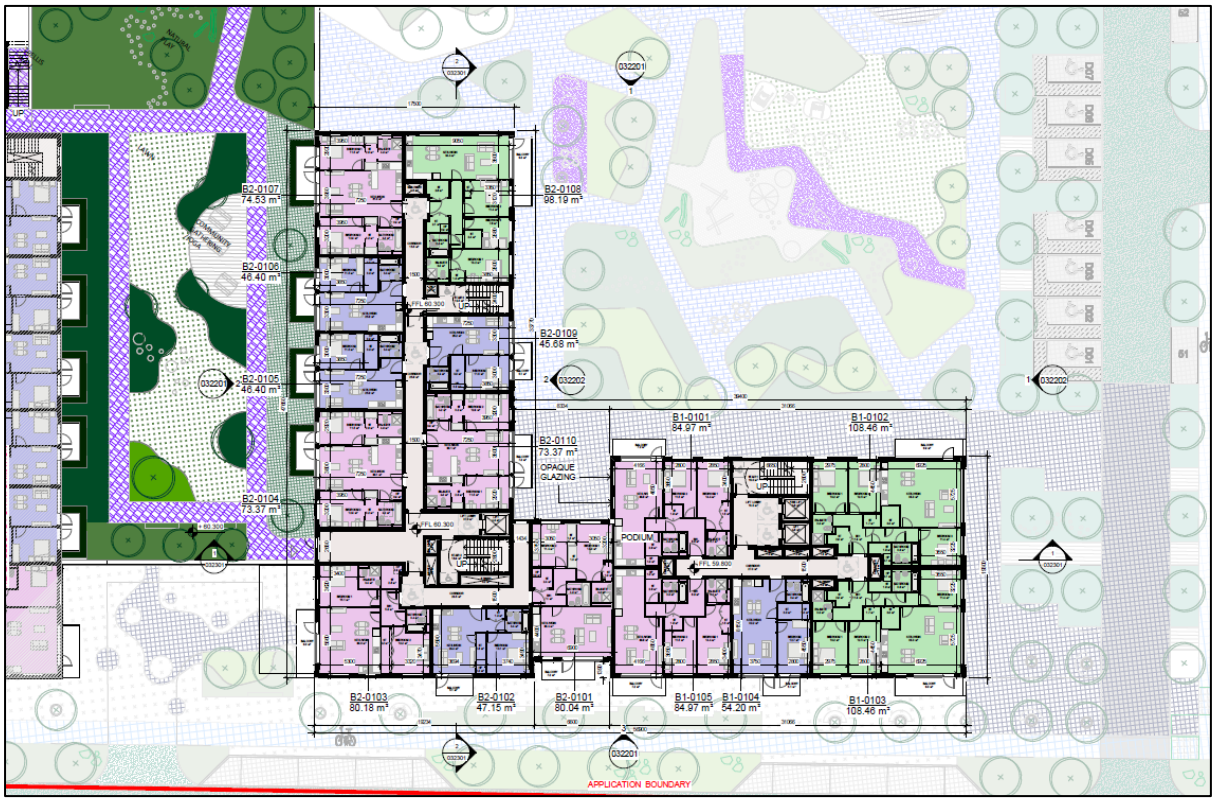

Figure 2.17 Proposed First Floor Plan Block B

Figure 2.18 Proposed South Elevation Block B

Figure 2.19 Proposed North Elevation Block B

Block C

Block C is an L-shaped block which ranges in heights from 8 to 12 storeys comprising 130 no. apartments (38 no. 1 bed units, 71 no. 2 bed units and 21 no. 3 bed units). Each apartment will have a kitchen/dining/living area, bedrooms, bathroom and storage space. Private amenity space will be provided in the form of a balcony or terrace. Communal amenity spaces will be located at ground floor

level, providing passive surveillance and activity along all frontages. All balconies and terraces will overlook communal outdoor space thus providing passive surveillance and improving safety and security on the site. 2 no. commercial units will be provided at second floor level fronting Greenhills Road.

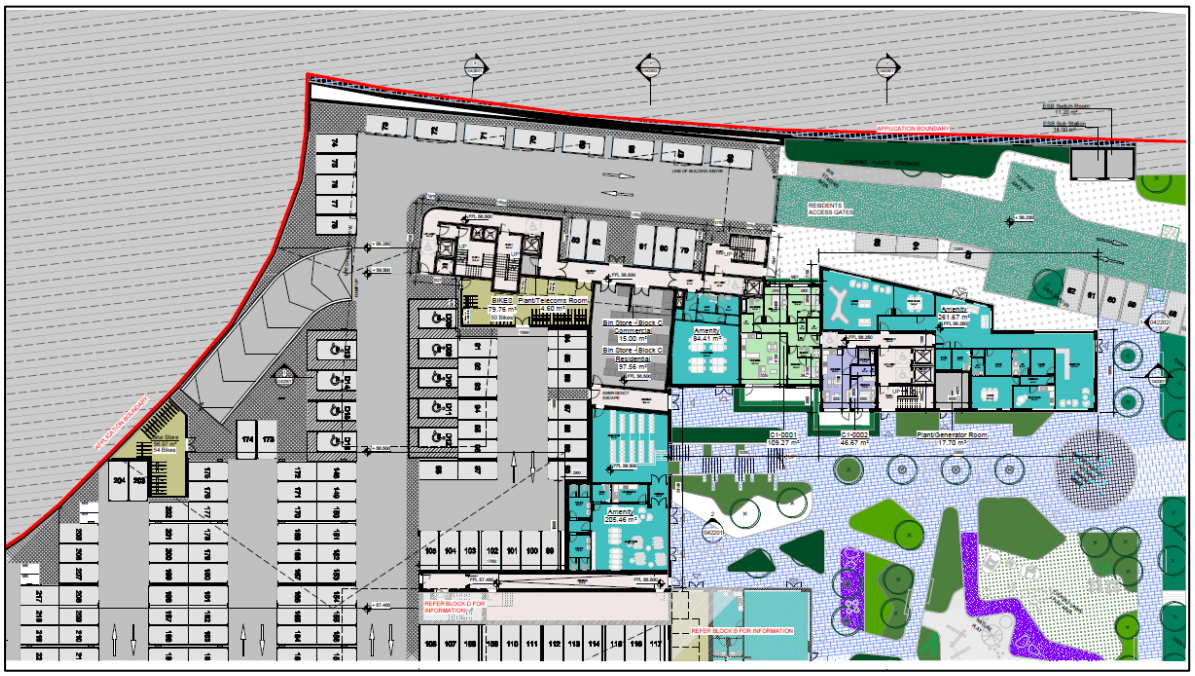

Figure 2.20 Proposed Ground Floor Plan Block C

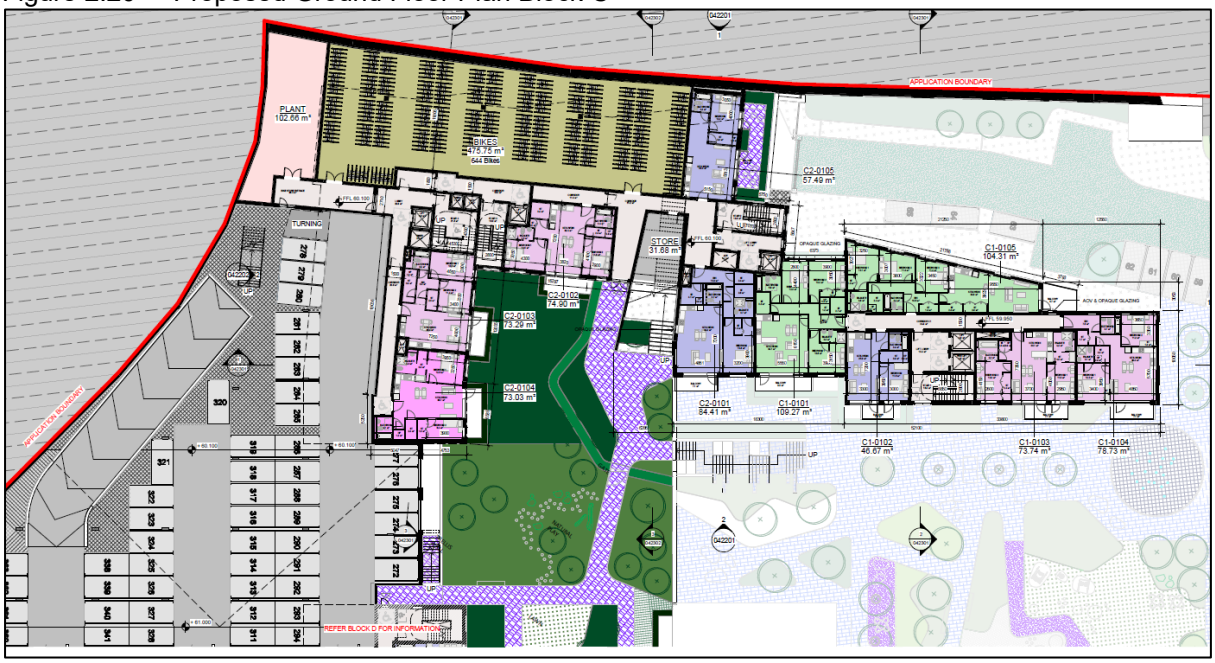

Figure 2.21 Proposed First Floor Plan Block C

Figure 2.22 Proposed North Elevation Block C

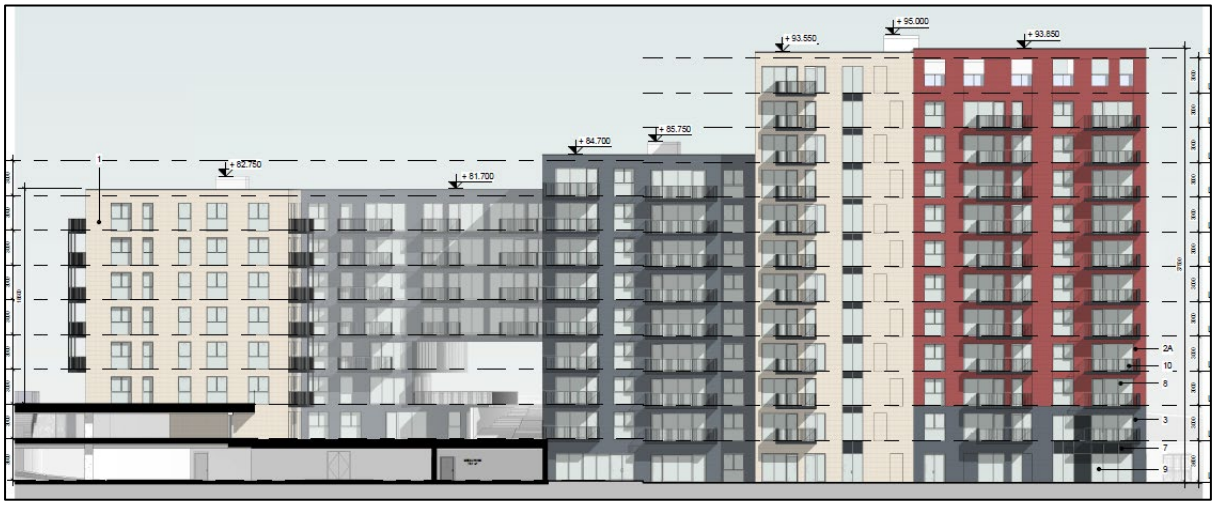

Figure 2.23 Proposed South Elevation Block C

Block D

Block D is an L-shaped block which ranges in heights from 6 to 10 storeys comprising 173 no. apartments (99 no. 1 bed units, 58 no. 2 bed units and 16 no. 3 bed units). Each apartment will have a kitchen/dining/living area, bedrooms, bathroom and storage space. Private amenity space will be provided in the form of a balcony of terrace. Bicycle and car parking will be provided in an undercroft car park. Communal amenity spaces will be located at ground floor level, providing passive surveillance and activity along all frontages. All balconies and terraces will overlook a podium based communal outdoor space thus providing passive surveillance and improving safety and security on the site. Commercial units will front the street to the south of the development, thus providing an active frontage.

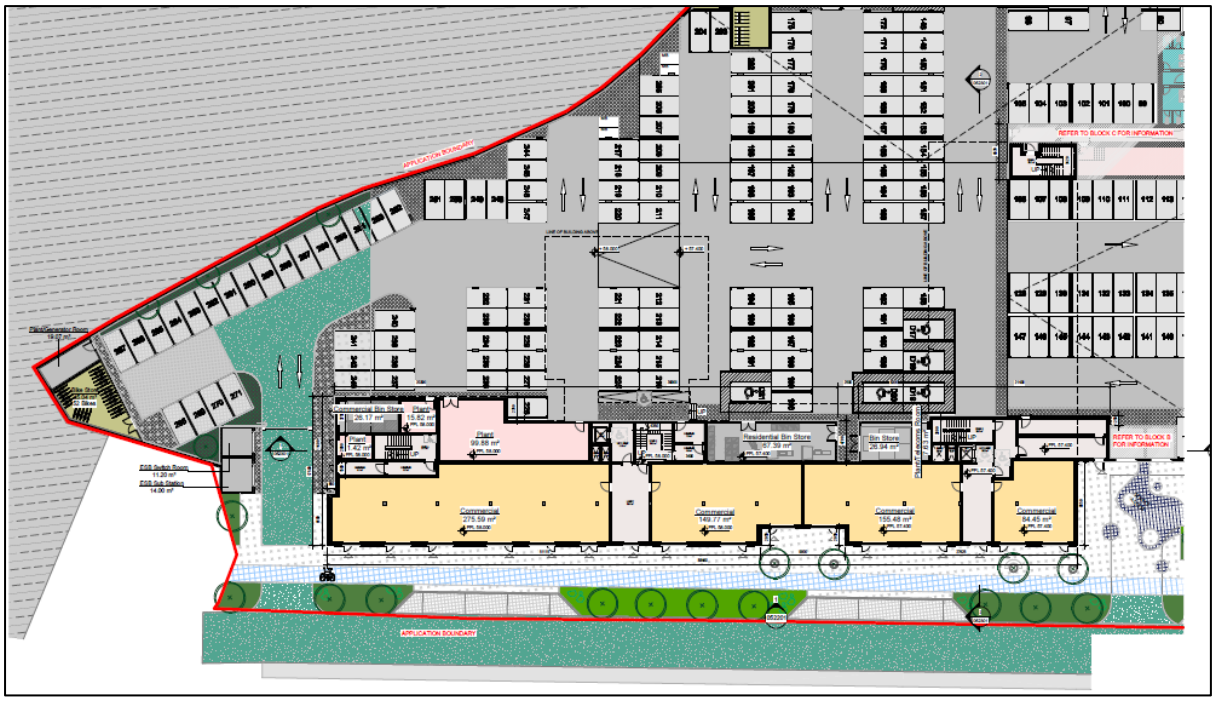

Figure 2.24 Proposed Ground Floor Plan Block D

Figure 2.25 Proposed Frist Floor Plan Block D

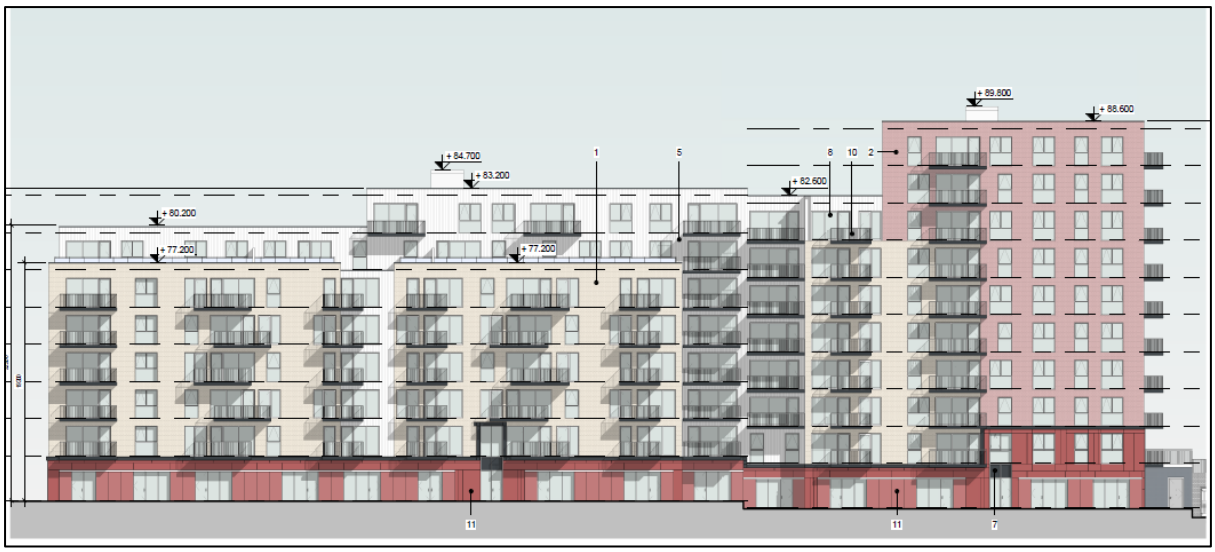

Figure 2.26 Proposed South Elevation Block D

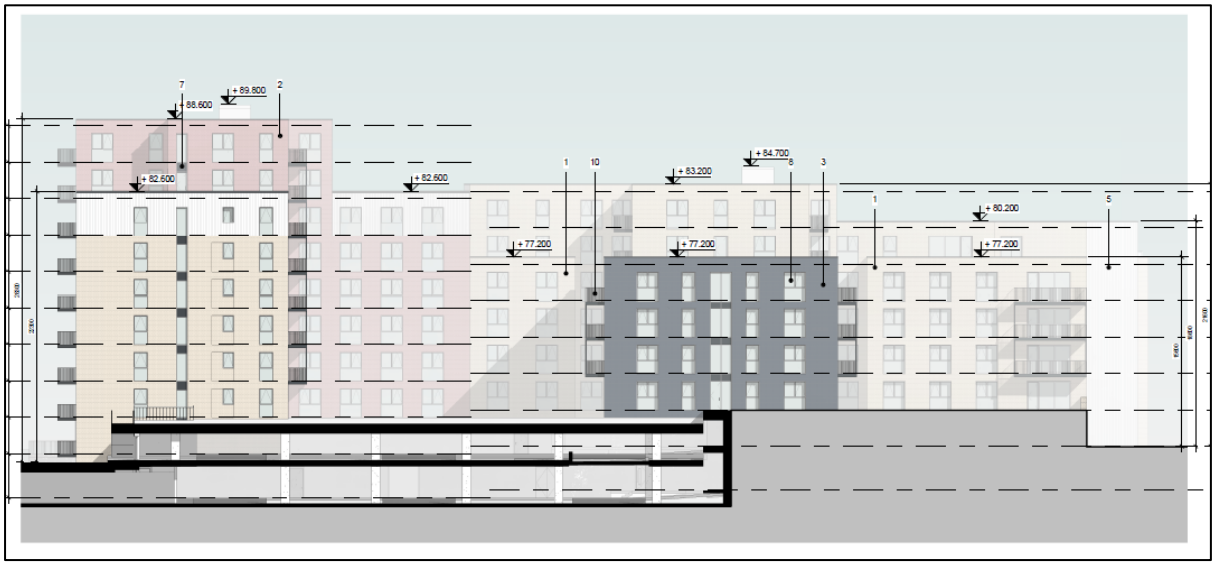

Figure 2.27 Proposed North Elevation Block D

The proposed development provides for 1,293 sq.m of internal build to rent amenity spaces. In addition, 5,020 sq.m. of external amenity space is proposed with an additional 176 sq.m. provided at the roof garden of Block C. The proposal provides a total of 6,489 sq.m. of internal and external amenity spaces.

The proposed open spaces comprise public open space and public realm. The main courtyard on the ground floor will provide opportunities for seating, recreation and areas of soft landscaping. The public open space will provide natural play provisions integrated into the design. The total public open space (Public Courtyard) is approx. 12% of the development site area. The communal open space areas are provided on the 1st and 2nd floors. These areas provide residents with areas for informal play, gathering, and community gardens.

The site layout proposes to maximise the permeability and connectivity to and through the site prioritizing the quality of open space within the development. The buildings have been set back along the southern boundary to allow for enhanced public realm along this frontage which includes; commercial/BTR amenity/ creche frontages to provide active street frontage and passive surveillance, pedestrian footpaths/ plaza rest spaces, dedicated cycle lane and also car parking lay-bys to serve the development.

Car parking and bicycle parking will be provided at street level and in 2 no. undercroft parking areas underneath Block A , and a two storey undercorft parking area located underneath Blocks C and D which are accessible from Greenhills Road. Primary access will be provided via Greenhills Road with secondary accesses off the road to the south of the development for emergency services. Some parking will be provided at ground level. Both undercroft parking areas will have landscaped communal areas located on top. The development will contain 398 no. car parking spaces, 21 no. mobility car parking spaces, 5 no. go-car spaces, and 15 no. commercial/unloading spaces. Bicycle parking for 1,035 no. bicycles will be provided in secure parking facilities located within the undercroft parking areas for residents with an additional 316 no. bicycle parking spaces provided for visitors at ground level.

Please also refer to the Design Statement and architectural drawing set, prepared by C+W O'Brien Architects, for further details regarding the above. The subject application has been prepared having regard to the feedback received from An Board Pleanála and South Dublin Council during pre-planning consultations.

Figure 2.28 CGI of the proposed development

Figure 2.29 CGI of the proposed development

Figure 2.30 CGI of the proposed development

Figure 2.31 CGI of the proposed development

Figure 2.32 CGI of the proposed development

Figure 2.33 CGI of the proposed development

Please also refer to the Design Statement and architectural drawing set, prepared by C+W O'Brien Architects, and the Landscape Strategy & Design Report and landscape drawing set, prepared by Parkhood Landscape Architects, for further information regarding the above.

2.3.3 Services and Proposed Infrastructure Works

Foul Sewer

The foul drainage system for the site has been designed having regard to the topography of the site. It is proposed to divide the foul sewer into two catchments.

To service the development, a 225/300mm diameter foul water pipe will be provided, commencing from the south-west corner of the site, extending to the last foul water manhole of site 'FW01'. The foul water will then flow towards the existing foul water manhole 'EX.FW01' located south-east of the site, on the access road parallel to the southern site boundary, discharging all the foul water Generated from the proposed development.

Please refer to Chapter 7 of this EIAR and Section 3.0 of the Engineering Services Report and associated engineering drawings, prepared by Lohan and Donnelly Consulting Engineers, for further information. It is worth noting that the design team have undertaken extensive consultation with Irish Water in relation to the proposed development.

Surface Water Drainage

It is proposed to provide a 225, 300 & 450mm diameter surface water pipes to service the development. Surface water collected from within the site boundary will flow into the last manhole on site "SW02", from there the surface water will flow into an intermediate manhole "SW01" in-between he last manhole on site and the existing surface water sewer. Finally, the surface water will discharge into the existing 225mm surface water sewer located on the access road parallel to Chadwicks Plumb Centre, south of the proposed development via a saddle connection.

A series of SUDS measures will be implemented to assist with surface water drainage. Surface water throughout the site will collected by a green roof system, tree pits, rain gardens, and permeable paving/asphalt before discharging into the attenuation facility allocated to each block.

Please refer to Chapter 7 of this EIAR and Section 4.0 of the Infrastructure Design Report and associated engineering drawings, prepared by Lohan and Donnelly Consulting Engineers, for further information.

Water Supply

The existing water main is to be demolished as it is not compliant with Irish Water's code of practice, and it does have sufficient capacity to serve the new proposal. Furthermore, another existing water main is present in the northern part of the development. This water main is 1200mm in Diameter and traverses the site, entering from middle-north and exiting in the north-east corner of the development. It is intended to retain the existing water main using the method outlined within Irish Water's instructions set out in Section 5.2 of the Infrastructure Design Report prepared by Lohan & Donnelly Consulting Engineers, rather than diverting & removing it from the premises. To achieve this a 7.5m, unobstructed wayleave either side of the pipe will be provided, to ensure that the existing water main is accessible for any potential future maintenance.

To service the development, it is proposed to provide a 200mm MDPE (medium density polyethylene) type PE-80 water main. The water main will be connected to the plant rooms where the water distribution system is located, distributing the water to the residing residents of the apartment complexes. To comply with guidance specification for fire hydrants, offline & on-line fire hydrants will be provided along the water main to provide full coverage of the proposed development in the event of a fire. The water main will exit the proposed development in the north-east corner and connect to the newly laid 200mm diameter water main as per the conditions set out in Irish Water's confirmation of feasibility letter. Prior to exiting the site, a boundary box and telemetry kiosk will be installed to measure the water usage for the development.

Please refer to Chapter 7 of this EIAR and Section 9.0 of the Infrastructure Design Report and associated engineering drawings, prepared by Lohan and Donnelly Consulting Engineers, for further information.

Road Upgrades

The primary vehicular access will be provided off Greenhills Road to the northeast, and secondary access for emergency vehicles and services will be provided off the road to the south of the subject site via newly created vehicular entrances. These entrances will also provide access to undercroft car parking areas accommodating 398 no. car parking spaces, 21 no. mobility car parking spaces, 5 no. go-car spaces, and 15 no. commercial/unloading spaces. Bicycle parking for 1,035 no. bicycles will be provided in secure parking facilities located within the undercroft parking areas for residents with an additional 316 no. bicycle parking spaces provided for visitors at ground level.

The proposed development also includes streetscape upgrades along Greenhills Road and the road to south, with footpaths, cycle lanes and landscaping also proposed internally within the application site.

Please refer to Chapter 13 of this EIAR and the Transportation Assessment Report, prepared by Lohan and Donnelly Consulting Engineers, for further information.

2.4 Alternatives Examined

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

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

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

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

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

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

2.4.1 Alternative Locations

Given the zoning of the subject site in the South Dublin County Development Plan 2016-2022 and the Draft South Dublin County Development Plan 2022-2028 and having regard to the project's objectives, no reasonable alternative locations were identified. The rationale for the subject project is to provide a residential development with ancillary facilities and a mixed-use component in a sustainable modern urban neighbourhood landscaped setting on Regeneration Zoned lands in a strategic location. The proposal is predicated on the zoning applying to the site for residential development in the South Dublin County Development Plan 2016-2022 and the objectives of the South Dublin County Development Plan 2016 - 2022 whereby new residential development is envisaged. The applicant and the design team are not aware of any adjoining sites within the Greenhills Industrial Estate that are available and ready to be developed that are appropriately zoned for re-development. It is within this statutory planning policy context that all alternatives have been considered.

It is also noted that from an environmental perspective, the lands subject to this assessment are appropriate for redevelopment and can accommodate the proposed development of 633 no. residential units, 1 no. creche and 10 no. commercial units noting that from the perspective of population and human health, there is a shortage of supply of housing and demand in this area; that there is good transport links compared to other sites; there is no river nearby or other ecological/environmental sensitivity onsite as set out in the Appropriate Assessment, that the proposal represents an improvement to the neighbourhood noting the high quality amenities proposed as part of the scheme and the visual enhancement of the proposal in the context of the existing warehouse buildings and that there will be no adverse visual impacts on adjoining development.

2.4.2 Alternative Uses

In addition to residential use, there are other land uses which are permitted in principle on these lands. The permitted in principle uses outlined for the 'REGEN' zoning include the following:

Advertisements and Advertising Structures, ***Childcare Facilities****, Community Centre, education, Enterprise Centre, Health Centre, Home Based Economic Activities, Hotel/Hostel, Housing for Older People, Industry-Light, Live-Work Units, Motor Sales Outlet, Office-Based Industry, Office less than 100 sq.m, Offices 100 sq.m –1,000 sq.m, Offices over 1,000 sq.mi, Open Space, Petrol Station, Public Services, Recreational Facility,* ***Residential****, Restaurant/Café, Residential Institution, Science and Technology Based Enterprise,* ***Shop-Local****, Sports Club/Facility, Stadium, Traveller Accommodation.*

From a zoning perspective, the construction of a mixed-use development, featuring apartments, commercial space and a creche on the subject site is consistent with the land use zoning applying to the site.

It is not considered that an alternative comprising one of the alternative uses would result in the best use of these lands, particularly having regard to the general acknowledged need for housing and particularly the creation of a sustainable urban community neighbourhood, given the proximity of the subject site to the immediately adjacent high quality public transport infrastructure. Currently, the environs of the subject site are largely industrial/commercial in nature. However, the Greenhills Industrial Estate is expected to be the subject of extensive urban renewal in the coming years, with existing industrial buildings being replaced with higher density development in accordance with the City Edge Project.

In this context, the proposed development which is the subject of this application comprises appropriate land uses in accordance with the proper planning and sustainable development of the area.

2.4.3 Description of Alternative Processes

Given the zoning of the subject site, and the nature of the proposed development, no reasonable alternative processes were identified. The proposed development will implement best practice processes including sustainable construction methods as well as durable and high quality materials within the proposed development.

2.4.4 Alternative Designs/Layouts and Consultations on the Design Development

The design approach for the proposed development is presented in the Architectural Design Statement prepared by the project Architects, C+W O'Brien Architects which is submitted as part of the planning application, and it should be read in conjunction with this chapter of the EIAR.

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

The following paragraphs analyses alternative development options considered for the site, starting with the initial layout tabled at the 1st pre-planning meeting had with South Dublin County Council on 9th March 2021, and then describing design options and changes which were incorporated into the scheme as the proposals progressed through extensive pre-application discussions with South Dublin County Council, the City Edge Team, and An Bord Pleanála and in response to input from the appointed EIAR team. The principal considerations and amendments to the design of the scheme, having regard to and comparing the key environmental issues, are set out and discussed.

Option 1 – Design/Layout discussed at the pre-planning consultations with South Dublin County Council in May 2019

The first design option explored by C+W O'Brien Architects in early 2021 (illustrated in Figures 2.34-2.35 below and overleaf), which was subsequently tabled at a pre-planning meeting with South Dublin County Council on 9th March 2021, can be described as follows:

> *The development will comprise of 4 no. 5-12 storey blocks accommodating 645 no. of 'Build-to-Rent' apartments, a 230sqm creche, 925qm of commercial space, a café/restaurant and internal communal amenity space to serve residents of the development. The 645 no. of 'Build-to-Rent' apartments proposed will feature the following mix: - 359 no. x 1-bed apartments; and 286 no. x 2-bed (4P) apartments. Residents of the development will also have access to 5,475sqm of external communal amenity space as well as a linear public park that traverses the site.*
>
> *Vehicular access is provided off Greenhills Road via a newly created vehicular entrance in the north-eastern corner of the site which will provide access to podium level car parking areas accommodating c. 247 no. standard car parking spaces, 18 no. limited mobility car parking spaces and 10 no. go-car spaces. 2 no. secondary vehicular accesses, providing access for emergency and servicing vehicles, feature along the site's southern boundary. Provision has also been made for the possible future*

extension of Calmount Road to the north of the site. Generous bicycle parking provisions will also be provided for residents of the scheme.

The proposed scheme has a housing density of 235 dwellings per Ha, a plot ratio of 1.91 and a site coverage of 26% (taken at first floor level). The proposed development has been designed having regard to the topography of the subject site, a water mains which features in the north-eastern corner of the site, the possible future extension of Calmount Road and the redevelopment of the surrounding industrial estate.

The layout comprised taller buildings than currently proposed, an increased number of apartments and a different block configuration. The central open space areas serving the various blocks required greater consideration with one large area of open space indicated as preferred by South Dublin County Council. The road layout and permeability proposed for the development required greater consideration.

Figure 2.34 Indicative site layout of the proposed development tabled at first S247 meeting with South `Dublin County Council in March 2021

Figure 2.35 3D drawing illustrating the massing of the proposed blocks across the site tabled at first S247 meeting with South Dublin County Council in March 2021

Option 2 – Design/Layout discussed at the pre-planning consultations with An Bord Pleanála on 29th April 2021

The second design option explored by C+W O'Brien Architects following the S247 pre-planning meeting with South Dublin County Council, which was subsequently tabled at the pre-planning consultation with An Bord Pleanála 29th April 2021, included the following key changes from the Option 1 design previously discussed:

- The maximum height was increased from 12 to 19 storeys;
- The number of units increased to 702 no; and
- 259.71sqm of commercial space was provided.

The development tabled at this meeting comprised the demolition of existing industrial units/buildings (totalling 11,120sq.m) and construction of a mixed-use development, featuring 702 no. apartments (367 no. x 1-bed apartments and 335 no. x 2-bed (4P) apartments), in 4 no. blocks varying in height from five to nineteen storeys (totalling 55,673.88sq.m). The proposed scheme had a housing density of 251.4 dwellings per Ha, a plot ratio of 1.99 and a site coverage of 25% (first floor level).

Figure 2.36 Site Layout Plan as submitted for Stage 2 SHD Consultation Meeting

The development was served by an undercroft carpark located under Block's A, and a shared car pack under Blocks B, C and D with access point provided for each. This provided a total of 290 no. parking spaces (including 266 no. standard spaces, 14 no. mobility impaired user parking spaces, 10 no. Go Car spaces). The development was served by 829 no. resident bicycle spaces at undercroft level and 280 no. visitor spaces at ground floor level

It was also proposed to construct a new road through the subject site, which linked Greenhills Road with the road to the south.

Figure 2.37 North Contextual Elevation as submitted for Stage 2 SHD Consultation Meeting

Figure 2.38 South Contextual Elevation as submitted for Stage 2 SHD Consultation Meeting

Option 3 – Design/Layout discussed at the pre-planning consultations with City Edge Team on 29th October 2021

Following the opinion issued by An Bord Pleanála, the Design Team engaged with the City Edge Team in October 2021. A revised scheme based on the feedback received form An Bord Pleanála was presented to the team with the following key changes from the Option 2 design previously discussed:

- The maximum height was decreased from 19 to 17 storeys;
- The number of units decreased; and
- The layout was amended to improve the permeability through the site.

Figure 2.39 Revised site plan of the proposed blocks on the site tabled at first meeting with City Edge Team in October 2021

Option 4 - Final Scheme Submitted to An Bord Pleanála

As noted above, following the receipt of detailed feedback from An Board Pleanála, as well as South Dublin County Council and the City Edge Team, during the course of the pre-application consultation, and following receipt of the Notice of Opinion of the Board which advised on further consideration relating to aspects of the proposed development, the applicant and design team have made amendments to the design of the development proposal which are incorporated in the subject application. These include the following:

- The proposed building heights have been reduced resulting in a reduction in unit numbers. The overall number of units resulting is 633 no. and heights ranging from 5 – 12 storeys;
- Resident car and bicycle parking spaces have been provided at undercroft levels with communal open spaces provided at first floor and second floor levels above;
- A public plaza has been added to front of Block C fronting Greenhills Road;
- Commercial space has been significantly increased; and
- Permeability through the site has been improved with strong pedestrian links between Greenhills Road and the road to the south being provided.

2.5 "Do Nothing" Alternative

In the event of the 'do-nothing' scenario, the current use of the site is likely to continue, whereby the lands would remain in industrial/commercial use. A "do-nothing" scenario was considered to represent an inappropriate, unsustainable and inefficient use of these residential zoned lands. In addition, the additional demand / support for local infrastructure, services, and businesses would not be generated by any new population on the site; nor would local housing demand be catered for.

In terms of landscape and visual impact, the site would continue to have an industrial character.

2.6 Comparison of Design Alternatives

The design options discussed above are set out in Table 2.5 below.

	Option 1	Option 2	Option 3	Option 4 - Proposed Layout as submitted	Option 5 - Do Nothing
Unit Nos.	645 (359 no. x 1-bed apartments; and 286 no. x 2-bed (4P) apartments) 1 no. creche 925 sq.m. commercial	702 (367 no. x 1-bed apartments and 335 no. x 2-bed (4P) apartments) 1 no. creche 259 sq.m commercial	Sketch Proposal presented – detailed unit numbers not provided but reduced from previous option noting reduction in height, scale and mass	633 residential units (292 no. one beds, 280 no. two beds and 61 no. three beds) 1 no. childcare facility 10 no. commercial/retail units (1,330 sq.m.)	10 vacant warehouse buildings
Height	5-12 storeys	12-19 storeys	5-17 storeys	5-12 storeys	1-2 storeys
Configuration	4 no. blocks	4 no. blocks	4 no. blocks	4 no. blocks	10 low rise buildings
Density	235	251.4	N/A	226.88	N/A
Daylight	Sub- optimal	Sub- optimal	Optimal	Optimal	N/A
Permeability	Low	Low	Medium	High	Low
Comments	The layout had taller buildings than currently proposed, an increased no. of apartments and a different block configuration. The central open space areas serving the various blocks required greater consideration with one large area of open space indicated as preferred by South Dublin County Council.	The layout had taller buildings, an increase no of apartments, reduced commercial space and reduced communal space. Additional pedestrian/cycle accesses from Greenhills Road were requested at pre-application to increase permeability and mobility. Central open space required.	A stronger edge to Greenhills Road outside of where a setback is needed in response to the wayleave was discussed. Residential units to the Ground Floor of Block D have been removed to introduce employment spaces to the southern road, creating areas of engagement and industry.	The layout was revised to provide increased commercial development. The revised landscape plans, prepared by Park Hood Landscape Architects, provide for a courtyard to serve each block. This will create a clear distinction between public and communal space and ensure the space is reserved for residents of the proposed development. The design has included pedestrian linkages through the site located along the eastern boundary and a central linkage through the site.	The existing buildings will remain on site – unused
Environmental Impacts	Sub Optimal daylight Low Permeability Low quality open space	Impacts on Human Health due to reduced commercial space. Sub optimal unit mix and dual aspect ratio Reduced permeability	Re-orientation of Block D to address southern road and increase in employment through increased commercial – improvement to human health.	Optimal daylight achieved internally and to open space whilst achieving a high-quality design. Appropriate Mix of uses permeability and quality of open spaces proposed. Mitigation measures are proposed to mitigate any adverse impacts.	Low impact but represents the sub optimal use of zoned brownfield lands.

Table 2.5 Comparison of Options Assessed

2.6 Conclusion

Having examined various reasonable alternative designs and having engaged in extensive and detailed consultations with South Dublin County Council, the City Edge Team, and An Bord Pleanála in the course of the design evolution of the current scheme, it is considered that the proposed design as set out in the subject SHD application is a preferable option both in terms of the sustainable development of the subject site and the creation of a sustainable community neighbourhood insofar as it achieves a residential and commercial development, including 633 no. built to rent units, 10 no. commercial units and 1 no. childcare facility achieving a net residential density of 226.9 units per hectare. The current design achieves a range of apartment types, sizes, and designs whilst also providing adequate open space and achieving a strong urban edge and passive surveillance.

3.0 PLANNING AND DEVELOPMENT CONTEXT

3.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, Ms. Anne McElligott, Associate Director, and Mr. Christopher Browne, Executive Planner, with Hughes Planning and Development Consultants.

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

Ms. Anne McElligott of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2011, having previously completed a Bachelor of Arts Degree in Geography and Irish from University College Cork in 2011. Anne has 10 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Anne is currently Director in the Practice of Hughes Planning and Development Consultants

Mr. Christopher Browne of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Urban Design and Planning in 2018, having previously completed a Bachelor of Arts Degree in Geography and History from Dublin City University in 2012. Christopher has 3 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Christopher is currently an Executive Planner in the Practice of Hughes Planning and Development Consultants.

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

3.2 Statutory Planning Context

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

National

- Project Ireland 2040 – National Planning Framework (2018);
- National Development Plan 2018-2027 as updated 2021-2030;
- Housing For All – A New Housing Plan for Ireland (2021);
- Urban Development and Building Heights - Guidelines for Planning Authorities, December 2018;
- Rebuilding Ireland – Action Plan for Housing and Homelessness, July 2016;
- Department of Housing, Planning and Local Government Circular PL 8/2016 APH 2/2016;
- Quality Housing for Sustainable Communities – Guidelines for Planning Authorities (2007);
- Sustainable Residential Development in Urban Areas – Guidelines for Planning Guidelines (2009);
- Urban Design Manual – A Best Practice Guide 2009;
- Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (2020);

- Design Manual for Urban Roads and Streets (2013);
- Smarter Travel: A Sustainable Transport Future - A New Transport Policy for Ireland (2009);
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009); and,
- Guidelines for Planning Authorities on Childcare Facilities (2001).

Regional

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

County

- South Dublin County Development Plan 2016-2022; and,
- Draft South Dublin County Development Plan 2022-2028

South Dublin County Development Plan 2016 - 2022

Under the South Dublin County Development Plan 2016-2022, the subject site is zoned 'REGEN', the objective of which is '*to facilitate enterprise and/or residential-led regeneration*' (refer to map excerpts below). Land uses permitted in principle in this zoning consist of the following:

> *'Advertisements and Advertising Structures, Childcare Facilities, Community Centre, Education, Enterprise Centre, Health Centre, Home Based Economic Activities, Hotel/Hostel, Housing for Older People, Industry-Light, Live-Work Units, Motor Sales Outlet, Office-Based Industry, Office less than 100 sq.m, Offices 100 sq.m –1,000 sq.m, Offices over 1,000 sq.m, Open Space, Petrol Station, Public Services, Recreational Facility,* ***Residential, Restaurant/Café,*** *Residential Institution, Science and Technology Based Enterprise,* ***Shop-Local,*** *Sports Club/Facility, Stadium, Traveller Accommodation.'*

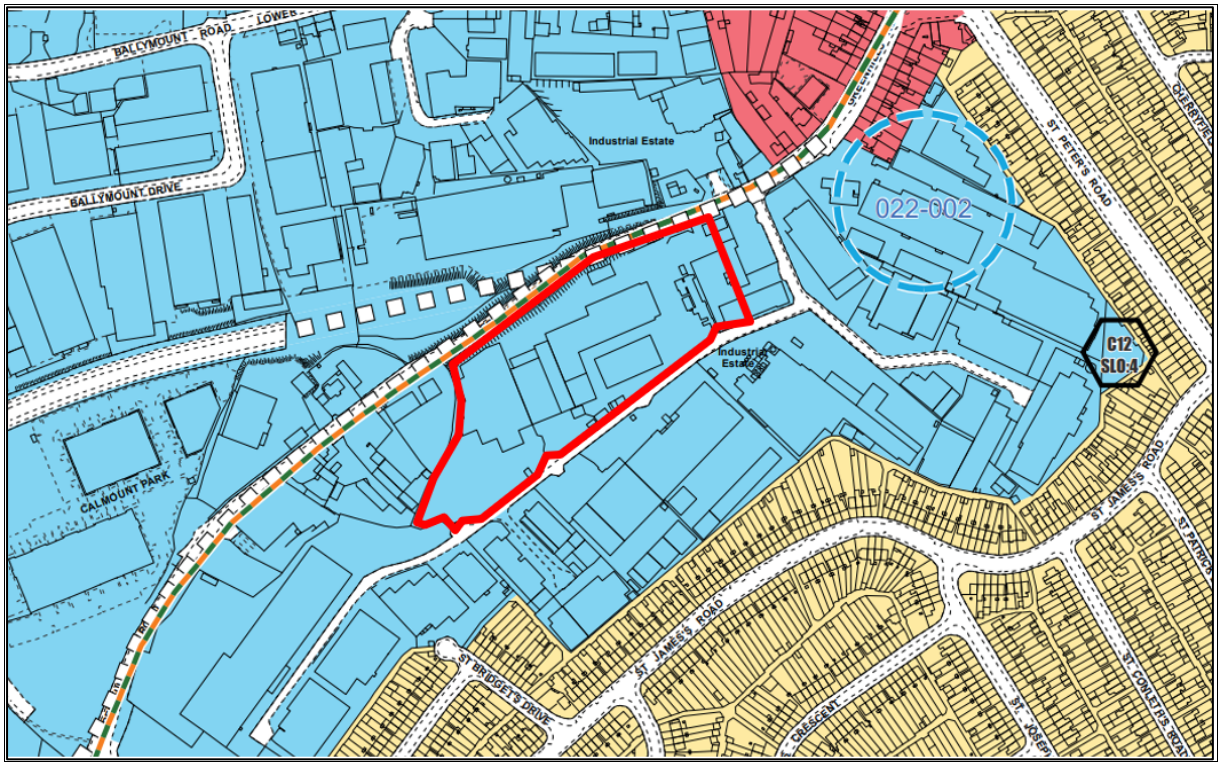

Figure 3.1 Extracts from South Dublin County Development Plan 2016-2022 zoning Map 5 showing the application site (in red) within lands with Zoning Objective 'REGEN'

The 'REGEN' zone is a new addition to the land-use zoning classifications, in the South Dublin County Development Plan 2016-2022, and is aimed at supporting and facilitating the regeneration of underutilised industrial lands that are within close proximity to town centres and/or public transport nodes, with a particular emphasis on more intensive enterprise and residential led development. The 'REGEN' zone is a relatively broad zoning designation under which a wide range of uses may be permitted.

Section 4.3.2 'Employment and residential in Regeneration Zones' set out in the South Dublin County Development Plan 2016-2022 outlines how the Council recognises that there are a high level of vacant lands of poor environmental quality throughout the county, and will seeks to support and facilitate a more intensive mix of enterprise and/or residential led development in 'REGEN' zoned lands, in particular in instances where the regeneration relates to underutilised industrial lands that are in close proximity to town centres and public transport nodes.

Draft South Dublin County Development Plan 2022 - 2028

Stage 2 of consultation on the Draft South Dublin County Development Plan concluded in September 2021. It is anticipated this new development plan will be adopted in 2022. The Draft Development Plan is relevant to this report as it gives an indication of the zoning objectives and planning policies applicable to the subject site over the next 6 years.

The subject site remains zoned 'REGEN' in the South Dublin County Council Development Plan 2016-2022, the objective of which is *to facilitate enterprise and/or residential-led regeneration subject to a development framework or plan for the area incorporating phasing and infrastructure delivery*.

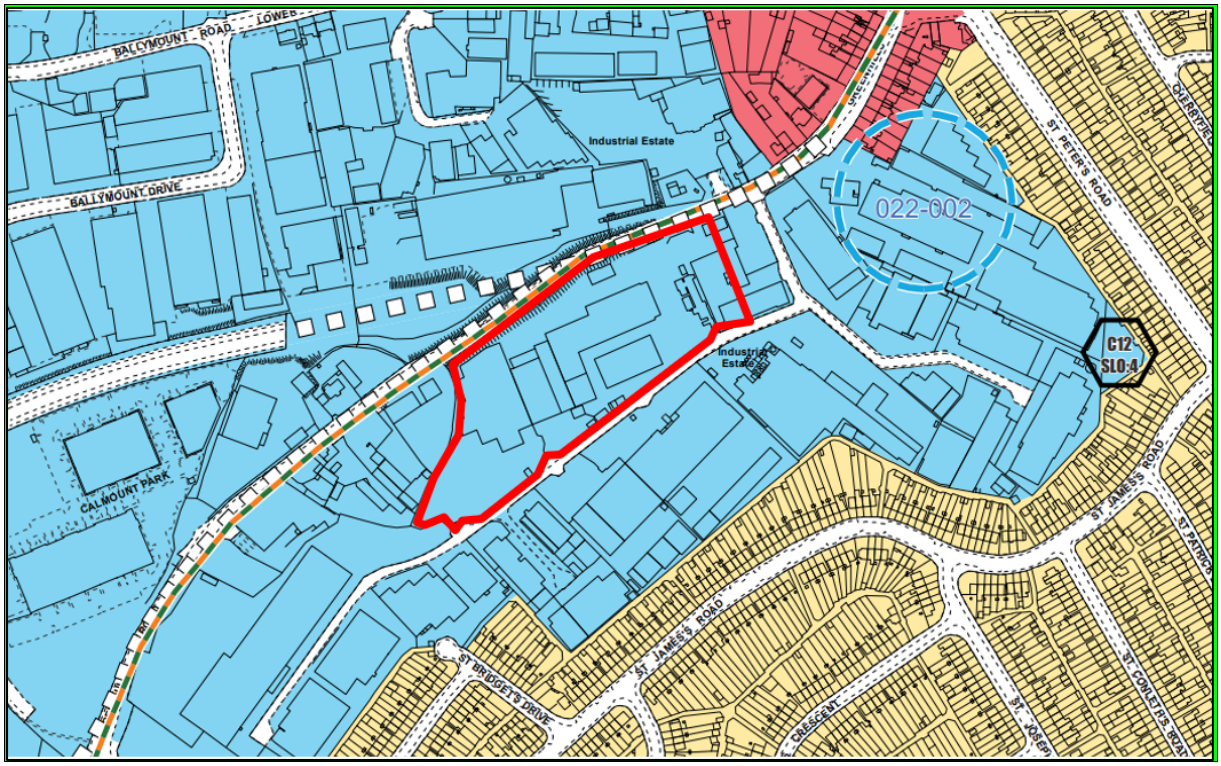

Figure 3.2 Extracts from South Dublin County Development Plan 2022-2028 zoning Map 5 showing the application site (in red) within lands with Zoning Objective 'REGEN'

From a zoning perspective, the construction of a mixed-use development, featuring apartments, commercial space and a creche on the subject site is consistent with the land use zoning applying to the site.

3.3 Planning History of the Site

A review of the South Dublin County Council planning register revealed no relevant planning applications for the subject site.

3.3.1 Planning History of Surrounding Area

There are several existing planning permissions on record in the area ranging from small-scale extensions and alterations to existing residential properties to some larger-scale developments. A review of the South Dublin County Council and An Bord Pleanála's planning registers found the following planning applications relating to large infill sites within the surrounding area and within the nearby Cookstown Industrial Estate, which are also zoned for regeneration.

CHM Premises, Ballymount Road Lower, Walkinstown, Dublin 12

Reg. Ref. ABP-309658-21 Permission granted by An Bord Pleanála on 23rd June 2021 for Demolition of an existing warehouse/factory building and ancillary outbuildings/structures and the construction of a residential development of 171 apartments with supporting tenant amenity facilities (gym, lounges and meeting room), café, creche, landscaping, public realm improvements, and all ancillary site development works. The proposed development will consist of 2 x studio apartments, 59 x 1-bedroom apartments, 103 x 2-bedroom apartments and 7 x 3-bedroom apartments contained in two apartment blocks ranging in height from 1 to 8 storeys. The proposed development provides for outdoor amenity areas, landscaping, under-podium car parking, bicycle racks, bin stores, ancillary plant, and roof mounted solar panels.

The approved development ranged in heights from 1 to 8 storeys across the subject site, in contravention of the South Dublin Development Plan 2016-2022. The Inspector's Report, dated 18th June 2021, notes that the county development plan does not provide for buildings more than 5 stories in height in the area in question. The Inspector noted however, that the proposed 8 storeys were consistent with national policy:

> *The proposed development is consistent with objectives 33 and 35 of the NPF which encourage increased scale and densities in settlements.*

The Inspector tested the scheme against SPPR3 of the Building Height Guidelines and concluded with the following statement:

> *I consider that the criteria above are appropriately incorporated into the development proposal and on this basis that SPPR3 of the Building Height Guidelines can be applied. I am satisfied that the proposal positively assists in securing National Planning Framework objectives to focus development into key urban centres, fulfilling targets related to brownfield, infill development and to deliver compact growth in our urban centres.*

Figure 3.3 Elevation of development approved under Reg. Ref. ABP-309658-21

Figure 3.4 Site layout plan of development approved under Reg. Ref. ABP-309658-21

Figure 3.5 Photomontage of development approved under Reg. Ref. ABP-309658-21

Lands immediately east of the Assumption National School, Long Mile Road, Walkinstown, Dublin 12 (Dublin City Council)

ABP Ref. ABP-304686-19

Permission was granted by An Bord Pleanala on 18th September 2019 for a Strategic Housing Development at Lands immediately east of the Assumption National School, Long Mile Road, Walkinstown, Dublin 12. In summary, the development involved construction of 153 no. residential units (comprising of 15 no. Duplex/Maisonettes and 138 no. apartments) and associated site works. Of particular note, the development will have 129 no. car parking spaces, 5 no. motorbike parking spaces 198 no. secure bike parking spaces, the majority of which will be at undercroft level, with 2 no. disabled car parking spaces and 4 no. car parking spaces at grade to the front of the development along with some visitor cycle parking spaces.

Figure 3.6 Ground floor plan approved under ABP Ref. ABP-304686-19.

Figure 3.7 Landscape plan, including proposals for first-floor courtyard, approved under ABP Ref. ABP-304686-19

Carraiglea Industrial Estate, Muirfield Drive, Naas Road, Dublin 12 (Dublin City Council)

Reg. Ref. 3940/17 Permission was granted by Dublin City Council for amendments to a previously permitted development of 306 units, which comprises of a development of 5 to 7 storeys in height. The description of development was as follows: amendments to previously permitted residential development, Reg. Ref. 4244/15 and Reg. Ref. 2438/17. The proposed amendments comprise of: (i) the provision of an additional floor on permitted Block AC (Reg. Ref. 2438/17) increasing the height of the block from 6 no. storeys with a 7 no. storey pop up corner element to 7 no. storeys on the north-west elevation (ii) the provision of 2 no. additional floors on Block D and L, increasing the height of the Blocks from 5 no. storeys to 7 no. storeys. (iii) the reconfiguration of permitted basement increasing the car parking provision from 316 no. to 346 no. car

parking spaces and 545 no. to 552 no. cycle parking spaces, (iv) Revised hard and soft landscaping masterplan, (v) provision of new balconies to serve each of the proposed 32 no. units; together with all necessary site development work to facilitate the proposed development. The proposed amendments will provide for 12 no. additional units in Block D (8 no. 2 bed, 4 no. 3 bed units), 12 no. additional units in Block L (10 no. 2 bed, 2 no. 3 bed units) and 8 no. additional units in Block AC (1 no. 1 bed, 6 no. 2 bed, 1 no. 3 bed units), increasing the total provision within the development from 306 to 338 no. units comprising of (55 no. 1 bed, 222 no. 2 bed, 61 no. 3 bed units).

Figure 3.8 Site layout plan as approved under Reg. Ref. 3940/17

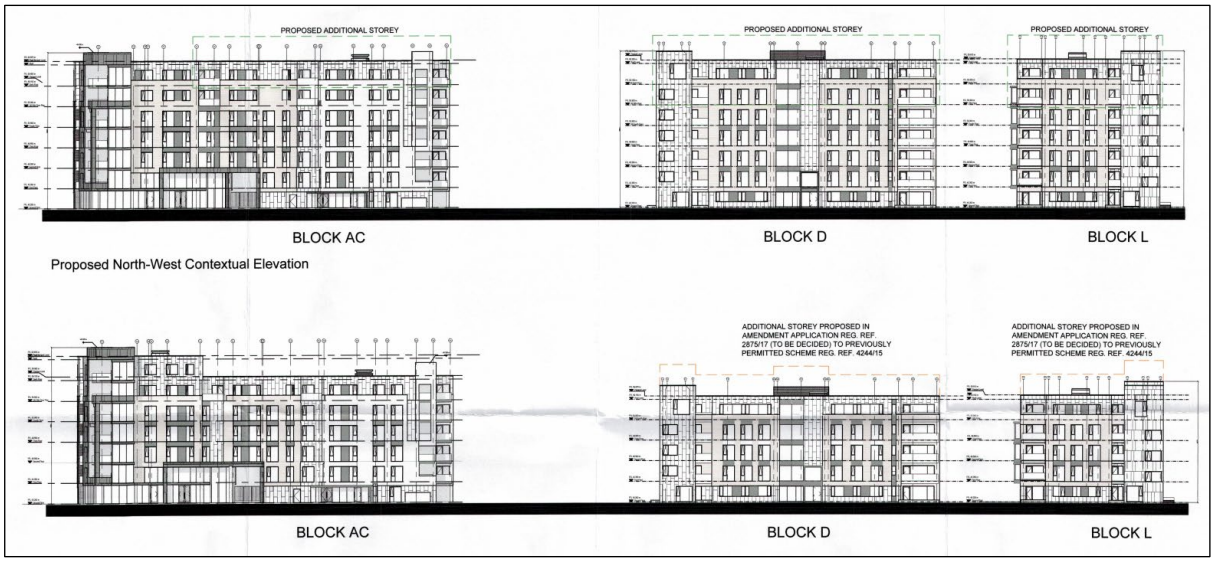

Figure 3.9 Elevations as approved under Reg. Ref. 3940/17

Lands at the Former Concorde Industrial Estate, Naas Road, Walkinstown, Dublin 12 (Dublin City Council)

ABP Ref. ABP- 304383-19 Permission was granted by An Bord Pleanála on 15th August 2019 for a for a mixed-use development comprising of a Build to Rent Residential Development and commercial units including the construction of 492 residential units (104 no. studios, 136 no. 1 bed units and 252 no. 2 bed units), ranging in height from 4 no. storeys (12 m) to 8 no. storeys (24.1 m) over basement level.

Figure 3.10 Front elevation of development granted under ABP Ref. ABP- 304383-19.

Figure 3.11 Site layout plan of development granted under ABP Ref. ABP- 304383-19.

Figure 3.12 CGI of development granted under ABP Ref. ABP- 304383-19.

DCC Ref. 4684/19

Permission was granted by Dublin City Council on 14th February 2020 for the development will consist of demolition of existing single storey house and replace with 3 no. terraced houses with 2 no. rooflights to the front. The first two houses are 2 storeys with attic conversions and 3 no. bedrooms. The end of terrace house is 2 storeys with 2 no. bedrooms. The existing driveway opening will be widened from 2.76 metres to 3.96 metres with 3 no. parking bays, electric car charging point and timber frame bicycle shed with solar panels on roof. New perimeter walls, permeable paving and associated site works.

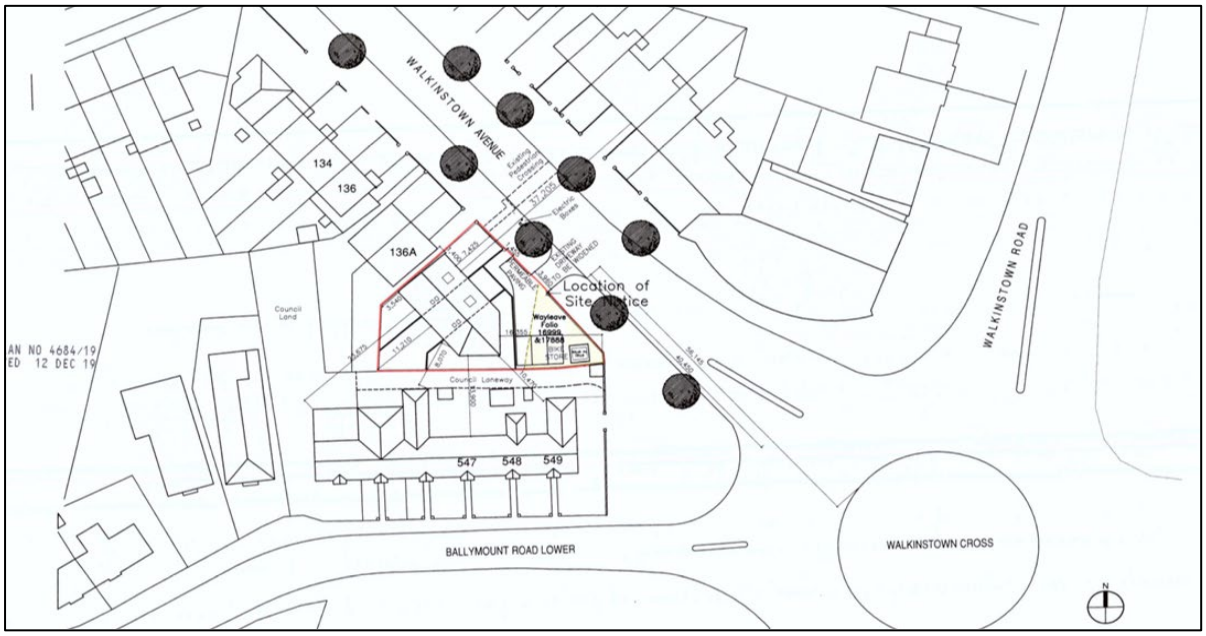

Figure 3.13 Site Layout of development approved under Ref. 4684/19

SDCC Ref. SD17A/0391

Permission was granted by South Dublin County Council on 30th May 2018 at 22 Greenhills Road, Walkinstown, Dublin 12 for the demolition of the existing house, motor sales office and sheds, the change of use from existing car sales outlet with residential to a mixed retail and residential use and the construction of development as follows: Block A - five 3 storey, 3 bed terrace houses and Block B - 1 three storey mixed use building comprising of 2 retail units, two 2 bed apartments and two 1 bed apartments. The development also includes all associated site development and infrastructural works, surface car parking and landscaping, all on a site area of 0.16ha.

Figure 3.14 3D Images of Permitted Development SD17A/0391

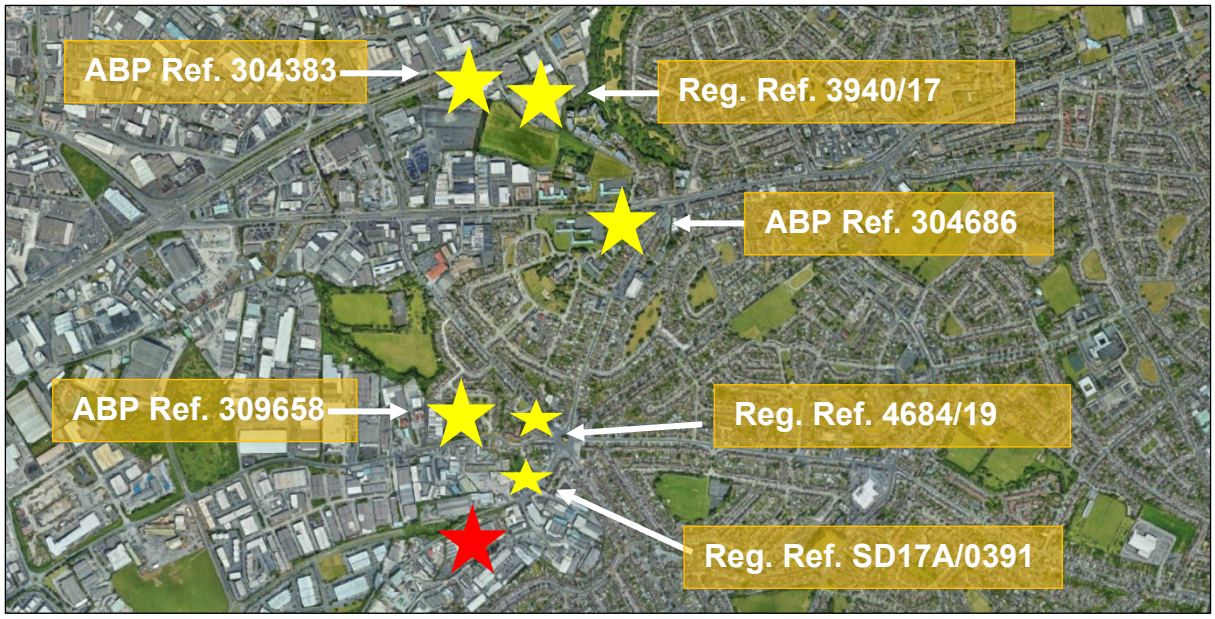

Figure 3.15 Locations of SHD applications (yellow stars) in relation to the subject site (red star) in Dublin 12.

3.4 Conclusion

The proposed development is consistent with national, regional and local planning polies for the following reasons:

- The subject proposal involves the redevelopment of a large serviced and well-connected underutilised brownfield site in an existing built-up area which is identified for 'regeneration' in the South Dublin County Development Plan 2016-2022 and the Draft South Dublin County Development Plan 2022-2028.
- The 'sustainable transport' focus adopted in the context of the proposed development's design is consistent with national planning policy which encourages reduced car parking provision in central areas such as this which are well served by public transport.
- The proposed development has been designed having regard to the South Dublin County Development Plan 2016-2022 and incorporates a variety of new open spaces; improving legibility throughout the area through the introduction of a new block structure and the creation of new streets and introducing a series of buildings, which adopt varying heights and feature a rich palette of materials and finishes, and create visual interest.
- The proposed development is consistent with the requirements outlined for apartments in the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (2020), and provides numerous amenity spaces (both internal and external) across the site to serve residents, consistent with the requirements specific to Build-to-Rent developments.
- The proposed development will result in a highly accessible and sustainable modern high-quality urban residential neighbourhood, as sought by the South Dublin County Development Plan 2016-2022, due to the design/quality of the development proposed as well as the employment opportunities existing in the surrounding area and the sites proximity to multiple public transport services and the nearby Tallaght Town Centre.

Further to the above, the proposed development has had regard to the emerging character of the Greenhill Industrial Estate and Ballymount Industrial Estate and will sit comfortably in this emerging area. As previously mentioned, a detailed assessment of the proposed development against the relevant policies and objectives is provided in the Statement of Consistency and Planning Report, prepared by Hughes Planning and Development Consultants, which accompanies the planning application.

4.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, Ms. Anne McElligott, Associate Director, and Mr. Christopher Browne, Executive Planner, with Hughes Planning and Development Consultants.

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

Ms. Anne McElligott of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2011, having previously completed a Bachelor of Arts Degree in Geography and Irish from University College Cork in 2011. Anne has 10 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Anne is currently Associate Director in the Practice of Hughes Planning and Development Consultants.

Mr. Christopher Browne of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Urban Design and Planning in 2018, having previously completed a Bachelor of Arts Degree in Geography and History from Dublin City University in 2012. Christopher has 3 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Christopher is currently an Executive Planner in the Practice of Hughes Planning and Development Consultants.

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

> *'a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population*
>
> *The Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft (2017) advise that "in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc.".'*

This section of the EIAR assesses the impact of the proposed development on the human environment in the general area of the subject site the Former Chadwick's Site, Greenhills Road, Walkinstown, Dublin 12, in terms of population levels; employment and economic activity; land use and settlement patterns; housing; community infrastructure and social facilities; health and safety; and risk of major accidents and disasters.

This chapter addresses potential impacts of the proposed mixed-use development at the Former Chadwick's Site, Greenhills Road, Walkinstown, Dublin 12, on population and human health. Potential impacts of this proposal on population and human health arising from traffic and transportation, air

quality and climate, noise and vibration, visual amenity and material assets: utilities and the risk of major accidents and/or disasters are dealt with in the specific chapters in this EIAR dedicated to those topics.

4.2 Methodology

At the time of writing there is no guidance from the EU Commission on the EIA Directive to indicate how the new term 'Human Health' should be addressed. Therefore, this chapter of the EIAR document has been prepared with reference to recent national publications which provide guidance on the 2014 EIA Directive including Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 2017 and Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018)

To establish the existing receiving environment / baseline, several site visits were undertaken to appraise the location and likely and significant potential impact upon human receptors. Further to this, a desk top study of a number of relevant policy documents and data sources was carried out, including: Central Statistics Office Census data; the ESRI Quarterly Economic Commentary; the Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly, the South Dublin County Development Plan 2016-2022 and the Draft South Dublin County Development Plan 2022-2028.

This chapter of the EIAR document focuses primarily on the potential impacts on Population, which includes Human Beings as required under the Schedule 6 of the Regulations, and Human Health in relation to health effects/issues and environmental hazards arising from the other environmental factors. Where there are identified associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document, these are referred to. The reader is directed to the relevant environmental chapter of this EIAR document for a more detailed assessment.

4.3 Population

4.3.1 Receiving Environment (Baseline Scenario)

The subject site is located in Greenhill Industrial Estate, to the south of Ballymount Industrial Estate, therefore, the population to the north, west and east are minimal due to the presence of the Ballymount Industrial Estate which mostly comprise large industrial or retail units. Lands immediately to the south contain residential dwellings.

The subject site is located within the Electoral Division of Terenure St. James which, according to the Census had a population of 2,568 no. persons in 2016. This represents a population percentage change of 2.1% or an actual population decrease of 55 no. people from the 2011 Census figures. The subject site is also located south of the Tallaght Kinamanagh ED which had a total population of 4,386 persons in 2016 and 4,457 persons in 2011 – a decrease of 66 persons.

From the census figures, it can be gathered that the population in the vicinity of the proposed development has remained similar over recent intercensal periods. Within the surrounding area, the population growth levels have been very disparate, however, Table 4.1 shows the population growth within the Electoral Division (EDs) for Terenure St. James, the 2km catchment area surrounding the site and Ireland as a whole. The population levels of the area have remained relatively similar. This can be attributed to the restrictions in available land for development due to the established suburbs of Kilnamnagh, Kingswood, Perrystown and Templeogue as well as the Greenhills and Ballymount Industrial Estates.

Figure 4.1 Location of subject site

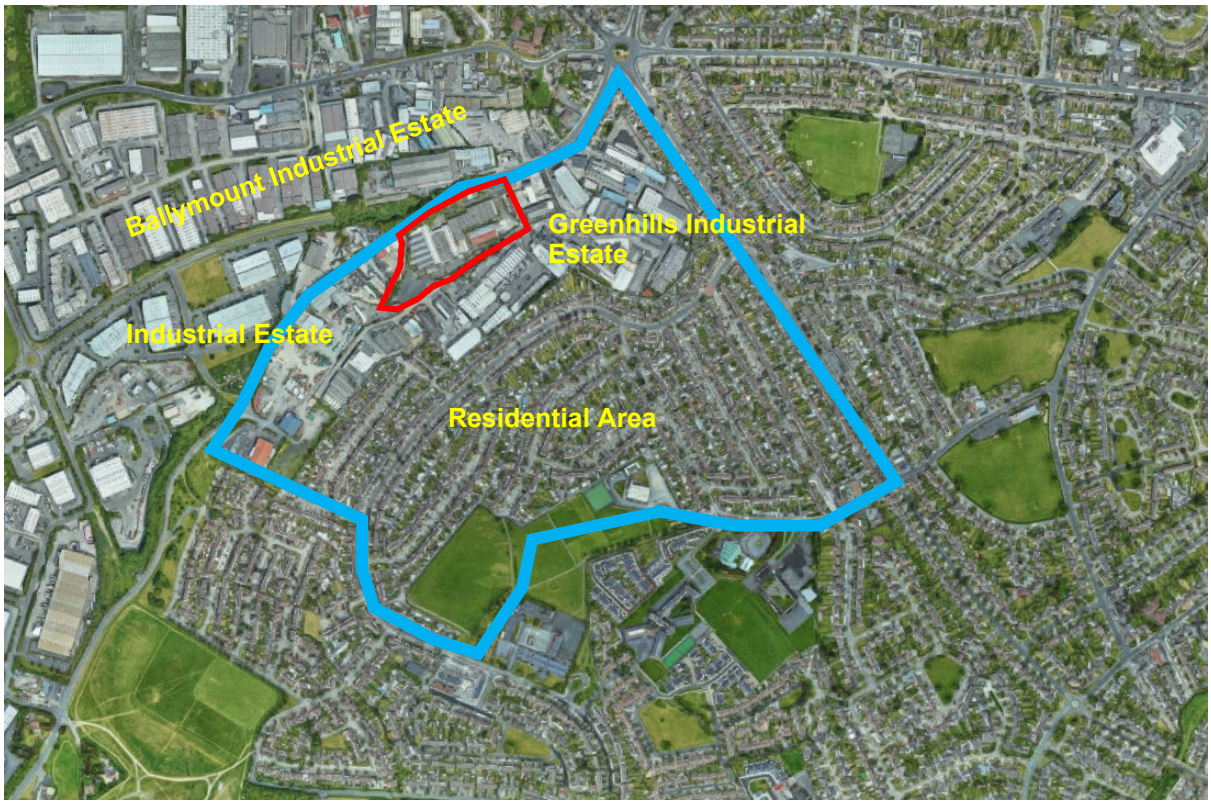

Figure 4.2 Location of subject site in context of the Electoral Division of Terenure St. James (outlined in blue)

Figure 4.3 Location of subject site (orange star) in the context of the Electoral Division of Terenure St. James (blue outline) with Electoral Divisions within 2km of the subject site outlined in red.

Settlement/Province	2006	2011	2016	Percentage Change		
				06-11	11-16	06-16
Ireland - State	4,239,848	4,588,252	4,761,865	8.2	3.8	12.3
South Dublin County	246,935	265,205	278,767	7.4	5.1	12.9
Walkinstown/Greenhills	47,308	46,110	46,730	-2.6	1.3	-1.2
Terenure St. James	2,822	2,623	2,568	-7	-2.1	-9

Table 4.1 Population Trends 2006-2016

The above table identifies the overall population decline up to 2016 since 2006 (-1.2%) in the settlements of Walkinstown/Greenhills, with a minor population increase since 2011 (1.3%) especially in comparison to Ireland as a whole in recent years. The CSO data outlines that Ireland has seen a 12.3% increase in population from 2006 to 2016, whilst during the same period, the area surrounding the subject site has experienced a decline of -1.2%. The electoral division of Terenure St. James decreased by 9% in the same time period. The population of the area is expected to grow in the coming years with the recent announcement of the City Edge project, a collaborate regeneration project between Dublin City Council and South Dublin Council. The project will see the development of c. 700 hectares with existing industrial estates being redeveloped for mixed-use developments.

Approximately 15.8% of the population of the Electoral Division of Terenure St. James is under 18 years of age, compared to 26.2% of the state population. Similarly, approximately 36.9% of the population of the Electoral Division of Terenure St. James population are over the age of 65 years in comparison to over 13.3% of the State population. The Dependency Ratio (i.e. those not in the workforce – aged 0-18 and over 65) can therefore be said to be approximately 52.7% and is thus higher than that of the State, the figure for which is 39.5%.

Age Cohort	Population in each Age Cohort - 2016		
	State	South Dublin County	Electoral Division of Terenure St. James

All Ages	4,761,865	278,767	2,568
0-4	331,515	21,733	111
5-12	548,693	34,665	182
13-18	371,588	22,270	114
19-24	331,208	19,567	143
25-44	1,406,291	87,539	501
45-64	1,135,003	62,068	569
65-69	211,236	11,864	95
70+	426,331	19,061	853

Table 4.2 Population Profile 2016 in Electoral Division of Terenure St. James, South Dublin County & the State

4.3.2 Potential Impact of the Proposed Development

'Do Nothing' Scenario

Were the development to not proceed, the present industrial/commercial use of the subject site would remain vacant. This would be an underutilisation of the site from a sustainable planning and development perspective, particularly considering the location of the lands adjacent to high quality public transport, and within an area which is identified for regeneration. The subject site is zoned 'REGEN', the objective of which is:- *'to facilitate enterprise and/or residential-led regeneration*'. As such, a 'do nothing' scenario would mean that this objective of the Development Plan would not be met, at least in the short-to-medium term, and some 633 no. households would remain uncatered for.

Were the lands to remain undeveloped, the status of the environmental receptors described throughout this EIAR document would be likely to remain unchanged. The potential for any likely and significant adverse environmental impacts arising from both the construction and the operational phase of the proposed development would not arise.
In terms of likely evolution without implementation of the project as regards natural changes from the baseline scenario, it is considered there would be limited change from the baseline scenario in relation to population (human beings) and human health. However, similarly the potential for any likely and significant positive environmental impacts arising from both the construction and operational phases of the proposed development would not arise.

Failure to deliver the proposed residential units would result in existing housing need and demand remaining unmet. The new pedestrian and cycle links, childcare facility and public open spaces to be provided in the development and serving the wider area would also not be provided. The proposed development provide for the regeneration and re-use of existing and vacant buildings to provide a high quality of residential amenity.

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

Construction Phase

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

The construction phase will generate a greater number of people within the area on a temporary basis, as the construction will see construction workers and delivery drivers arriving and leaving the site at the start and end of each day. However, the implications of this are not considered to have significant effects to the surrounding community due to the location of the site near Ballymount Industrial Estate, separated from the nearest residential area by St. James Road to the south.

Operational Phase

The operational phase of the proposed development will have a direct impact on the population of the area and the subject lands. With a total of 633 no. residential units proposed to be built, the anticipated increase in population for the site can be expected to be c. 1,512 based on the average household size of 2.39 in the Terenure St. James electoral division. This is based on average household numbers for studio, one, two, and three-bedroom residential units. The impacts of an increase in the population within the site will be gradual during the completion of the development. The population of the development will therefore be significant and positive particularly in the context of current housing demand and taking account of the subject site's location in close proximity to public transport links such as the proposed bus connects routes and access to areas of employment

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

4.4 Employment and Economic Activity

4.4.1 Receiving Environment (Baseline Scenario)

The CSO's Quarterly Labour Force Survey provides information in relation to national employment levels, unemployment levels and current labour force participation rates. The CSO's quarterly Labour Force Survey (Q1 for 2020) indicated an annual increase of 2.2% (51,500), in employment at national level, bringing total employment to 2,353,500. This shows a steady increase from the previous years with a 3.7% in 2019 Q1, 2.9% in 2018 Q1 and 2.5% in 2017 Q2. The current number of persons in employment people is difficult to ascertain at this time due to the effects of Covid-19 on the economy.

Nationally, in the CSO's quarterly Labour Force Survey (Q1 for 2020) unemployment remained the same as the previous year at 114,400. The number of people currently unemployed is difficult to ascertain at this time due to the effects of Covid-19 on the economy, however, the Labour Force Survey (Q3 2021) shows that employment figures are improving with 232,866 unemployed people.

Nationally, of the 14 no. economic sectors that form the Irish economy, 10 no. have shown an increase in employment figures for Q3 2021. The largest of these was Professional, scientific and technical activities sector which increased by 24.26% since Q3 2019, followed by Financial, insurance and real estate activities (20.75%).

A wide range of businesses operate, and employment opportunities currently exist in the Ballymount Industrial Estate. It is expected that the variety of businesses operating, and the employment opportunities will improve further in the immediately surrounding area. Further to this, employment opportunities in the broader Dublin area are highly accessible from Walkinstown. It is proximate to a number of main arterial routes into Dublin City centre and the M50 motorway thereby providing access to a large extent of the Irish road network. It is also well serviced by public transport with multiple Red Line Luas stops featuring in the area offering a high frequency, high-capacity public transport service with direct links to Dublin City Centre, Dublin Docklands, Heuston Station, Citywest Campus and Tallaght Hospital. Multiple Dublin Bus Routes also serve the Walkinstown area.

4.4.2 Potential impact of the Proposed Development

'Do Nothing' Scenario

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

In a 'do nothing' scenario, the economic investment arising from a large scale construction project would not be availed of, and this strategically located, zoned site would remain vacant with established industrial/commercial land use. This would represent a lost opportunity in economic terms.

Construction Phase

The construction phase of the proposed development will provide a positive improvement to the to the economy and employment prospects within Ballymount and the surrounding area more broadly, particularly within the wider construction sector for a 36 month period (estimated construction period). The construction of a mixed-use development, including 633 no. apartments, will provide a substantial number of construction-related jobs for the duration of the development. Whilst it is difficult to place a total number on the employment for the proposed development, the extent of work and varying construction-related industries required for the residential development will provide a variety of employment phased throughout the development including up to 80 works during construction.

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

Whilst there will be some negative impacts felt to the wider community during the construction phase by way of noise, dust and traffic, this is unlikely to be significant. These issues and appropriate mitigation measures are addressed in Chapters 8, 9 and 10 of the EIAR and in the Construction & Demolition Waste Management Plan and Outline Construction Environmental Management Plan, both prepared by AWN Consulting, which accompany the application.

Operational Phase

The operational phase of the proposed development will result in the provision of 633 no. apartments in 4 no. 5-12 storey blocks, a 360sqm childcare facility, 1330sqm of commercial space and internal communal amenity space to serve residents of the development.

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

4.5 Land Use and Settlement Patterns

4.5.1 Receiving Environment (Baseline Scenario)

The subject site is a brownfield site that has been earmarked for regeneration. Located adjacent to the southern boundary of the Ballymount Industrial Estate, the site is located in an area that offers direct connections to Dublin City Centre and surrounding prominent centres. The lands are located within Greenhills Industrial estate with industrial uses immediately abutting the subject lands. Further to the south there are residential dwellings.

Similar developments have been granted permission in the surrounding area in recent years, paving the way for a high-density suburb with strong transport links to Dublin.

Whilst the subject site and immediately adjoining lands have predominantly operated as industrial land, present zoning (REGEN) reflects changing land use patterns for this area, south west of Walkinstown village. The zoning of the land reflects the opportunity for the area to increase the population and employment opportunities for the area, and become more than a suburb of Dublin City. As Figure 4.4 overleaf outlines, the subject site is zoned REGEN, the objective of which is to *'facilitate enterprise and/or residential led regeneration'*.

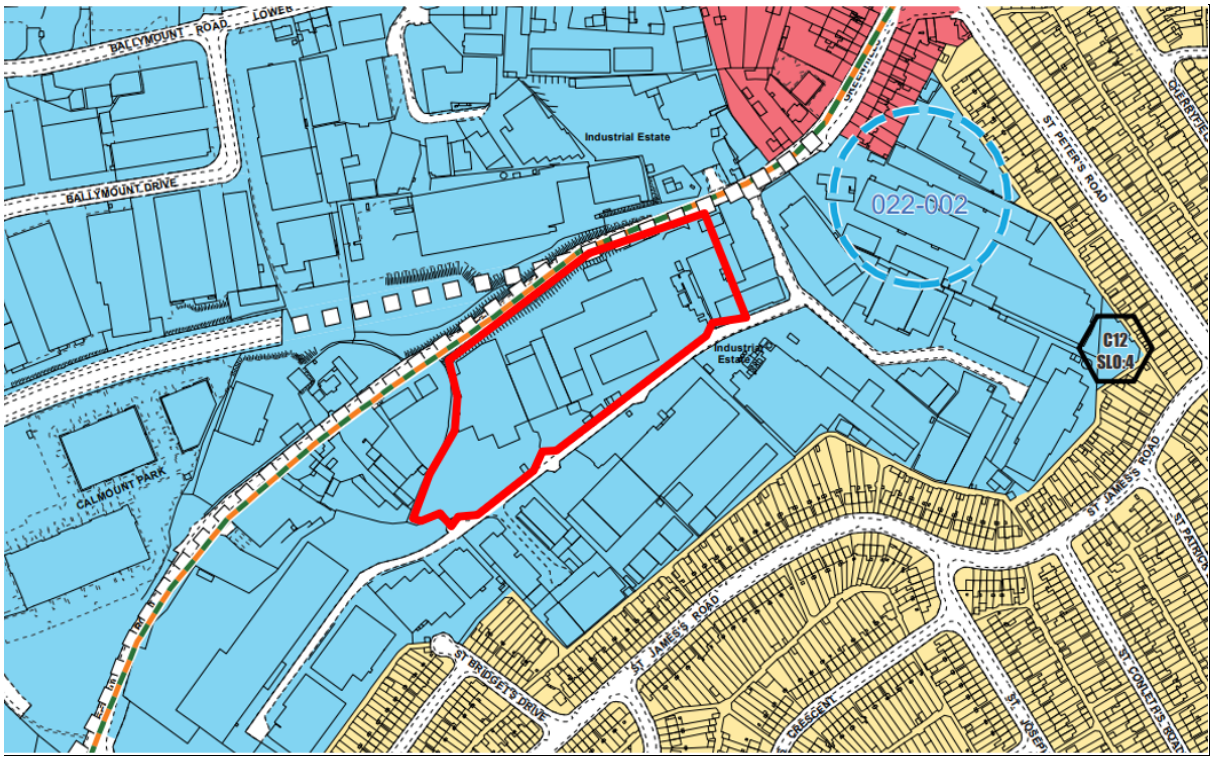

Figure 4.4 Extract from South Dublin County Development Plan 2016-2022 zoning Map Nos. 5 showing the application site (in red) within lands with Zoning Objective 'REGEN'

The proposed development is in keeping with the policies and objectives for South Dublin and is consistent with the identified land uses earmarked for the site, and appropriately responds to the existing settlement pattern and residential densities of nearby developments, including recently approved developments.

4.5.2 Potential impact of the Proposed Development

'Do Nothing' Scenario

Were the development not to proceed, the present industrial/commercial use of the subject site would remain and the site would remain vacant which represents an inefficient use of land resources. Vacant sites can have adverse effects on the character of an area by means of urban blight and decay. Vacant sites often attract anti-social behaviour which can have a negative effect on the local population. As discussed in Section 4.3.2 above, a do-nothing scenario would mean that the objectives of the Development Plan would not be met, and some 633 no. households would remain uncatered for.

Construction Phase

The construction phase of the development will see site works comprising primarily of infrastructural works in preparing the road and drainage infrastructure and works on the subject site to accommodate the residential apartments.

As the development is on a brownfield site within an industrial estate, the demolition works are limited to the existing warehouses and industrial units. Given the nature of work carried out at this location and the lack of residential units, it is submitted that the proposed development works will not cause any significant disturbance to the adjoining properties.

There will be an increase in population on the site during construction as a result of the proposed development. Given the location and size of the subject site, the rise of employment numbers on-site is not considered to negatively impact the surrounding community. There may be some increase in traffic

on Greenhills Road which immediately abuts the site, however, this is considered to be within reason, and will be managed in accordance with a Traffic Management Plan which will be prepared and agreed with South Dublin County Council prior to construction commencing. Construction works are likely to take place on a phased basis over 36 months, which may result in a marginally increased population in the wider area due to increased construction employment in the area, however, this would be temporary in nature and the impact would be imperceptible.

Operational Phase

The operational phase will see former industrial land transformed into residential land use which in keeping with planning policy, helps address the growing population and housing shortage across Ireland and Dublin in particular. In light of the existing housing crisis, it is considered that a high-density development at this location would result in a likely significant positive impact as it would realise the objective of compact urban growth through the efficient and effective use of zoned and services landbank to provide much needed housing for future populations.

The proposed development will feature a creche, commercial space, and a range of amenity facilities for residents. It is noted that the area is well served by primary and secondary schools.

The development will include public open space to be utilised by the surrounding community. The public open space will be fronted by the proposed commercial units as well proposed apartments, providing passive surveillance over the public space.

4.6 Housing

4.6.1 Receiving Environment (Baseline Scenario)

Housing completions across the country plummeted after the recession occurred in 2007/2008 with completions declining from almost 90,000 no. per year in 2007 to approximately 11,000 no. in 2014. In light of this, the Government published the 'Rebuilding Ireland - Action Plan for Housing and Homelessness' policy document to increase housing supply. This document has been subsequently replaced by the 'Housing for All - A new Housing Plan for Ireland' was published in September 2021 as part of the Irish Government's 'Our Shared Future' programme which, in turn, sets out the Government's mission to tackle the housing crisis. The objective of the plan is to ensure that everybody has *access to sustainable, good quality housing to purchase or rent at an affordable price, built to high standard, and located close to essential services, offering high quality of life.*

The plan seeks to increase new housing supply to an average of at least 33,000 new units per year with specific pathways outlined to achieve the four overarching objectives of the plan which are:

- *Supporting Homeownership and Increasing Affordability;*
- *Eradicating Homelessness, Increasing Social Housing Delivery and Supporting Social Inclusion;*
- *Increasing New Housing Supply; and*
- *Addressing Vacancy and Efficient Use of Existing Stock.*

According to the CSO Q4 New Dwelling Completions Report, 17,952 and 21,241 new dwellings were completed in 2018 and 2019, respectively. In Q4 2020 and 2021, the number rose to 20,526 and 20,433 new dwellings respectively. In period from 2019-2021, the number of dwellings constructed fell short of the target set in the 'Rebuilding Ireland - Action Plan for Housing and Homelessness' policy document which sets a target to construct 25,000 new homes annually to 2021.

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

4.6.2 Potential impact of the Proposed Development

‘Do Nothing’ Scenario

There are currently no persons residing on the subject lands. The subject site comprises a brownfield site with existing buildings on site comprising industrial and commercial units. Were the development not to proceed, this scenario would continue and the site would remain in its current use.

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

Construction Phase

As discussed in Section 4.3.2 previously, the construction phase of the proposed development will see no additional persons will be housed on site and therefore it is not anticipated to impact on the quantum of or access to housing. The amenity of the surrounding area will be affected during construction however this impact is temporary and not considered to be significant.

Operational Phase

The proposed development will result in the addition of 633 no. units to the supply of housing in the Walkinstown area. These will be a mixture of 1-bedroom, 2-bedroom and 3-bedroom apartments.

The addition of these proposed units will contribute to the housing unit target outlined in the South Dublin Development Plan 2016-2022.

4.7 Community Infrastructure and Social Facilities

4.7.1 Receiving Environment (Baseline Scenario)

This section of the EIAR assesses the impact of the proposed development on the local community and the social infrastructure and facilities in the vicinity of the subject site.

The subject site is located to the south of Ballymount Industrial Estate and within the Greenhills Industrial Estate. The spread of the population is contained to the north east, south, south-east, and south-west of the subject site. Currently, the population is sparse to the north-west of the subject site, an area comprised mostly of industrial units.

It is noted that the Walkinstown area offers a wide range of community infrastructure including education facilities; facilities associated with social service provision; health and medical centres; childcare facilities including private nurseries; sporting and recreation facilities; social/community facilities; and religious buildings.

4.7.2 Potential impact of the Proposed Development

‘Do Nothing’ Scenario

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

Construction Phase

The construction of the proposed development will not have any significant implications for the existing community infrastructure and social facilities. The immediate effects of the construction phase will be centred around the subject site. The construction phase will have some impacts on the surrounding environment through noise and increased traffic. There are however no foreseeable short-term construction impacts that will impact negatively on the community infrastructure or social facilities.

Operational Phase

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

The commercial units and childcare facility featuring within the proposed development, due to the proposed positioning and access arrangements, will serve both residents of the subject development and the surrounding area more broadly. This will improve community infrastructure and social facilities in this area.

The inclusion of landscaped public open space areas, new commercial activities and facilities will enable more residents and visitors to gain access to the high-quality open space, improving residents' ability to lead a healthy lifestyle, and will improve pedestrian safety. This will be a significant positive impact of existing and future residents.

It is therefore considered that the proposal will not have any adverse impacts on the existing community and social infrastructure.

4.8 Health and Safety

4.8.1 Receiving Environment (Baseline Scenario)

The subject site is a brownfield site located to the south of the Ballymount Industrial Estate and comprises the Former Chadwick's Site. The site forms part of the Greenhill Industrial Estate. As noted previously in this report, a very strong feature of the site includes a level difference that exists between the Greenhills Road interface and the subject site's southern boundary.

The surrounding environs consists of a mix of commercial, warehousing and industrial land uses. The Ballymount Industrial Estate, to the north, contains two Seveso sites which are located more than 1km from the site. It is considered that these sites are unlikely to result in a risk to human health and safety. This is illustrated in the Extracts from the South Dublin County Development Plan 2016-2022 zoning Map Nos. 5 included at Figure 4.5.

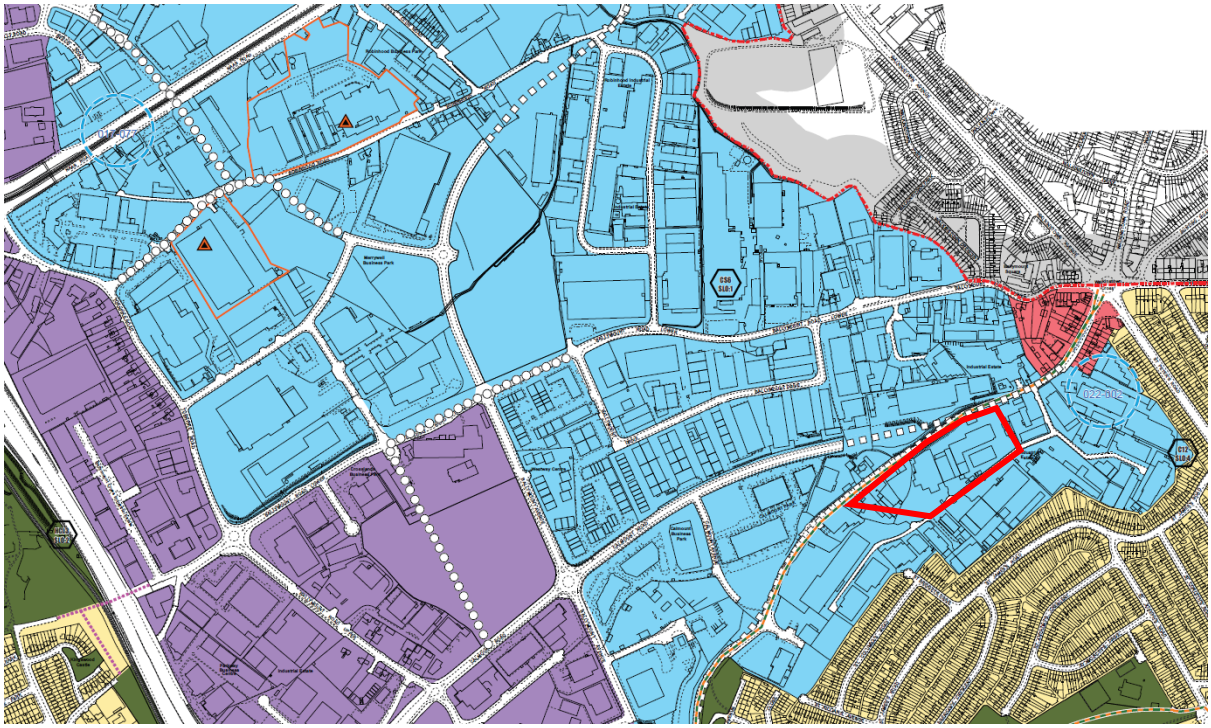

Figure 4.5 Extract from South Dublin County Development Plan 2016-2022 zoning Map Nos. 5 showing the application site (in red) and the location of Seveso sites

4.8.2 Potential impact of the Proposed Development

‘Do Nothing’ Scenario

The site is in a brownfield state and is used for purposes. The subject site does not contain any dwellings and therefore does not currently accommodate a resident population. Were the development not to proceed, this scenario would continue and the site would remain in its current use. Accordingly, there would be a neutral impact on health and safety in a do-nothing scenario.

Construction Phase

The construction of the proposed development will give rise to several short-term impacts which will include noise, dust and an increase in traffic flow arising from site workers, deliveries etc. The construction impacts are dealt with in the relevant chapters of this EIAR document. In general, the construction of the proposed development will be done so in accordance with the Construction Management Plan and Traffic Management Plan (both of which will be agreed with South Dublin County Council) which will ensure that the works do not pose an adverse risk to the health and safety of both the surrounding properties/community and the workers on-site. Particular care will be taken in relation to construction proximate to the existing petrol station being retained on site.

The construction methods employed, and the hours of construction proposed will be designed to minimise potential impacts. The development will also comply with all Health & Safety Regulations during the construction of the project.

The construction of the development may also generate localised dust during the demolition and construction phases. Mitigation measures will be implemented during construction to control dust and other air pollutants to ensure that the residual impact on Human health will be short-term, slight to moderate negative in nature.

The potential impact on human beings in relation to noise and vibration during the construction phase in the absence of mitigation is that high levels of noise and vibration could impact people in noise sensitive areas. Implementation of the mitigation measures set out in Chapter 8 and 9 of this EIAR as

well as measures within the Construction and Environmental Management Plan (CEMP) will ensure that the residual impact on Human health will be short-term, slight to moderate negative in nature.

The potential impacts on human beings in relation to the generation of waste during the demolition, construction and operational phases would occur from the incorrect management of waste. This could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific C&DWMP and OWMP, will ensure appropriate management of waste and avoid any negative impacts on the local population. Given the nature of the development when operational, the predicted residual effects during the operation phase are long-term, imperceptible and neutral.

There is a risk to Human Health should the ground water or the existing water supply become contaminated during the construction or operational stages, and the water is consumed. In order to mitigate these risks the measures outlined within the EIAR will be adopted. source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short-term, localised and imperceptible with respect to human health.

Given the above, it is considered that the construction impacts of the proposed development on health and safety will be short-term, slight and negative.

Operational Phase

The operational stage of the development is unlikely to precipitate any significant negative impacts in terms of health and safety. The design of the proposed development has been formulated to provide for a safe environment for future residents and visitors alike. The paths, roadways and public areas have all been designed in accordance with best practice and the applicable guidelines. Likewise, the proposed residential units accord with the relevant guidelines and will meet all relevant safety and building standards and regulations, ensuring a development which promotes a high standard of health and safety for all occupants and visitors.

The inclusion of multiple open space areas throughout the development will increase the availability of exercise and leisure activities. This will encourage residents and visitors to move around the site therefore giving a greater level of physical activity improving the physical health of the local people whilst also improving the levels of mental health and wellbeing.

The scheme is designed to encourage more sustainable forms of transport including walking, cycling and an increased use of public transport, as well as upgrades to the road, junction and streetscape proposed along Greenhills Road. Walking and cycling can help increase activity levels which again can help improve cardiovascular health, mental health and wellbeing. The increased level of sustainable journeys will help to reduce the level of car use in and around the area. Reduced car use is linked to improvements in air quality levels which is beneficial for respiratory health. The operation of the proposed development will therefore have a long term, moderate positive effect on residents and visitors.

The proposed development will not result in any significant impacts on human health and safety once completed and operational. The impacts on population and human health to future residents from the surrounding area has been assessed with mitigation measures proposed to reduce any impacts on human health as a result of noise, dust, air quality during the operation of the proposed development. The implementation of mitigation measures throughout the scheme ensures that the proposed development therefore is unlikely to result in negative impacts in relation to population and human health in this regard.

4.9 Risk of Major Accidents and Disasters

4.9.1 Receiving Environment (Baseline Scenario)

The 2018 EIA Guidelines state that an EIAR must include the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project. Regarding natural disasters, the site does not occur in an area prone to earthquakes or volcanic eruptions.

Annex IV of the Directive 2011/92/EU as amended by Directive 2014/52/EU refers to both a proposal's potential to cause accidents/disasters and to the vulnerability of the proposal to accidents/disasters. These risks can be from both man-made and natural disasters and there is a requirement to build resilience into projects and to invest in risk prevention. Regarding natural disasters, the site does not occur in an area prone to earthquakes or volcanic eruptions.

In respect of man-made accidents and disasters, the site does not occur within the consultation distance of any Tier 1 or Tier 2 SEVESO III site.

There is potential for risk of accidents to occur given the proximity of the subject lands to Walkinstown and such accidents could occur during construction and operational phases of the development.

The development is considered as a highly vulnerable development and is located in a Flood Zone C category. This flood zone in accordance with the "The Planning System and Flood Risk Management Guidelines for Planning Authorities, 2009" is considered to be of the lowest significance type flood zone, having a very remote chance and consequential outcome of flooding. The risk of flooding for the development is minimal and within the acceptable limits.
The identification and assessment of risks of accidents and/or disasters is provided in chapters 5, 7, 8, 9, 11 and 12 of this Report.

4.9.2 Potential impact of the Proposed Development

Do nothing

Were the development not to proceed, risk would be low to major accidents noting no works would be proposed. From a traffic accident, risk would also be low noting access to the site will remain to the south.

Construction Phase

The construction of the proposed development will be done so in accordance with a Construction Management Plan (based on the Outline Construction Environmental Management Plan, prepared by AWN Consulting) to manage the day to day proceedings and to ensure that works on site do not create an unsafe environment. The construction traffic entering and exiting the site will be managed appropriately through a Traffic Management Plan which will be agreed with South Dublin County Council prior to construction commencing.

Therefore, there is not expected to be any major accidents or disasters as a result of the construction of the proposed development.

This assessment did not identify significant risks to human health during the construction phase. The proposed construction traffic was found to have a minimal and insignificant impact in terms of traffic, air quality and noise.

Operational Phase

This assessment found that the risk of accidents arising from the scheme was low, and the proposed works will significantly improve pedestrian and cyclist accessibility and safety within the subject lands. In this way, no significant impacts on human health were identified.

4.10 Cumulative Impacts

The cumulative effects of the development on the surrounding population and human health have taken into consideration in conjunction with other projects in the surrounding environment. A review of the South Dublin County Council planning register has indicated that there are a number of small scale alterations/extensions permitted in the area and that there are no major or substantial developments permitted abutting the subject lands. Large scale developments have been identified in Section 1.9 of Chapter 1 of the EIAR.

The only the cumulative impact of the proposed development will be a further increase in the population of the wider area. This impact is likely to be long term and is considered to be positive, having regard to the zoning objective for the subject ands, and their strategic location in close proximity to high quality, high frequency public transport, and the high level of demand for new housing in Dublin.

With regard to human health, the cumulative impact of the proposed development in conjunction with other nearby developments will provide for the introduction of high quality new neighbourhoods in the area with a high level of accessibility and amenity. The overall cumulative impact of the proposed development will therefore be long term and positive with regard to human health, as residents will benefit from a high quality, visually attractive living environment, with ample opportunity for active and passive recreation and strong links as well as access to commercial/retail facilities within the development.

The development of the site will likely have a positive cumulative impact on Greenhills in helping the area contribute to the projected growth for South Dublin. The economy will benefit both during the construction phase and operation phase increasing the economic activity within the town.

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

4.11 Mitigation Measures

Construction Phase

All standard health and safety procedures will be implemented at every stage of this project. The Main Contractor for the project is responsible for the method in which the demolition and construction works are carried out and to ensure that best practices and all legal obligations including Local Authority requirements and Health and Safety legislation are complied with. Further to this, Building Regulations will also be adhered to during the construction phase. The health and safety procedures are set out in the Construction Management Plan which will provide a mechanism for the implementation of the construction mitigation measures set out within the EIAR.

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

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

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

Operational Phase

The proposed development has been designed to avoid negative impacts on population and human health through the inclusion of landscaping, the provision of a creche, provision of energy efficient measures and through high quality finishes and materials. The mitigation measures relating to the operation phase of the development concerning traffic, transport, noise, vibration, water, air and dust quality and landscaping as set out in this EIAR (and listed in Chapter 16.0) will be carried out in full to minimise impacts on residents of the development, adjacent residents and human health.

4.12 Residual Impacts

It is anticipated that the proposed development will realise significant positive overall economic and social benefits for the local community and the wider Greenhills/Walkinstown area.

Strict adherence to the mitigation measures recommended in this EIAR will ensure that there will be no negative residual impacts or effects on Population and Human Health from the construction and operation of the proposed scheme. Indeed, the delivery of much needed housing will realise a likely significant positive effect for the local area.

4.13 Monitoring

Measures to avoid negative impacts on Population and Human Health are largely integrated into the design and layout of the proposed development. Compliance with the design and layout will be a condition of any permitted development. There is no other ongoing monitoring required in relation to the effect of the proposed development on the population and human health.

4.14 References

- Central Statistics Office www.cso.ie.
- Central Statistics Office (2016) - Census 2016.
- Central Statistics Office (2018) - CSO Statbank.
- DoHPLG (2017) Rebuilding Ireland - Action Plan for Housing and Homelessness.
- South Dublin County Development Plan 2016-2022
- ESRI Quarterly Economic Commentary (June 2019).
- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, Draft August 2017).

5.0. BIODIVERSITY

5.1. Introduction

Enviroguide Consulting was commissioned by Steeplefield Ltd. to prepare a Biodiversity Chapter for a Proposed Residential Development at the Former Chadwicks Site, Greenhills Road, Walkinstown, Dublin 12.

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the baseline biodiversity of the Site of the Proposed Development and surrounding environs, with emphasis on habitats, flora and fauna, and details the methodology of assessment used in each case. Likely significant impacts arising from the Proposed Development are identified and an assessment of the predicted effects are outlined. The assessment considers both habitats and species, particularly those protected by national and international legislation, or considered to be of particular conservation importance. Where required, mitigation measures to avoid, minimise and, if possible, offset any significant negative effects are proposed. A description of residual effect that will remain following the implementation of mitigation is also outlined in this Chapter.

5.1.1. Quality Assurance and Competence

Synergy Environmental Ltd., T/A Enviroguide Consulting, is wholly Irish Owned multi-disciplinary consultancy specialising in the areas of the Environment, Waste Management and Planning. All of our consultants carry scientific or engineering qualifications and have a wealth of experience working within the Environmental Consultancy sectors, having undergone extensive training and continued professional development.

Enviroguide Consulting as a company remains fully briefed in European and Irish environmental policy and legislation. Enviroguide staff members are highly qualified in their field. Professional memberships include the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association and Chartered Institute of Ecology and Environmental Management (CIEEM).

All surveying and reporting have been carried out by qualified and experienced ecologists and environmental consultants. Aisling Walsh, Professional Bat Ecologist with Ash Ecology and Environmental Ltd. undertook the on-site bat surveys. Eric Dempsey, Ornithologist with Enviroguide Consulting, undertook the breeding bird surveys. Siobhán Atkinson, Senior Ecologist with Enviroguide Consulting prepared this chapter and undertook the habitat surveys and desktop research.

Eric Dempsey is an Environmental Consultant and Ornithologist who has worked on a wide range of conservation, research and ecological monitoring projects across Ireland. Eric is the author of the best-selling books, The Complete Field Guide to Ireland's Birds and Finding Birds in Ireland and is experienced in coordinating and undertaking surveys along with being highly proficient in report writing and data management. Eric is very experienced with all survey methodology and has inputted in various Environmental Impact Assessment Reports, Environmental Assessments and Appropriate Assessments. Eric is currently part of the team of field ornithologists undertaking the long-term Dublin Bay Wetlands Survey.

Aisling Walsh is a Professional Ecologist and director of Ash Ecology Environmental Ltd. Aisling has a wealth of academic qualification having studied a MSc in Biodiversity and Conservation (TCD), A BSc (Hons) Zoology (NUIG), a Diploma in Applied Aquatic Sciences (GMIT), a Post Graduate Diploma in Statistics (TCD), and a Certificate in Environmental Noise (Institute of Acoustics); while also holding a full membership of the Chartered Institute of Ecology and Environmental Management (CIEEM). Aisling has written numerous Ecological Impact Assessments (EcIA), Screening for Appropriate Assessment Stage I and Stage II Natura Impact Statement, Environmental Impact Assessments/Statements, Badger Surveys, Bat Surveys, Habitat Surveys. She has also provided input and reviewed Ecological and Environmental assessments for several EIS and EIA Reports and conducted numerous noise surveys for EPA licensed facilities. AEE is listed as a Registered Practice by the CIEEM.

Siobhán Atkinson has a B.Sc. (Hons) in Environmental Biology and a Ph.D. in Freshwater Biology from University College Dublin, and extensive experience in desktop research, literature review and reporting, as well as practical field and laboratory experience including environmental DNA analysis, freshwater macroinvertebrate sampling and identification, fish sampling and processing and habitat surveying. Siobhán has prepared Ecological Impact Assessments (EcIA), Stage I and Stage II

Appropriate Assessment Reports, Habitat Surveys and Invasive Species Surveys and input and reviewed Ecological and Environmental assessments for several EIA Reports.

5.2. Research Methodology

This section details the steps and methodology employed to undertake an Ecological Impact Assessment of the Proposed Development.

5.2.1. Relevant Legislation

5.2.1.1. National Legislation

Wildlife Act 1976 and amendments

The Wildlife Act 1976 was enacted to provide protection to birds, animals and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. With regards to the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur without an appropriate licence from the National Parks and Wildlife Service (NPWS). This list includes all birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1st of March to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species, which were excluded from the 1976 Act.

EU Habitats Directive 1992 and EC (Birds and Natural Habitats) Regulations 2011

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transported into Irish law through the EC (Birds and Natural Habitats) Regulations 2011 (as amended).

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitats Directive, any person who, in regards to the listed species, "Deliberately captures or kills any specimen of these species in the wild, deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, deliberately takes or destroys eggs from the wild or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence."

Flora (Protection) Order, 2015

The Flora (Protection) Order (S.I. No. 356/2015) affords protection to several species of plant in Ireland, including 68 vascular plants, 40 mosses, 25 liverworts, 1 stonewort and 1 lichen. This Act makes it illegal for anyone to uproot, cut or damage any of the listed plant species, and it also forbids anyone from altering, interfering, or damaging their habitats. This protection is not confined to within designated conservation sites and applies wherever the plants are found.

Invasive Species Legislation

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended). In addition, soils and other materials containing such invasive plant material are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Failure to comply with the legal requirements set down in this legislation can result in either civil or criminal prosecution, or both, with very severe penalties accruing. Convicted parties under the Act can be fined up to €500,000.00, jailed for up to 3 years, or both.

Extracts from the relevant sections of the regulations are reproduced below.

"49(2) Save in accordance with a licence granted [by the Department of Arts, Heritage and the Gaeltacht], any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in anyplace [a restricted non-native plant], shall be guilty of an offence.

49(3) … it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

50(1) Save in accordance with a licence, a person shall be guilty of an offence if he or she […] offers or exposes for sale, transportation, distribution, introduction, or release—

(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,

(b) anything from which an animal or plant referred to in subparagraph (a) can be reproduced or propagated, or

(c) a vector material listed in the Third Schedule, in any place in the State specified in the third column of the Third Schedule in relation to such an animal, plant or vector material."

5.2.1.2. International Legislation

EU Birds Directive

The Birds Directive constitutes a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and for wetlands which attract large numbers of birds. There are 25 Annex I species that regularly occur in Ireland and a total of 153 Special Protection Areas have been designated.

EU Habitats Directive

The Habitats Directive aims to protect some 220 habitats and approximately 1000 species throughout Europe. The habitats and species are listed in the Directives annexes, where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive requires the designation of Special Areas of Conservation for areas of habitat deemed of European interest. The SACs together with the SPAs from the Birds Directive form a network of protected sites called Natura 2000.

Water Framework Directive

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, so the second (current) cycle runs from 2016 – 2021.The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least 'good' ecological status, through River Basin Management Plans (RBMP), by 2027.

Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced to give protection to migratory species across borders in Europe.

Ramsar Convention

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,994 Ha.

5.2.1.3. South Dublin County Council Development Plan

Policies and objectives within the South Dublin County Council Development Plan 2016-2022 that are relevant to the Proposed Development are outlined below:

G2 Objective 5: To integrate Green Infrastructure as an essential component of all new developments

G2 Objective 6: To protect and enhance the County's hedgerow network, in particular hedgerows that form townland, parish and barony boundaries, and increase hedgerow coverage using locally native species.

G2 Objective 11: To incorporate appropriate elements of Green Infrastructure e.g. new tree planting, grass verges, planters etc. into existing areas of hard infrastructure wherever possible, thereby integrating these areas of existing urban environment into the overall Green Infrastructure network.

G2 Objective 12: To seek to control and manage non-native invasive species and to develop strategies with relevant stakeholders to assist in the control of these species throughout the County.

G4 Objective 4: To minimise the environmental impact of external lighting at sensitive locations within the Green Infrastructure network to achieve a sustainable balance between the recreational needs of an area, the safety of walking and cycling routes and the protection of light sensitive species such as bats.

G5 Objective 1: To promote and support the development of Sustainable Urban Drainage Systems (SUDS) at a local, district and county level and to maximise the amenity and biodiversity value of these systems.

G5 Objective 2: To promote the provision of Green Roofs and/or Living Walls in developments where expansive roofs are proposed such as industrial, retail and civic developments.

G6 Objective 1: To protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process.

G6 Objective 2: To require new development to provide links into the wider Green Infrastructure network, in particular where similar features exist on adjoining sites.

G6 Objective 3: To require multifunctional open space provision within all new developments that includes provision for ecology and sustainable water management.

5.2.2. Scope of Assessment

The specific objectives of the study were to:

- Undertake baseline ecological surveys and evaluate the nature conservation importance of the Site of the Proposed Development;
- Identify and assess the direct, indirect, and cumulative ecological implications or impacts of the Proposed Development during its lifetime;
- Where possible, propose mitigation measures to remove or reduce those impacts at the appropriate stage of development;
- Achieve the best possible biodiversity outcome from a change in current land use.

Zone of Influence

The ‘zone of influence’ (ZOI) for a project is the area over which ecological features may be affected by changes as a result of the proposed development and associated activities. This is likely to extend beyond the development site, for example where there are ecological or hydrological links beyond the site boundaries (CIEEM, 2018). The ZOI will vary with different ecological features, depending on their sensitivities to an environmental change. Given the urban context of the proposed development, the ZOI is regarded to be relatively limited and within the red line boundary of the Site for most ecological receptors (with the exception of designated sites, e.g. European sites, Ramsar sites, Natural Heritage Areas and proposed Natural Heritage Areas – see below).

To determine the ZOI of the Proposed Development for *designated sites*, reference was made to the OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management’ (OPR, 2021), a practice note produced by the Office of the Planning Regulator, Dublin. This note was published to provide guidance on screening for appropriate assessment (AA) during the planning process, and although it focuses on the approach a planning authority should take in screening for AA, the methodology is also readily applied in the preparation of Biodiversity Chapters such as this to identify relevant designated sites potentially linked to the proposed development.

In addition, the guidance document published by the Department of Housing, Planning and Local Government (then DEHLG) ‘Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities’ (2009) was considered, which recommends an arbitrary distance of 15km as the precautionary ZOI for a plan or project being assessed for likely significant effects on European Sites, stating however that this should be evaluated on a case-by-case basis.

As such, the 15km ZOI is used in this report as an initial starting point for collating *designated sites* for this Biodiversity Chapter.

The methodology used to identify relevant designated sites comprised the following:

- Use of up-to-date GIS spatial datasets for designated sites and water catchments – downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) to identify designated sites which could potentially be affected by the Proposed Development;
- The catchment data were used to establish or discount potential hydrological connectivity between the project boundary and any designated sites.
- All designated sites within the ZOI (within 15km of the proposed development site) were identified and are shown in Figure 5-2 and Figure 5-3.
- The potential for connectivity with designated sites at distances greater than 15km from the Proposed Development was also considered in this initial assessment. In this case, there is no potential connectivity between the Proposed Development Site and designated sites located at a distance greater than 15km based on the Source-Pathway-Receptor model.
- Table 5.5 provides details of all relevant designated sites as identified in the preceding steps. The potential for pathways between designated sites and the Proposed Development Site was assessed on a case-by-case basis using the Source-Pathway-Receptor framework as per the OPR Practice Note PN01 (March 2021). Pathways considered included:
    a. Direct pathways (e.g. proximity (i.e. location within the designated site), water bodies, air (for both air emissions and noise impacts)).
    b. Indirect pathways (e.g. disruption to migratory paths, 'Sightlines' where noisy or intrusive activities may result in disturbance to shy species

5.2.3. Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's natural environment. The desktop study relied on the following sources:

- Information on species records[1] and distributions, obtained from the National Biodiversity Data Centre (NBDC) at www.*maps.biodiversityireland.ie* ;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at www.*gis.epa.ie* ;
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at *www.gsi.ie* ;
- Information on the network of designated conservation sites, boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at *www.npws.ie* ;
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland;
- Information on the existence of permitted developments, or developments awaiting decision, in the vicinity of the Proposed Development from the National Planning Application Database available at: https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de

[1] The Site of the Proposed Development lies within the 2km grid square O13A. Records from the last 20 years from available datasets are given in the relevant sections of this report.

- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team;
- The current conservation status of birds in Ireland taken from Gilbert et al. (2021).
- The pollinator friendly planting code provided by The All-Ireland Pollinator Plan (2015-2020) available at www.pollinators.ie
- Connecting with Nature – Draft Biodiversity Action Plan for South Dublin County 2020-2026
- South Dublin County Council Development Plan 2016-2022
- South Dublin County Council Draft Development Plan 2022-2028

5.2.4. Field Survey

5.2.4.1. Habitat Survey

A habitat survey was carried out at the Site on the 23rd April 2021. Habitats were categorised according to the Heritage Council's '*A Guide to Habitats in Ireland'* (Fossitt, 2000) to level 3. The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2010) published by the Heritage Council. Satellite imagery was used together with GPS to accurately enable field navigation. Habitat categories, characteristic plant species, invasive species and other ecological features were recorded.

5.2.4.2. Bat Survey

A bat survey of the Site of the Proposed Development was undertaken by Ash Ecology & Environmental Ltd (AEE) on the 21st April 2021, with a further bat habitat assessment carried out on the 1st of March 2022. A general bat activity survey was undertaken on the 21st April 2021 from 20.00 to 22.00 (sunset was 20.38) by walking the Site boundary and around all structures onsite. The weather was optimal for a bat survey with temperatures on the night 12°C in calm conditions. The equipment used for the bat activity surveys included a Elekon Bat Logger M detector. Visual observations were taken with the aid of a powerful L.E.D. torch (AP Pros-Series 220 Lumens High Performance Spotlight).

A bat potential assessment of the buildings onsite using a Seek Thermal Reveal Pro High-Resolution Thermal Imaging Camera along with a RIDGID 36848 Micro CA-150 Hand-Held Borescope for inspection of any crevices (where accessible) was carried out. This piece of equipment is fitted with a camera and allows visibility of confined spaces and narrow passages potentially used by hibernating/roosting bats. It allows spaces up to 3m from ground level to be inspected. The BCT guidelines were followed. All buildings were assessed externally and internally, where accessible, during April 2021 and a follow-up external and internal inspection was again carried out March 1st 2022.

Full details of these bat surveys can be found in the Bat Survey Report appended to this chapter.

5.2.4.3. Bird Survey

Enviroguide Senior Ornithologist Eric Dempsey completed a breeding bird survey of the Site on 21st April 2021.

5.2.4.4. Mammal Surveys

Mammal surveys of the Site were carried out in conjunction with the habitat survey. The Site was examined for tracks and signs of mammals. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area.

5.2.4.5. Invasive Flora Survey

The Site was assessed for the presence of invasive plant species during the habitat survey undertaken.

5.2.5. Assessment

This Chapter has been completed having regard to the Guidelines for Ecological Impact Assessment in the United Kingdom (UK) and Ireland, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018), together with the guidance outlined in the Environmental Protection Agency documents Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft, August 2017) and Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015).

The value of the ecological resources, i.e. the habitats and species present or potentially present, was determined using the ecological evaluation guidance given in the National Roads Authority's Ecological Assessment Guidelines (NRA, 2009a). This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of impacts that may ensue from a proposal. As per the NRA guidelines, impact assessment is only undertaken of key ecological receptors (KERs).

The assessment of the potential effect or impact of the Proposed Development on the identified key ecological receptors was carried out with regard to the criteria outlined in the draft EPA Guideline (EPA, 2017). These guidelines set out a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts.

5.2.5.1. Value of Ecological Resources

The ecological features identified within the Site of the Proposed Development and the wider area are evaluated based on their value. These values are detailed in Table 5.1 below and are taken from the Guidelines for Assessment of Ecological Impacts of National Road Schemes published by the NRA (2009b), now Transport Infrastructure Ireland (TII).

Table 5.1. Description of values for ecological resources based on geographic hierarchy of importance (NRA, 2009b).

Importance	Criteria
International Importance	- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. - Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). - Features essential to maintaining the coherence of the Natura 2000 Network - Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive - Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). - World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). - Biosphere Reserve (UNESCO Man & The Biosphere Programme) - Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). - Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). - Biogenetic Reserve under the Council of Europe. - European Diploma Site under the Council of Europe. - Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	- Site designated or proposed as a Natural Heritage Area (NHA). - Statutory Nature Reserve. - Refuge for Fauna and Flora protected under the Wildlife Acts. - National Park. - Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive
County Importance	- Area of Special Amenity. - Area subject to a Tree Preservation Order. - Area of High Amenity, or equivalent, designated under the County Development Plan.

Importance	Criteria
	- Resident or regularly occurring populations (assessed to be important at the County level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. - County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. - Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. - Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; - Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value)	- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; - Sites or features containing non-native species that is of some importance in maintaining habitat links.

5.2.5.2. Impact Assessment Criteria

Once the value of the identified Key Ecological Receptors (KERs) was determined, the next step was to assess the potential effect or impact of the Proposed Development on these KERs. This was carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009b; CIEEM, 2018) that set down a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the proposal could constitute impact or sources of impacts. Once impacts are defined, their significance was categorised using EPA Guidelines (EPA, 2017).

Identification of a risk does not constitute a prediction that it will occur, or that it will create or cause a significant impact. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature and exposure to the risk and the characteristics of the ecological receptor.

5.2.5.3. Criteria used to define the quality, significance and duration of effects

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying the quality of effects. See Table 5.2 below.

Table 5.2. Definition of Quality of Effects.

Quality	Definition

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

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying the significance of impacts. See Table 5.3 below.

Table 5.3. Definition of Significance of Effects.

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

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying duration and frequency of effects. See Table 5.4 below.

Table 5.4. Definition of Duration of Effects

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

5.2.6. Limitations

An extensive search of available datasets for records of rare and protected species within proximity of the Proposed Development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.

General habitat and invasive species surveys were carried out within the standard acceptable timeframe for general botanical field surveying. The bat survey carried out by Ash Ecology Environmental on the 21st April 2021 was carried out in optimal weather conditions for a bat survey with temperatures on the night at 12˚C in calm conditions. Bat activity and emergence surveys can be carried out mid-March to end of September (Kelleher and Marnell, 2006) in suitable weather conditions which the bat survey was.

Mammal surveys were undertaken within the appropriate time of year. Mammal surveys can be undertaken at any time of year but are less likely to provide reliable results during mid- to late-summer, when the presence of dense vegetation may make it difficult to find field signs and dens.

No limitations were encountered which would prevent robust conclusions being drawn as to the potential impacts of the Proposed Development.

5.3. Receiving Environment

5.3.1. Description of the Receiving Environment

The Site is located to the south-east of Greenhills Road at the former Chadwicks Site. The Site is approximately 2.79 hectares in area, located within an industrially surrounded zone and comprises of existing low-rise disused industrial units which are to be demolished as part of the proposal. The existing development does not have any SuDS measures in place.

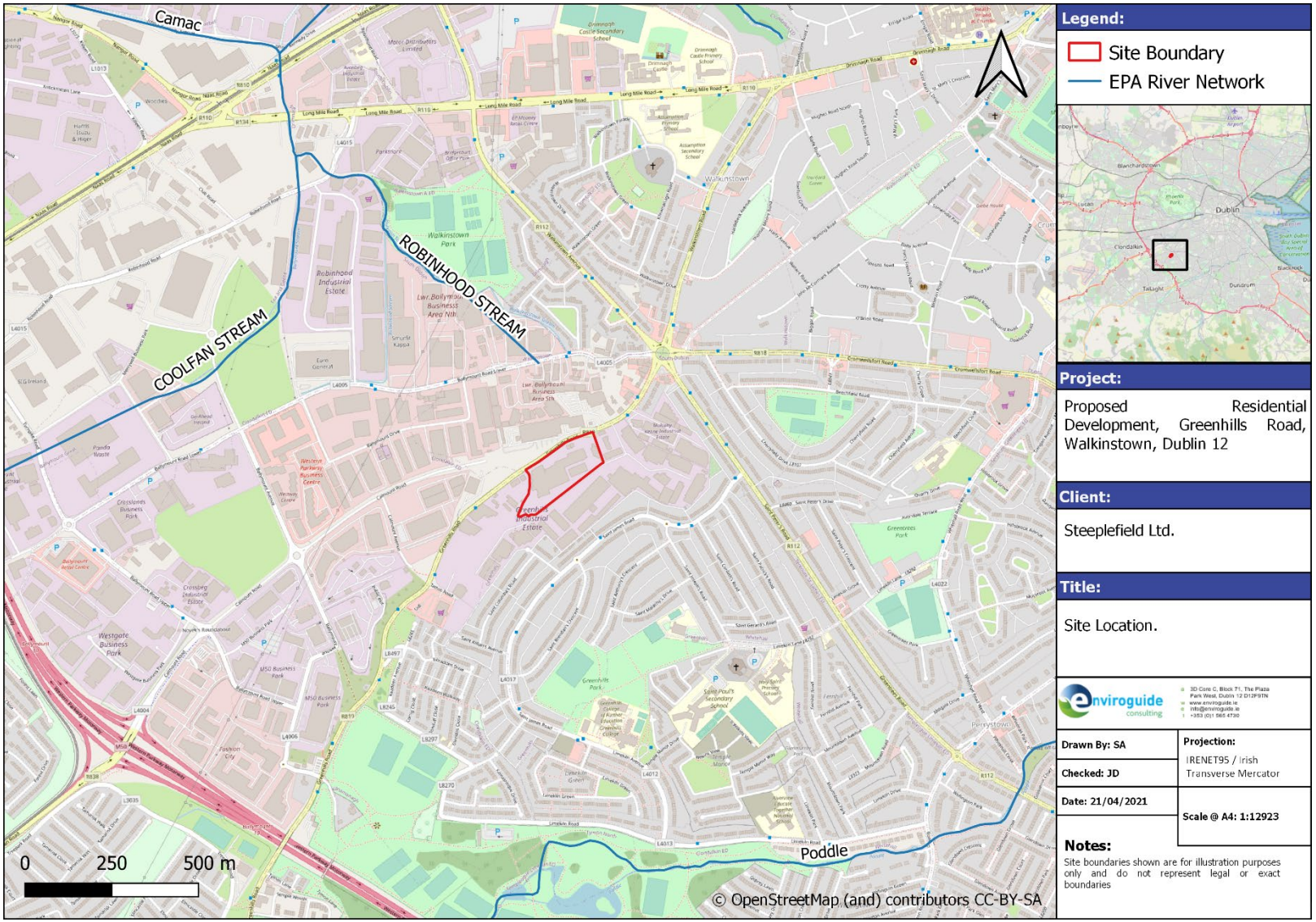

Figure 5-1. Site Location.

5.3.2. Desk Study

5.3.2.1. Geology, Hydrology and Hydrogeology

The Site of the Proposed Development is within the Liffey and Dublin Bay catchment and Liffey_SC_090 sub catchment. There are no river waterbodies within the Site of the Proposed Development.

The Robinhood Stream, a small, 1st order tributary of the River Camac, is the closest river waterbody to the Site and is located approximately 270m to the north. From this point, the stream flows in a north/northwest before joining the River Camac. Water quality in the Camac river was classed as *Poor* by the EPA in 2019 (station code RS09C020500 at Emmet Road).

The Site of the Proposed Development is situated on the Dublin (IE_EA_G_008) groundwater body. The aquifer type in the area is *Locally Important* (LI) on bedrock which is *Moderately Productive only in Local Zones* (EPA, 2021). The groundwater rock units underlying the aquifer are classified as *Dinantian Upper Impure Limestones*. The level of vulnerability to groundwater contamination from human activities ranges from *Moderate* to *High*. The subsoil is made ground *(Made)*. The soil is classed as *urban* (EPA, 2021).

5.3.2.1. Designated Sites

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

Natural Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with SAC and/or SPA sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

Table 5.5 below presents details of the designated sites within a 15km radius of the Proposed Development. In addition, the potential for connectivity with designated sites at distances of greater than 15km from the Development was also considered in this initial assessment. In this case, there is no potential connectivity between the Development site and designated sites located at a distance greater than 15km from the Proposed Development.

The result of this preliminary screening concluded that there is a total of six SACs, three SPAs and 19 pNHAs located within the Zone Of Influence of the Proposed Development Site. The distances to each site listed are taken from the nearest possible point of the Proposed Development Site boundary to nearest possible point of each Natura 2000 site or pNHA. There are two Ramsar Sites within the ZOI of the proposed development, namely North Bull Island (site ID 406) and Sandymount Strand/Tolka Estuary (site ID 832). In addition, Dublin Bay is designated as a UNESCO Biosphere[2]. Dublin Bay Biosphere contains three different zones, which are managed in different ways:

- The core zone of Dublin Bay Biosphere comprises 50km² of areas of high natural value. Key areas include the Tolka and Baldoyle Estuaries, Booterstown Marsh, Howth Head, North Bull Island, Dalkey Island and Ireland's Eye.
- The buffer zone comprises 82km² of public and private green spaces such as parks, greenbelts and golf courses, which surround and adjoin the core zones.

[2] A biosphere is a special designation awarded by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) but managed in partnership by communities, NGOs and local and national governments (https://www.dublinbaybiosphere.ie/).

- The transition zone comprises 173km² and forms the outer part of the Biosphere. It includes residential areas, harbours, ports and industrial and commercial areas.

A **Screening for Appropriate Assessment** (Enviroguide, 2022) for the Proposed Development, prepared in accordance with the requirements of Part XAB of the Planning and Development Act, 2000 (as amended) and in particular Section 177U and Section 177V thereof, is submitted with this application under separate cover. The following conclusion is extracted from the Appropriate Assessment Screening Report, which concluded that the proposed development would not have a significant effect on any European Sites:

"The Proposed Development at Former Chadwicks Site, Greenhills Road, Walkinstown, Dublin 12 has been assessed taking into account:

- *the nature, size and location of the proposed works and possible impacts arising from the construction works.*
- *the qualifying interests and conservation objectives of the European Sites*
- *the potential for in-combination effects arising from other plans and projects.*

In conclusion, upon the examination, analysis and evaluation of the relevant information and applying the precautionary principle, it is concluded by the authors of this report that, on the basis of objective information; the possibility ***may be excluded*** *that the Proposed Development will have a significant effect on any of the European Sites listed below:*

Glenasmole SAC (001209)

South Dublin Bay SAC (000210)

Wicklow Mountains SAC (002122)

Rye Water Valley/Carton SAC (001398)

North Dublin Bay SAC (000206)

Knocksink Wood SAC (000725)

South Dublin Bay and River Tolka Estuary SPA (004024)

Wicklow Mountains SPA (004040)

North Bull Island SPA (004006)

In carrying out this AA screening, mitigation measures have not been taken into account. Standard best practice construction measures which could have the effect of mitigating any effects on any European Sites have similarly not been taken into account.

On the basis of the screening exercise carried out above, it can be concluded, on the basis of the best scientific knowledge available, that the possibility of any significant effects on any European Sites, whether arising from the project itself or in combination with other plans and projects, can be excluded. Thus, there is no requirement to proceed to Stage 2 of the Appropriate Assessment process; and the preparation of a Natura Impact Statement (NIS) is not required."

Table 5.5. Designated sites within 15km of the Site of the Proposed Development, their qualifying interests, distance to the Site of the Proposed Development and potential pathways linking the designated site and the Proposed Development.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
Special Area of Conservation			
Glenasmole Valley SAC (001209)	**Annex I Habitats:** [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)*	6.3 km	None

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	[6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [7220] Petrifying springs with tufa formation (Cratoneurion)*		
South Dublin Bay SAC (000210)	**Annex I Habitats:** [1140] Tidal Mudflats and Sandflats [1210] Annual vegetation of drift lines [1310] Salicornia and other annuals colonising mud and sand [2110] Embryonic shifting dunes	8.4 km	**Yes** – Weak hydrological pathway via surface water discharges to the River Camac during both the Construction and Operational Phases and discharges from Ringsend WwTP into Dublin Bay during the Operational Phase. However, the AA Screening concluded that there is no likelihood of significant effects on this site.
Wicklow Mountains SAC (002122)	**Annex I Habitats:** [3110] Oligotrophic Waters containing very few minerals [3130] Mixed *Najas flexilis* lake habitat [3160] Dystrophic Lakes [4010] Wet Heath [4030] Dry Heath [4060] Alpine and Subalpine Heaths [6130] Calaminarian Grassland [6230] Species-rich Nardus Grassland* [7130] Blanket Bogs (Active)* [8110] Siliceous Scree [8210] Calcareous Rocky Slopes [8220] Siliceous Rocky Slopes [91A0] Old Oak Woodlands **Annex II Species:** [1355] Otter (*Lutra lutra*)	8.8 km	None.
North Dublin Bay SAC (000206)	**Annex I Habitats:** [1140] Tidal Mudflats and Sandflats [1210] Annual Vegetation of Drift Lines [1310] Salicornia Mud [1330] Atlantic Salt Meadows [1410] Mediterranean Salt Meadows [2110] Embryonic Shifting Dunes [2120] Marram Dunes (White Dunes) [2130] Fixed Dunes (Grey Dunes)* [2190] Humid Dune Slacks **Annex II Species:** [1395] Petalwort (*Petalophyllum ralfsii*)	11.4 km	**Yes** – Weak hydrological pathway via surface water discharges to the River Camac both the Construction and Operational Phases and discharges from Ringsend WwTP into Dublin Bay during the Operational Phase. However, the AA Screening concluded that there is no likelihood of significant effects on this site.
Rye Water Valley/Carton SAC (001398)	**Annex I Habitats:** [7220] Petrifying springs with tufa formation (Cratoneurion) **Annex II Species**: [1014] *Vertigo angustior* (Narrow-mouthed Whorl Snail); [1016] *Vertigo moulinsiana* (Desmoulin's Whorl Snail)	11.4 km	None.
Knocksink Wood SAC (001229)	**Annex I Habitats:** [7220] Petrifying springs with tufa formation (Cratoneurion); [91A0] Old sessile oak woods with Ilex and Blechnum in the British Isles;	14.0 km	None.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	[91E0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)		
Special Protection Area			
South Dublin Bay and River Tolka Estuary SPA (004024)	[A046] Light-bellied Brent Goose *Branta bernicla hrota* [A130] Oystercatcher *Haematopus ostralegus* [A137] Ringed Plover *Charadrius hiaticula* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A144] Sanderling *Calidris alba* [A149] Dunlin *Calidris alpina alpina* [A157] Bar-tailed Godwit *Limosa lapponica* [A162] Redshank *Tringa totanus* [A179] Black-headed Gull *Chroicocephalus ridibundus* [A192] Roseate Tern *Sterna dougallii* [A193] Common Tern *Sterna hirundo* [A194] Arctic Tern *Sterna paradisaea* [A999] Wetlands	8.5 km	**Yes** – Weak hydrological pathway via surface water discharges to the River Camac both the Construction and Operational Phases and discharges from Ringsend WwTP into Dublin Bay during the Operational Phase. However, the AA Screening concluded that there is no likelihood of significant effects on this site.
Wicklow Mountains SPA (004040)	[A098] Merlin *Falco columbarius* [A103] Peregrine *Falco peregrinus*	8.7 km	None.
North Bull Island SPA (004006)	[A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A052] Teal *Anas crecca* [A054] Pintail *Anas acuta* [A056] Shoveler *Anas clypeata* [A130] Oystercatcher *Haematopus ostralegus* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A144] Sanderling *Calidris alba* [A149] Dunlin *Calidris alpina alpina* [A156] Black-tailed Godwit *Limosa limosa* [A157] Bar-tailed Godwit *Limosa lapponica* [A160] Curlew *Numenius arquata* [A162] Redshank *Tringa totanus* [A169] Turnstone *Arenaria interpres* [A179] Black-headed Gull *Chroicocephalus ridibundus* [A999] Wetlands	11.4 km	**Yes** – Weak hydrological pathway via surface water discharges to the River Camac both the Construction and Operational Phases and discharges from Ringsend WwTP into Dublin Bay during the Operational Phase. However, the AA Screening concluded that there is no likelihood of significant effects on this site.
Proposed Natural Heritage Area			
Grand Canal (002104)	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. A number of different habitats are found within the canal boundaries - hedgerow,	2.0 km	No – there is no hydrological connectivity with the Canal.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The rare and legally protected Opposite-leaved Pondweed (*Groenlandia densa*) (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.		
Dodder Valley (00991)	This stretch of the River Dodder extends for about 2 km between Firhouse Bridge and Oldbawn Bridge in the south-west of Dublin City. The vegetation consists of woodland scrub mainly of willows (*Salix* spp.), but up to thirteen species of tree have been recorded. The understorey vegetation contains a good variety of plant species. Forty-eight bird species have been recorded recently in the area, including Little Grebe, Kingfisher, Dipper and Grey Wagtail. Part of the river bank supports a Sand Martin colony of up to 100 pairs. The site represents the last remaining stretch of natural riverbank vegetation on the River Dodder in the built-up Greater Dublin Area.	2.7 km	No- Significant distance between the Site and this pNHA. No hydrological connectivity, the Proposed Development Site is in a separate subcatchment.
Liffey Valley (000128)	The Liffey Valley site is situated along the River Liffey between Leixlip Bridge on the Kildare-Dublin border and downstream of the weir at Glenaulin, Palmerstown, Co. Dublin. The threatened Green Figwort (*Scrophularia umbrosa*), a species listed in the Irish Red Data Book, is recorded from a number of stations along the river within the site. This stretch of the river Liffey has the greatest number of recently recorded populations of this species in Ireland. The rare and legally protected Hairy St. John'swort (*Hypericum hirsutum*) (Flora Protection Order 1987) has been recorded from the woodlands in this site. The threatened Yellow Archangel (*Lamiastrum galeobdolon*), listed in the Irish Red Data Book, is also recorded from these woodlands. This site is part of the Liffey Valley Special Amenity Areas Order 1990. The site is important because of the diversity of the habitats within the site, ranging from aquatic to terrestrial. A number of rare and threatened plant species have been recorded from the site.	4.4 km	No- Significant distance between the Site and this pNHA. No hydrological connectivity, the Camac River flows into the River Liffey downstream of Liffey Valley.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
Glenasmole Valley (001209)	Refer to Qualifying Interests for Glenasmole Valley SAC.	6.3 km	No- see entry for Dodder Valley.
Lugmore Glen (001212)	This small wooded glen is located about 2km south-east of Saggart in Co Dublin. It is quite a narrow valley cut in glacial drift. A small stream winds through the valley. The flora of the site is notable for the presence of the rare Red Data Book species, Yellow Archangel (*Lamiastrum galeobdolon*). The importance of this site is that it is a fine example of a wooded glen with a good representation of woodland plants. This type of semi-natural habitat is now scarce in Co. Dublin. The presence of a rare plant species adds to the interest of the site.	6.5 km	No- no hydrological connectivity. The Proposed Development Site is located downstream of Lugmore Glen.
Royal Canal (002103)	A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The rare and legally protected Opposite-leaved Pondweed *Groenlandia densa* (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. *Tolypella intricata* (a stonewort listed in the Red Data Book as being vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	6.7 km	No – no hydrological connectivity with Canal.
Fitzsimon's Wood (001753)	Fitzsimon's Wood occupies an area of approximately 8ha near Lamb's Cross in Sandyford, Co. Dublin. Despite significant recreational pressure, the basic woodland structure remains intact and as birch woodland is very rare in Co. Dublin, Fitzsimon's Wood continues to be of ecological importance.	8.3 km	No- see entry for Dodder Valley.
North Dublin Bay (000206)	Refer to qualifying interests for North Dublin Bay SAC.	8.3 km	There is an indirect hydrological connection to Dublin Bay via discharges from Ringsend WWTP and the surface water sewer serving the Site. However, the potential for surface water and/or foul water generated at the Site of the Proposed Development to reach Dublin Bay and cause significant effects, during both the Construction and Operational Phase, is excluded due to: • The fact that the hydrological link will only exist during rainfall events;

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
			• The potential for dilution in the surface water network during these rainfall events; • The incorporation of SUDS into the Project Design • Effects on marine biodiversity and the Natura 2000 sites within Dublin Bay from the current operation of Ringsend WwTP are unlikely (see section 5.5.4.3 for more details).
South Dublin Bay (000206)	Refer to qualifying interests of South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA.	8.4 km	No – see entry for North Dublin Bay
Booterstown Marsh (001205)	Booterstown Marsh lies approximately 5km south of Dublin City. It is separated from Merrion Strand to the east by an embankment which carries the Dublin to Wexford railway, and to the west it is bounded by the road from Dublin to Blackrock. Booterstown Marsh is the only saltmarsh in south Dublin and, despite some concerns about the increasing salinity of the site, it remains a valuable habitat for many birds as well as containing a diverse flora including the protected plant Borrer's Saltmarshgrass (Puccinellia fasciculata).	9.0 km	No – see entry for North Dublin Bay
Slade of Saggart and Crooksling Glen (000211)	This site is located in the south-west of Co. Dublin and stretches from Brittas northwards to approximately 2km south of Saggart. The northern half of the site comprises a river valley with steep tree-covered sides, while the southern side is flatter and contains two small lakes, the Britta's Ponds. The site includes a good example of a wooded river valley and a small wetland system. The presence of a rare plant, a rare invertebrate and a variety of wildfowl species adds to the interest of the site.	8.9 km	No- Significant distance between the Site and this pNHA. No hydrological connectivity, the Proposed Development Site is located downstream of this pNHA.
Dolphins, Dublin Docks (000201)	Dolphins, Dublin Docks pNHA is comprised of two mooring 'dolphins' in the River Liffey near Pigeon House Harbour. These 'dolphins' are used by nesting terns with approximately 350 pairs of Common Tern Sterna hirundo recorded in 2006 (Dublin City Biodiversity Action Plan, 2008 – 2012).	9.7 km	No – see entry for North Dublin Bay
Santry Demesne (000178)	This site is located immediately north of old Santry village, Co. Dublin, and comprises the remnants of a former demesne woodland.	10.9 km	No- see entry for Dodder Valley.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	A species legally protected under the Flora Protection Order 1987, Hairy St. John'swort *Hypericum hirsutum*, was recorded here in 1991. The primary importance of this site is that it contains a legally protected plant species. The woodland, however, is of general ecological interest as it occurs in an area where little has survived of the original vegetation.		
Rye Water Valley/ Carton (001398)	Refer to qualifying interests for Rye Water Valley/ Carton SAC.	11.4 km	No- see entry for Dodder Valley.
Dingle Glen (001207)	Dingle Glen is situated approximately 5km west of Killiney. It is a dry valley formed by a glacial lake overflow channel. The importance in this site lies in the variety of habitats within a relatively small area. The site is secluded and not subject to much disturbance.	13.1 km	No- see entry for Dodder Valley.
Ballybetagh Bog (001202)	Ballybetagh Bog includes three separate areas of marshland situated approximately 5km north-west of Enniskerry. Ballybetagh Bog is renowned for the number of skeletons of the extinct Giant Irish Deer (*Megaloceros giganteus*) that have been dug from it. Although the site contains samples of fen and marsh vegetation, the main interest lies in its historical value.	13.2 km	No- see entry for Dodder Valley.
Knocksink Wood (000725)	Refer to qualifying interests for Knocksink Wood SAC.	13.9 km	No- see entry for Dodder Valley.
Dalkey Coastal Zone and Killiney Hill (001206)	This site includes the coastal stretch from Scotman's Bay to south of White Rock, the Dalkey Island group and Dalkey Sound, and Killiney Hill. Killiney Hill is at the edge of the Wicklow mountains intrusion and so it is formed of a mixture of granite and mica schist. This site represents a fine example of a coastal system with habitats ranging from the sub-littoral to coastal heath. The flora is well developed and includes some scarce species. The islands are important bird sites. The site also has geological importance.	14.0 km	No- Significant distance between the Site and this pNHA. No hydrological connectivity, the Proposed Development Site is in a separate subcatchment and there is a significant marine buffer.
Glencree Valley (001755)	The Glencree Valley is a glacial valley which lies at the north-eastern edge of the Wicklow Mountains. The Glencree River, which flows through the valley, is a good example of a fast flowing upland river with many boulders and often	14.5 km	No- see entry for Dodder Valley.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	brown peaty coloured water. The importance of the site is that it is a good example of deciduous woodland even though it is rather fragmented. The presence of an upland river and boggy flushes add to the habitat diversity of the site.		

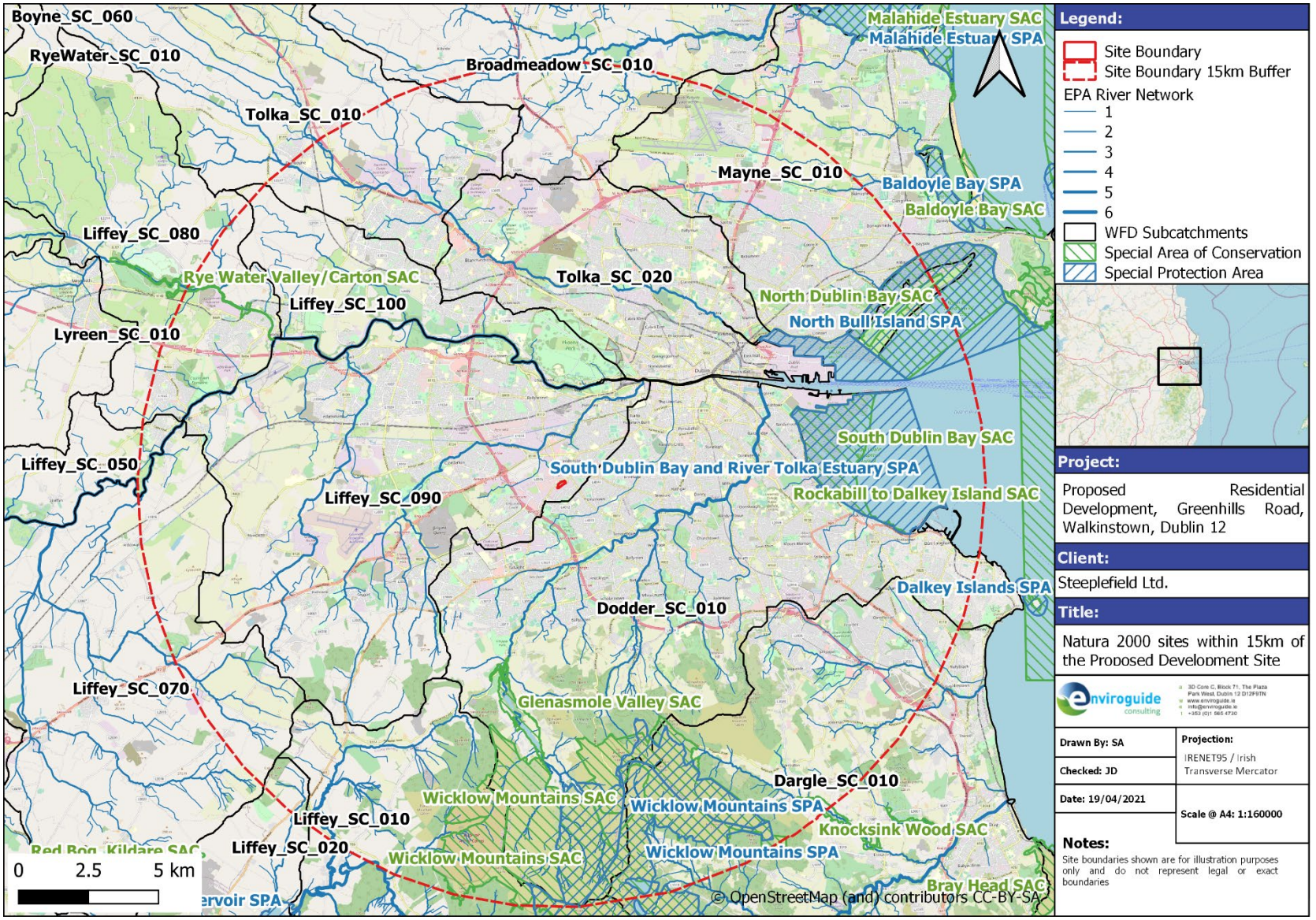

Figure 5-2. Natura 2000 Sites within 15km of the Proposed Development Site.

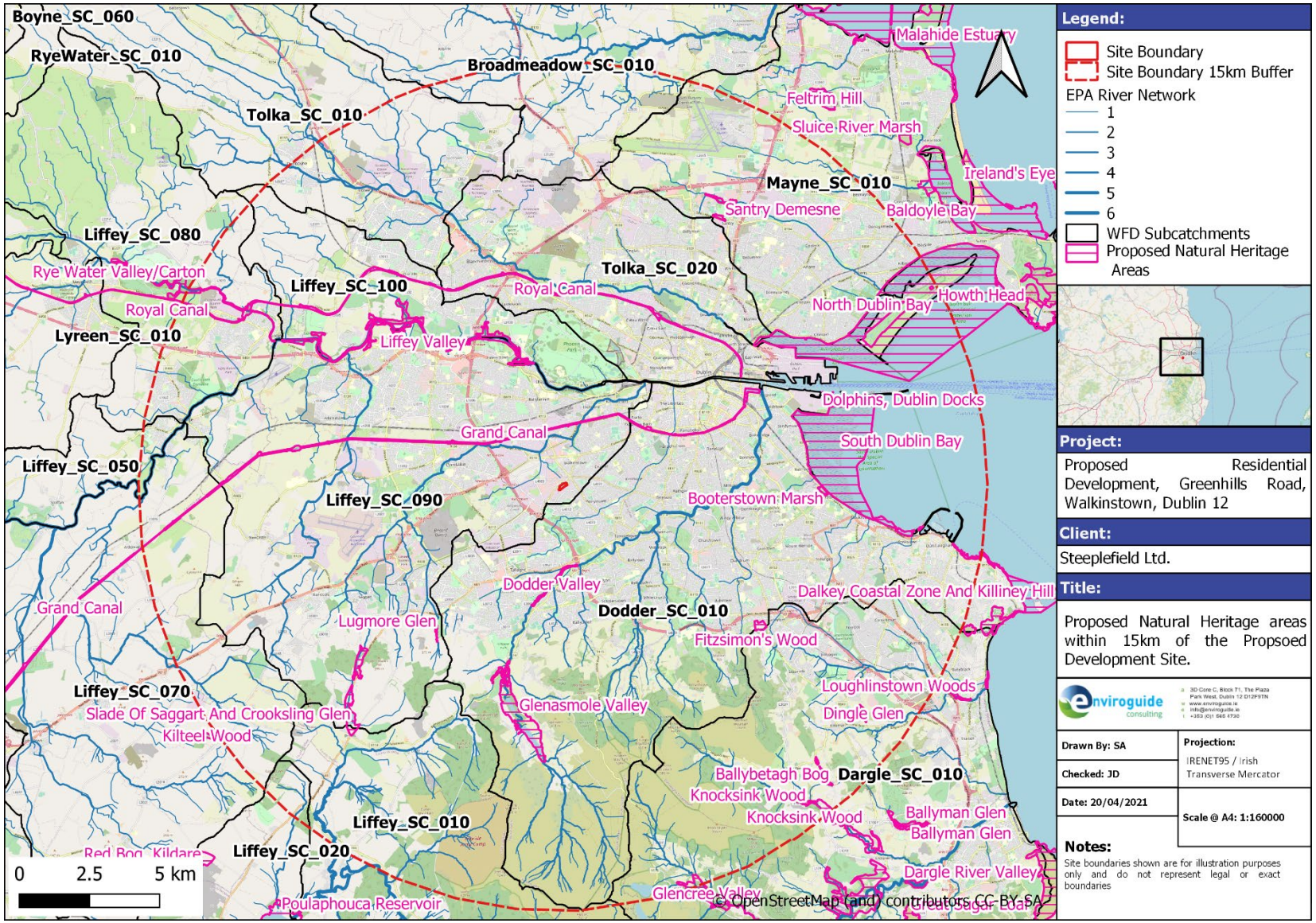

Figure 5-3. Proposed Natural Heritage Areas within 15km of the Proposed Development Site.

5.3.2.2. Species and Species Groups

The Site of the Proposed Development is located within the O13A Ordnance Survey tetrad. Species records from the National Biodiversity Data Centre (NBDC) online database for this grid square was studied for the presence of rare or protected flora and fauna. The following records were excluded:

- Records greater than 20 years old;
- Species records with no designation or conservation status (excluding mammals and birds).

In addition, data from various sources (e.g. Inland Fisheries Ireland) were used to determine the presence of species in the vicinity of the Proposed Development. The following sections outline the results of this assessment.

5.3.2.3. Flora

Rare and Protected Flora

Species records from the NBDC online database were studied for the presence of rare of protected flora. The only rare or protected species within the tetrad were Opposite-leaved Pondweed *Groenlandia densa* which was recorded in 1999 and Meadow Barley *Hordeum secalinum* which was recorded in 1866. Opposite-leaved Pondweed is considered near threatened whereas Meadow Barley is considered vulnerable according to the most recent red-list (Wyse Jackson et al., 2016). There are no records for protected bryophytes within the area[3].

Invasive Plant Species

The NBDC have records (dated within the last 20 years) of two high impact invasive plant species within the 2km (O13A) grid square, namely *Fallopia japonica x sachalinensis = F. x bohemica* and Japanese Knotweed *Fallopia japonica* (Table 5.6).

Table 5.6. Invasive plant species within the 2km (O13A) tetrad. The records are dated within the last 20 years and are provided by the NBDC.

Name	Date of last record	Database	Legal status / Designaion
Fallopia japonica x sachalinensis = F. x bohemica	17/06/2015	National Invasive Species Database	- High Impact Invasive - Regulation S.I. 477 (Ireland)
Japanese Knotweed *Fallopia japonica*	05/10/2013	National Invasive Species Database	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)

Non-volant Mammals

Records for terrestrial mammals were retrieved from the NBDC online database. Table 5.7 lists these species, their last record date and summarises their legal status/designation. Two native terrestrial mammals were recorded within the 2km grid square (O13A), one of which, the European Otter, is afforded protection under the Wildlife (Amendment) Act, 2000. The Otter record refers to a roadkill sighting made on Walkinstown Avenue just north of Long Mile Road in 2013. According to the Dublin City Otter Survey, carried out as part of an Action of the Dublin City Biodiversity Action Plan 2015-2020 (Macklin et al., 2019), Otters occur in the Camac River, which is approximately 1.3km to the north of the Site. Given this distance and the substantial urban buffer between the Camac and the Site, it is not anticipated that Otter would utilise the Site of the Proposed Development.

Two non-native terrestrial mammals were recorded within the 2km grid square.

3 https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e

Table 5.7. Non-volant mammal species within the O13A tetrad. The records are dated within the last 20 years and are provided by the NBDC.

Name	Date of last record	Database	Legal Status / Designation
European Otter (*Lutra lutra*)	23/09/2013	Mammals of Ireland 2010-2013	- EU Habitats Directive [92/43/EEC] Annex II & IV - Wildlife (Amendment) Act, 2000
Red Fox (*Vulpes vulpes*)	12/05/2018	Mammals of Ireland 2016-2025	n/a
European Rabbit *Oryctolagus cuniculus*	30/07/2018	Mammals of Ireland 2016-2025	- Medium Impact Invasive Species
Eastern Grey Squirrel (*Sciurus carolinensis*)	17/09/2015	Atlas of Mammals of Ireland 2010-2015	- High Impact Invasive - EU Regulation No. 1143/2014 - Regulation S.I. 477 (Ireland)

Bats

There are no records for bat species within the tetrad associated with the Site (O13A). The NBDC maps landscape suitability for bats based on Lundy et al. (2011). The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The overall habitat suitability index for bats in the area is 23.67.

Birds

A total of 22 bird species have been recorded within the 2km grid square by the NBDC. Of these, 6 are listed as *Amber*, and 1 is listed as *Red* in *Birds of Conservation Concern in Ireland 2020-2026* (Gilbert et al., 2021).

Amber listed species include:

Barn Swallow *Hirundo rustica*
Black-headed Gull *Larus ridibundus*
Common Starling *Sturnus vulgaris*
Herring Gull *Larus argentatus*
House Sparrow *Passer domesticus*
Mallard *Anas platyrhynchos*

Red-listed species include:

Redwing *Turdus iliacus*

Fish

A fish survey of the River Camac was carried out by Inland Fisheries Ireland (IFI) in 2017. Four age classes of brown trout *Salmo trutta* 0+, 1+, 2+ and 3+ were recorded in the river, with 0+ individuals the most abundant cohort (Matson et al., 2018). Of all the fish species captured in the Camac, brown trout was the most abundant. Lamprey species *Lampetra* spp. were recorded in one of the five sites surveyed in the Camac (Matson et al., 2018). Four sites were assigned a fish ecological status of *Moderate* and one site was assigned *Poor* status.

The European Eel *Anguilla anguilla* is a red listed, native Irish species and is considered one of the most threatened fish species in Ireland (King et al., 2011). There is a NBDC record of European Eel within the 2km grid square O13A (2km) dated the 9th of July 2008. Furthermore, Eels were captured during IFI fish surveys of the Camac River in 2011 (Kelly et al., 2012).

Amphibians

The Common Frog Rana temporaria was recorded within the relevant tetrad in June 2014.

Invertebrates

Within the last 20 years, a single invertebrate species was recorded within the 2km grid square - the Large Red Tailed Bumble Bee *Bombus (Melanobombus) lapidaries* which was recorded in 2019.

Furthermore, point data provided by the Environmental Protection Agency (EPA) indicate the presence of white-clawed crayfish *Austropotamobius pallipes* in the Camac River in 2007 and 2013. These data are based on opportunistic field observations made by EPA staff while undertaking routine biological monitoring between the years 2007 and 2016.

Reptiles

There are no records of common lizard *Zootoca vivipara* within the tetrad associated with the Site (O13A). In addition, this species is associated with coastal and heathland habitats, but also locally in rural gardens, stone walls and roadside verges (King et al., 2011). The habitat at the Site of the Proposed Development is not considered suitable for this species.

5.3.3. Field Surveys

5.3.3.1. Habitats and Flora

Several distinct habitat types, as well as mosaics of different habitats (codes follow Fossitt, 2000) were recorded within the habitat survey area. These are described below.

Buildings and Artificial Surfaces

Buildings and artificial surfaces are one of the main habitats present at the Site of the Proposed Development. This habitat comprises the carparks, warehouses and buildings at the Site (Figure 5-4).

Figure 5-4. Warehourses and hardstanding at the Site of the Proposed Development. Image taken on April 23rd 2021.

Recolonising Bare Ground (ED3)

This habitat occurs throughout the Site where vegetation has started to recolonise the areas of hardstanding including the former car parks and outdoor storage areas. Butterfly Bush *Buddleja davidii* dominates the vegetation here. Other species recorded in this habitat include Rose *Rosa* sp., Ragwort *Senecio* spp., Red Valerian *Centranthus ruber*, Ribwort Plantain *Plantago lanceolata*, Willow *Salix* sp., Herb Robert *Geranuim robertianum,* Bramble *Rubus fruticosus,* Colt's Foot *Tussilago farfara*, Ivy *Hedera helix* and Ground Ivy *Glechoma hederacea*.

Figure 5-5. Recolonising bare ground at the Site of the Proposed Development. Image taken on April 23rd 2021.

Scrub (WS1) & Ornamental/non-native shrub (WS3)

A habitat which can be best described as a mosaic of scrub (WS1) and ornamental/non-native shrub (WS3) occurs along the northern boundary of the Site. This part of the Site was dense and impenetrable in places and was dominated by both ornamental and native shrub species (Figure 5-6 and Figure 5-7). Species recorded included Brambles, Ivy, Butterfly Bush, *Cotoneaster* sp*., Forsythia* sp., *Rosa* sp. Box *Buxus* sp., Hawthorn *Crataegus monogyna,* Blackthorn *Prunus spinosa*, Lilac *Syringa* sp., *Escallonia* sp., Darwin's Barberry *Berberis darwinii,* Ash *Fraxinus excelsior* and Elder *Sambucus nigra*.

Scrub (WS1)

A small patch of scrub (WS1) habitat was recorded along the eastern boundary of the Site. Species recorded here included Ivy, Brambles, Box, Hart's Tongue fern *Asplenium scolopendrium,* Vetch *Vica* sp, Hawthorn and bindweed *Calystegia sepium*.

Figure 5-6. Scrub/Ornamental non-native shrub habitat at the northern boundary of the Site of the Proposed Development. Image taken April 23rd 2021.

Figure 5-7. Scrub/Ornamental non-native shrub habitat at the northern boundary of the Site of the Proposed Development. Image taken April 23rd 2021.

Figure 5-8. Habitats at the Site of the Proposed Development.

Non-volant Mammals

A number of mammal trails were observed during the field visit carried out on the 23rd of April 2021. These were typically found within the scrub habitat at the Site. A den, most likely a Fox *Vulpes vulpes* den, was recorded within the scrub and ornamental/non-native shrub habitat mosaic at the northern boundary of the Site (Figure 5-9). This den was located under a Hawthorn tree at 53.314881, -6.337126. Further evidence of Fox was indicated through Fox scent throughout the Site as well as the remains of pigeons found in various warehouses in the Site.

Figure 5-9. Fox den at the Site of the Proposed Development. Image taken on April 23rd 2021.

Breeding Birds

The only bird species found nesting in the warehouses and buildings at the Site were Feral Pigeons (Figure 5-10) with a single Wren's nest found in a small cabin indicating breeding in 2020.

The bird species recorded during the site visit on 21st April 2021 are outlined in Table 5.8.

Table 5.8 Birds recorded at the Site during the breeding bird survey.

Species	BoCCI[4]	Observations/Notes
Bullfinch *Pyrrhula pyrrhula*	Green	Female recorded on northern section
Linnet *Linaria cannabina*	Amber	Pair holding territory in shrub in centre of warehouse complex
Blue Tit *Cyanistes caeruleus*	Green	Two pairs recorded on site
Wren *Troglodytes troglodytes*	Green	At least three males holding territory throughout site
Coal Tit *Periparus ater*	Green	Male in song at south-western area of site
Dunnock *Prunella modularis*	Green	Male in song at south-western area of site
Goldfinch *Carduelis carduelis*	Green	Two pairs recorded on site

[4] Gilbert et al. (2021) Birds of Conservation Concern in Ireland 4: 2020–2026. *Irish Birds* 43: 1–22

Species	BoCCI[4]	Observations/Notes
Robin *Erithacus rubecula*	Green	Male holding territory in north-east section of site
Sparrowhawk *Accipiter nisus*	Green	One in flight over site
Herring Gull *Larus argentatus*	Amber	Present on site but nesting off site
Lesser Black-backed Gull *Larus fuscus*	Amber	Present on site but nesting off site
Feral Pigeon *Columba livia f. domestica*	Green	Present and nesting in the warehouses

There were no species recorded breeding on site which are on the Red List of the Birds of Conservation Concern in Ireland (Gilbert et al. 2021). Linnet is the only species recorded as probably breeding on which is on the Amber List of the Birds of Conservation Concern in Ireland. Two other species recorded on site, Herring Gull and Lesser Black-backed Gull, are also on the Amber List of the Birds of Conservation Concern but are not breeding on site.

Figure 5-10. Feral pigeon nest within a warehouse at the Proposed Development Site.

Bats

General Activity Survey

The results of bat survey carried out April 2021 yielded no results i.e. no bats were detected during the survey despite ambient weather and the appropriate time of year.

According to the bat survey report, the lack of bat activity within the Site boundary during April 2021 may be due to the Site location within a heavily urbanised/industrialised area with high levels of traffic, lighting and anthropogenic disturbance which would discourage bats.

The Site lacks commuting and foraging routes (with no mature trees) to more suitable habitat and is relatively well illuminated due to the surrounding urban landscape. This is further implied via the low bat suitability score given to the general environment surrounding the Site.

Buildings Assessment Survey & Tree Assessment

The buildings onsite were grouped into 17 sections (see Figure 3 of the bat report) and inspected. All buildings were assessed externally and internally, where accessible, during April 2021 and a follow-up external and internal inspection was again carried out March 1st 2022. The March survey was outside the window for emergence surveys however all accessible spaces, including attic space of Building 17, that could potentially allow bats access the buildings were visually examined in detail for bats, signs of bats, or evidence of bat activity, using a torch where necessary. Cracks, crevices etc. were investigated for ingress / egress points and evidence of bat habitation, such as smearing lines, droppings, and staining. The majority were of corrugated steel and lacked bat roost potential inside including attic spaces.

No bat emergence was detected or observed from any buildings onsite during the survey April 21st 2021. No signs of bats e.g. piles of bat droppings, feeding remains etc were uncovered in the follow-up survey on March 1st 2022. The majority of buildings had 'Negligible' suitability for bats, whereas a small number had 'Low' suitability (No. 1, 2, 3, 6, 7, 8 & 17). There were no buildings classified as 'Moderate' or 'High' suitability.

The trees onsite had no/negligible potential for roosting bats.

5.3.4. Designated Sites, Habitat and Species Evaluation

Fauna which have the potential to utilise habitat within the immediate area of the Proposed Development, or for which records exist in the wider area, have been evaluated below in Table 5.9 for their conservation importance. In addition, designated sites and habitats have been evaluated. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b). The rationale behind these evaluations is also provided. The term 'ecological receptors' is used when impacts upon them are likely.

Table 5.9. Evaluation of designated sites, habitats and fauna recorded within the Site and surrounding area.

Designated Sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
Designated Sites			
SACs & SPAs	International Importance	No	Significant effects on Natura 2000 sites ruled out in AA Screening.
pNHAs	National Importance	No	Refer to Table 5.5
Dublin Bay Biosphere and Ramsar Sites	International Importance	No	No significant hydrological connection or otherwise
Habitats			
Buildings and artificial surfaces (BL3)	Negligible value	No	Man-made habitat of low biodiversity value.
Scrub (WS1)	Local importance (lower value)	No	Low diversity scrub habitat adjacent to busy industrial yard.
Scrub (WS1) & Ornamental/non-native shrub (WS3)	Local importance (higher value)	**Yes**	Dense and mature scrub which provides habitat for a range of fauna.
Recolonising bare ground (ED3)	Negligible value	No	Man-made habitat of low biodiversity value.
Fauna			

Designated Sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
European Otter *Lutra lutra*	Local importance (higher value)	**Yes**	Potential hydrological connectivity to the Camac River.[5]
Hedgehog *Erinaceus europaeus*	Local importance (lower value)	No	No evidence of Hedgehog during field survey. Surrounding area is highly urbanized, no records within 2km grid square.
Red Fox *Vulpes vulpes*	Local importance (higher value)	**Yes**	This species is not considered to be of conservation concern and is not afforded legal protection in Ireland. Nevertheless, given the presence of a den on the Site, this species is further assessed below.
Bat Assemblage	Local importance (higher value)	**Yes**	No bat species were detected at the Site of the Proposed Development during the dedicated survey. However, some buildings with bat potential, albeit 'Low', were recorded.
Birds	Local importance (higher value)	**Yes**	A number of potential breeding species were recorded on site during the April 2021 field surveys.
Common Frog	Local importance (lower value)	No	No suitable habitat at the Site for this species (e.g. ditches, ponds).
Brown trout *Salmo trutta;* European Eel *Anguilla anguilla;* Brook and river lamprey *Lampetra* spp.	County Importance	**Yes**	Potential hydrological connectivity to the Camac River via surface water discharges
White-clawed crayfish *Austropotamobius pallipes*	International Importance	**Yes**	Potential hydrological connectivity to the Camac River via surface water discharges

5.4. Characteristics of the Proposed Development

5.4.1. Description

The Proposed Development will consist of the following:

- The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3 m – 9.9 m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;

- The construction of a mixed-use Build-to-Rent residential and commercial development comprising 633 no. build-to-rent apartment units (292 no. one-beds, 280 no. two-beds and 61 no. three-beds), 1 no. childcare facility and 10 no. commercial units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:

[5] Surface water from the Proposed Development will discharge into the existing 225mm surface water sewer located on the access road parallel to Chadwicks Plumb Centre, south of the Proposed Development. According to the Greater Strategic Dublin Drainage Study, the Site is within S1004 – River Camac Storm Level 1 Catchment. Therefore, it is likely that surface water flows from the Site will discharge to the River Camac.

- Block A comprises 209 no. apartments (102 no. 1 bed-units, 106 no. 2 bed-units and 1 no. 3-bed units) measuring 5 - 10 storeys in height. (b) Block B comprises 121 no. apartments (53 no. 1 bed-units, 45 no. 2 bed-units and 23 no. 3 bed-units) measuring 8 - 10 storeys in height. (c) Block C comprises 130 no. apartments (38 no. 1-bed units, 71 no. 2-bed units and 21 no. 3-bed units) measuring 8 - 12 storeys in height. (d) Block D comprises 173 no. apartments (99 no. 1 bed-units, 58 no. 2 bed-units and 16 no. 3 bed-units) measuring 6 - 10 storeys in height. All apartments will be provided with private balconies/terraces;

- Provision of indoor communal residential amenity/management facilities including a co-working space, communal meeting room/ work space, foyer, toilets at ground floor of Block A; gym, changing rooms, toilets, resident's lounge, studio, laundry room, communal meeting room/ work space, multi-function space with kitchen at ground floor of Block B; games room with kitchenette, media room, co-working space, resident's lounge, communal meeting room/ work space, reception area, management office with ancillary staff room and toilets, toilets, parcel room at ground floor of Block C;

- The construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block A;

- The construction of 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C as follows: Block A has 3 no. units at ground floor comprising 79.46 sq.m., 90.23 sq.m., and 121.39 sq.m., Block B has 1 no. unit at ground floor comprising 127.03 sq.m., Block C has two units at second floor comprising 120.85 sq.m. and 125.45 sq.m., and Block D has 4 no. units at ground floor comprising 84.45 sq.m., 149.77 sq.m., 155.48 sq.m. and 275.59 sq.m.;

- The construction of 3 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 2 no. secondary entrances from the south for emergency access and services (access from existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

- Provision of 424 no. car parking spaces comprising 398 no. standard spaces, 21 no. mobility spaces and 5 no. car club spaces located at ground floor level car park located within Block A and accessed via the proposed entrance at Greenhills Road, a two-storey car park located within Blocks C and D also accessed from the proposed entrance at Greenhills Road and on-street parking at ground floor level adjacent to Blocks A and C. Provision of an additional 15 no. commercial/ unloading/ drop-off on-street parking spaces at ground floor level (providing for an overall total of 439 car parking spaces). Provision of 4 no. dedicated motorcycle spaces at ground floor level parking area within Blocks C and D;

- Provision of 1363 no. bicycle parking spaces comprising 1035 no. residents' bicycle spaces, 5 no. accessible bicycle spaces and 7 no. cargo bicycle spaces in 9 no. bicycle storerooms in ground and first floor parking areas within Blocks A, C and D, and 316 no. visitors' bicycle spaces located externally at ground floor level throughout the development;

- Provision of outdoor communal amenity space (5,020 sq.m.) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting, and scented gardens located on podiums at first and second floor levels; provision of a communal amenity roof garden in Block C with seating area and planting (176 sq.m.); and inclusion of centrally located public open space (3,380 sq.m.) adjacent to Blocks B and C comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space; and incidental open space/public realm;

- Development also includes landscaping and infrastructural works, foul and surface water drainage, bin storage, ESB substations, plant rooms, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development. This application is accompanied by an Environmental Impact Assessment Report (EIAR).

The incorporation of Sustainable Urban Drainage Systems (SUDS) into the design of the Proposed Development is mandatory for all new developments under the Greater Dublin Regional Code of Practice for Drainage Works. As such, the Proposed Development design entails a suite of SuDS measures. SUDS is a series of management practices and control structures that aim to mimic natural drainage. SUDS reduces flood risk, improves water quality and provides amenity through the use of permeable paving, swales, green roofs, rain water harvesting, detention basins, ponds and wetlands[6].

Table 5.10. SuDS Measures incorporated into the Proposed Development (adapted from Lohan and Donnelly, 2021).

SuDS Measure	Comments
Extensive/Intensive Green Roof	Both extensive and intensive green roof systems will be incorporated at podium level serving block A, C & D.
Permeable Paving	Permeable paving is proposed throughout all paved areas throughout the full extent of the development.
Porous (Permeable) Asphalt	Porous Asphalt is proposed to be used on the main external 6.0m wide service road within the development.
Petrol Interceptor	Class 2 Petrol interceptors are proposed in both undercroft car parks serving block A and blocks C & D. Petrol interceptors are connected to the surface water sewer prior to surface water discharging into the external foul water manhole outside the car park.
Attenuation Tank	Stormtech MC-3500 stormwater attenuation tank is proposed to be used, located under the courtyard area, adjacent to block B.
Rain Gardens	Rain Gardens are proposed to be used on both sides along the internal 6.0m wide service road, in-between block A & B.
Tree Pits	Tree Pits are proposed to be used along the full extent of the southern site frontage.
Hydrobrake (Site Run-off Control)	Hydrobrake is proposed to be used, installed on the last surface water manhole within the site to limit the outfall rate leaving the development to 8.021 l/s.

5.5. Potential impact of the Proposed Development

As per the relevant guidelines, likely significant effects have been assessed for Key Ecological Receptors only, as listed in Table 5.9. An impact is considered to be significant if it is predicted to affect the integrity or conservation status of a KER at a given geographical scale. All impacts are described in the absence of mitigation.

Ecological surveys undertaken at the Site confirms that the Development Site supports common habitats, mammals, flora and birds. The only habitat of ecological value at the Site is the Ornamental/non-native shrub (WS3) mosaic habitat located along the northern boundary. No bats were recorded at the Site, despite optimal survey conditions. The Site is not used by badger and no invasive alien plants listed on Schedule 3 of SI No. 477 of 2011 are present. The Site is not connected to any protected sites. The Site is deemed to be of low biodiversity value.

[6] https://www.dublincity.ie/dublin-city-development-plan-2016-2022/9-sustainable-environmental-infrastructure/95-policies-and-objectives/954-surface-water-drainage-and

5.5.1. Construction Phase

5.5.1.1. Impact on Habitats

The Construction Phase will result in the loss of the entire section of scrub habitat along the northern boundary of the Site. This constitutes a *negative*, *permanent*, *moderate* impact in the absence of suitable mitigation at a local scale, due to the general lack of semi-natural habitats within the wider area.

5.5.1.2. Impacts on Fauna

Non-volant Mammals

A Fox den was recorded at the Site of the Proposed Development, along the northern boundary. Although Fox is not afforded legal protection in Ireland, care should be taken to when disturbing the den and the area around it. Removal of the den in the absence of mitigation could result in mortality of the occupant(s) resulting in a *negative*, *permanent*, *moderate* impact.

Bats

Although assessed as highly unlikely, there is potential for a *negative, permanent, moderate* impact to bats should they be roosting within the '*Low'* potential buildings which will be demolished as part of the Proposed Development. As noted in the bat report, the Site lies in a heavily urbanised/industrialised area with high levels of traffic, lighting and anthropogenic disturbance that would give the general environment surrounding the Site a low bat suitability score and potentially deter bats from using the Site. The unsuitability of the Site for bats is further supported by the initial activity and emergence survey on April 21st 2021 which did not detect any activity or emergence of bats on Site despite it being a calm, mild evening within the bat survey season. The follow-up survey which inspected all buildings for signs of bat, on March 1st 2022 endorses these conclusions.

Birds

There will be loss of habitat for birds at the Site of the Proposed Development through the removal of vegetation and warehouses, and disturbance of species during the Construction Phase is possible. This could have a *negative*, *permanent*, *moderate* impact on birds in the locality.

The increased noise and dust levels associated with the Construction Phase of the Proposed Development may have the potential to cause *negative, short-term, slight impacts* to local bird populations.

Aquatic Fauna

Surface water from the Proposed Development will discharge into the existing 225mm surface water sewer located on the access road parallel to Chadwicks Plumb Centre, south of the Proposed Development. According to the Greater Strategic Dublin Drainage Study, the Site is within S1004 – River Camac Storm Level 1 Catchment. Therefore, it is likely that surface water flows from the Site will discharge to the River Camac.

Surface water discharges associated with the Construction Phase of the Proposed Development may have the potential to cause *negative, short-term, moderate* impacts to aquatic fauna within the River Camac in the absence of suitable mitigation.

5.5.2. Operational Phase

5.5.2.1. Impacts on Fauna

Birds

Glass in buildings can pose a potentially lethal threat to bird species. This is a result of birds being unable to distinguish between reflections in glass and the natural environment (resulting in birds flying into windows that appear to be trees or sky), and their inability to perceive clear glass as a solid object (Toronto City Bird-Friendly Best Practices: Glass). Birds will strike clear glass while attempting to reach habitat and sky seen through corridors, windows positioned opposite each other in a room, ground floor lobbies, glass balconies or glass corners. The impact of striking a reflective or clear window in full flight often results in death.

The Proposed Development will range in height from 5 to 12 storeys. The maximum height of the structures is approximately 39 m. Migrating species tend to commute far above this, with Swans and Geese flying up to 2500ft (ca.750m) during migration along Irish Coasts (Irish Aviation Authority, 2020).

As such, the risk of migrating birds colliding with the structure due to its height is deemed to be negligible.

Typical elevations from two blocks (A and D) were reviewed by C + W O'Brien Architects to assess glazing ratios. The recommended ratio of glazing to façade should range between 25-40% as per Toronto City's Bird-Friendly Best Practice: Glass. Whereas a section of Block A was initially found to have 44.69% glazing, following the inclusion of the metal railings and walls that create the balconies within this area (features which would create visual cues for birds in the area to avoid while also reducing the amount of visible glass) the actual percentage of glazing in this section of Block A was 34.10%. The percentage of glazing in the remaining blocks reviewed was at or below 40%. There are no glass bridges, free-standing glass architectural elements and corner windows around the scheme. In addition, the overall façades of the proposed structures are well broken up, with a varied material composition which breaks up the reflective areas of the proposed structures. There is further subdivision occurring in the fenestration, balustrading etc. These architectural design features provide important visible cues as to the presence and extent of the proposed structures to any commuting/foraging bird species should they be in the vicinity of the Site. Therefore, it is considered that any local non-migratory bird species will adapt to the changing nature of the site as the construction phase progresses and for this reason the risk of bird collisions is *negligible*.

According to the Guidelines for Irish Planning Authorities on 'Urban Development and Building Heights' (Department of Housing, Planning and Local Government, 2018), "*In development locations in proximity to sensitive bird and / or bat areas, proposed developments need to consider the potential interaction of the building location, building materials and artificial lighting to impact flight lines and / or collision*".

In the case of the Proposed Development, the potential collision risk is considered to be significantly reduced by the location of the Proposed Development, i.e., remote from any important habitats for birds (e.g., wetlands, SPAs) within a well-lit urban centre.

Figure 5-11. Glazing to facade ratio of the east elevation of Block A (C + W O'Brien Architects).

Bats

During the Operational Phase, there is potential for disturbance to bats utilising the Site in general through light pollution during the Operational Phase. Given the urban context of the Site, this could have a *negative, permanent, slight* impact on bats in the locality. In addition, there is potential for a *negative, permanent, slight* impact on bats in the locality through the loss of foraging resources. There is no risk of bats colliding with Site structures. Bats use sonar and can therefore detect large stationary objects and fly alongside them as opposed to into them.

5.5.3. Do nothing Impact

Under the do-nothing scenario, large areas of the Site would remain as they are. The shrub habitat is likely to increase in size and potentially offer suitable habitat for a number of species.

5.5.4. Cumulative Impacts

If the Proposed Development and existing or proposed projects or plans impact on the same KERs, there is potential to lead to cumulative impacts which could be of a higher level of significance. This

applies to potential impacts on bats due to the combined loss of suitable commuting and/or foraging habitat in the locality and potential impacts on birds due to the combined loss of nesting or foraging habitat in the locality.

5.5.4.1. Existing granted planning permissions

There are several existing planning permissions on record in the area ranging from small-scale extensions and alterations to existing residential properties to some larger-scale developments. The larger-scale developments are outlined below:

Planning Application Reference: SD17A/0391.

Demolition of the existing house, motor sales office and sheds, the change of use from existing car sales outlet with residential to a mixed retail and residential use and the construction of development as follows: Block A - five 3 storey, 3 bed terrace houses and Block B - 1 three storey mixed use building comprising of 2 retail units, two 2 bed apartments and two 1 bed apartments. The development also includes all associated site development and infrastructural works, surface car parking and landscaping, all on a site area of 0.16ha. **(Decision: Grant Permission. Decision Date: 30/05/2018).**

Planning Application Reference: 4684/19.

The development will consist of demolition of existing single storey house and replace with 3 no. terraced houses with 2 no. rooflights to the front. The first two houses are 2 storeys with attic conversions and 3 no. bedrooms. The end of terrace house is 2 storeys with 2 no. bedrooms. The existing driveway opening will be widened from 2.76 metres to 3.96 metres with 3 no. parking bays, electric car charging point and timber frame bicycle shed with solar panels on roof. New perimeter walls, permeable paving and associated site works. **(Decision: Grant Permission. Decision Date: 14/02/2020)**.

Planning Application Reference: SHD3ABP-309658-21.

Demolition of an existing warehouse/factory building and ancillary outbuildings/structures and the construction of a residential development of 171 apartments with supporting tenant amenity facilities (gym, lounges and meeting room), café, creche, landscaping, public realm improvements, and all ancillary site development works. The proposed development will consist of 2 x studio apartments, 59 x 1-bedroom apartments, 103 x 2-bedroom apartments and 7 x 3-bedroom apartments contained in two apartment blocks ranging in height from 1 to 8 storeys. The proposed development provides for outdoor amenity areas, landscaping, under-podium car parking, bicycle racks, bin stores, ancillary plant, and roof mounted solar panels. Vehicular access to the proposed development will be provided via a relocated entrance from Ballymount Road Lower. **(Decision: Grant Permission. Decision Date: 23/06/2021).**

These sites are north-east of the Proposed Development Site. Given the lack of natural habitat within the proposed sites and distance and urban buffer between the Proposed Development site and the above-mentioned permitted developments, it is concluded that there is no potential for in-combination effects to arise as a result of the Proposed Development on local ecology.

5.5.4.2. Relevant policies and plans

Plans and policies that may result in possible in-combination effects with the Proposed Development include:

- Connecting with Nature – Draft Biodiversity Action Plan for South Dublin County 2020-2026
- South Dublin County Council Development Plan 2016-2022
- South Dublin County Council Draft Development Plan 2022-2028

The Connecting with Nature – Draft Biodiversity Action Plan for South Dublin County 2020-2026 is set out to protect and improve biodiversity, and as such will not result in negative in-combination effects with the Proposed Development. In addition, sustainable development including SuDS measures for all new developments is inherent in the objectives of all development plans within the Greater Dublin Area.

The Greenhills Road is proposed to be upgraded as part of SDCC Six-year Road Programme. The upgrade includes the area from Airton Road to Walkinstown Roundabout with new links to Ballymount Avenue, Limekiln Road and Calmount Road. As this development is subject to available funding, and

has not yet been implemented, it is considered that there are no means for the Proposed Development to act in-combination with the proposed road upgrade.

Therefore, there is no potential for in-combination impacts to arise.

Operation of Ringsend WwTP

In June 2018 Irish Water applied for (and subsequently received) planning permission for upgrade works to the Ringsend Wastewater Treatment (WwTP) facility. These are currently on-going and will increase the capacity of the facility from 1.6 million PE to 2.4 million PE. This plant upgrade will result in an overall reduction in the final effluent discharge of several parameters from the facility including BOD, suspended soils, ammonia, DIN and MRP. An Environmental Impact Assessment Report (EIAR) was submitted by Irish Water as part of this application. The EIAR contains sections relating to Marine Biodiversity and Terrestrial Biodiversity, and each contains a section on the 'do-nothing scenario'. These review the effects of the WwTP on biodiversity in Dublin Bay in the absence of the upgrade works and so are relevant to this report.

The EIAR report acknowledges that under the do-nothing scenario "the areas in the Tolka Estuary and North Bull Island channel will continue to be affected by the cumulative nutrient loads from the river Liffey and Tolka and the effluent from the Ringsend WwTP", which could result in a decline in biodiversity (Irish Water, 2018). Nevertheless, the negative impacts of nutrient over-enrichment, which could result in the deterioration of the biological status of Dublin Bay are considered "unlikely" (Irish Water, 2018). This is because historical data suggests that pollution in Dublin Bay has had little or no effect on the composition and richness of the benthic macroinvertebrate fauna. The EIAR notes that "although a localised decline could occur, it is not envisaged to be to a scale that could pose a threat to the shellfish, fish, bird or marine mammal populations that occur in the area." Furthermore, the EIAR notes that significant impacts on waterbird populations foraging on invertebrates in Dublin Bay due to nutrient over-enrichment are "unlikely" to occur (Irish Water, 2018). What is important in the context of this Biodiversity Chapter is that the do-nothing scenario predicts that nutrient and suspended solid loads from the WwTP will "continue at the same levels and the impact of these loadings should maintain the same level of effects on marine biodiversity" and that "if the *status quo* is maintained there will be little or no change in the majority of the intertidal faunal assemblages found in Dublin Bay which would likely continue to be relatively diverse and rich across the bay."

Therefore, it can be concluded that significant effects on marine biodiversity and the Natura 2000 sites within Dublin Bay from the *current* operation of Ringsend WwTP are unlikely. Importantly, this conclusion is not dependent upon any future works to be undertaken at Ringsend. Thus, in the absence of any upgrading works, significant effects to habitats, fauna and Natura 2000 sites are not likely to arise.

On examination of the above it is considered that there are no means for the Proposed Development to act in-combination with any plans or projects.

5.6. Remedial and Reductive Measures

5.6.1. Mitigation By Design

5.6.1.1. Landscape Plan

The Proposed Development will result in the loss of the entire section of scrub along the northern boundary of the Site, a habitat which is considered a KER in this assessment.

In order to mitigate this habitat loss, the following measures have been incorporated into the landscape design:

- The planting scheme uses a mix of native and ornamental tree and shrub species
- The planting of the northern buffer perimeter consists of largely native trees and shrubs (*Prunus spinosa*, *Prunus padus*, *Crataegus monogyna*)
- Incorporation of 'green' components in the SuDS network, namely rain garden (bioswales) planting, wetland planting and Sedum green roofs.
- The planting scheme incorporates hedgerows
- Soft landscaping has been designed with consideration of climate change. Specifically, the following planting has been chosen:

- Native and hardy plants adjusted to urban conditions
- Plants adapted to capturing water in bioswales
- Sun- and shade-loving species
- Pollinator-friendly species (with reference to the All-Ireland Pollinator Plan 2015-2020)

The planting of native flora will improve local biodiversity and increase insect abundance. This will provide additional food for bats and birds at the Site.

5.6.2. Construction Phase

5.6.2.1. Aquatic Fauna and Surface Waters

The following measures set out below will protect surface waters throughout the Construction Phase:

General Surface water mitigation measures

- Storm drain inlets which could receive stormwater from the project will be protected throughout the Construction Phase. Inlet protection will be installed before soil-disturbing activities begin.
- Any imported materials will, as much as possible, be placed on site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.
- Refuelling of plant during Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.
- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site.
- All personnel working on site will be trained in pollution incident control response.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005).
- Portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel. All associated waste will be removed from site by a licenced waste disposal contractor.
- Runoff from machine service and concrete mixing areas will not enter the nearby drainage network.

All wastewater generated on-site during the Construction Phase will be stored and disposed of appropriately. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into the foul/surface water drainage network.

Contaminated soils if encountered will be segregated. If dewatering is required groundwater will be treated as required prior to discharge as agreed with Local Authority.

5.6.2.2. Reduction of noise and dust related impacts

Reduction of noise impacts

Short-term increases in disturbance levels as a direct result of human activity and through increased generation of noise during the Construction Phase can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing.

Noise generated during the Construction Phase of the Proposed Development could cause temporary disturbance to a number of faunal species in the vicinity of the Site of the Proposed Development. To mitigate this disturbance, the following measures will be implemented:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoidance of unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.
- Proper balancing of plant items with rotating parts.
- Keep internal routes well maintained and avoid steep gradients.
- Minimise drop heights for materials or ensure a resilient material underlies.
- Use of alternative reversing alarm systems on plant machinery.
- Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.
- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to nesting birds or any other fauna species in the vicinity of the Site of the Proposed Development will be reduced to a minimum.

Reduction of dust related impacts

The following general dust control measures will be followed for the duration of the Construction Phase of the Proposed Development and will ensure no significant dust related impacts occur to nearby sensitive receptors including local faunal species.

- In situations where the source of dust is within 25m of sensitive receptors screens (permeable or semi-permeable) will be erected.
- Haulage vehicles transporting gravel and other similar materials to site will be covered by a tarpaulin or similar.
- Access and exit of vehicles will be restricted to certain access/exit points.
- Vehicle speed restrictions of 20km/hr will be in place.
- Bowsers will be available during periods of dry weather throughout the construction period.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil thereby reducing the amount of dust.
- Stockpiles will be stored in sheltered areas of the site, covered, and watered regularly or as needed if exposed during dry weather.
- Gravel should be used at site exit points to remove caked-on dirt from tyre tracks.
- Equipment should be washed at the end of each work day.
- Hard surfaced roads will be wet swept to remove any deposited materials.
- Unsurfaced roads will be restricted to essential traffic only.
- If practical, wheel-washing facilities should be located at all exits from the construction site.
- Dust production as a result of site activity will be minimised by regular cleaning of the site access roads using vacuum road sweepers and washers. Access roads should be cleaned at least 0.5km on either side of the approach roads to the access points.

- Public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.
- The frequency of cleaning will be determined by the site agent and is weather and activity dependent
- The height of stockpiles will be kept to a minimum and slopes should be gentle to avoid windblown soil dust.
- The following will be dampened during dry weather:
    - Unpaved areas subject to traffic and wind
    - Stockpiles
    - Areas where there will be loading and unloading of dust-generating materials
- Under no circumstances should wastewater from equipment, wheel or surface cleaning enter the surface water drainage network.

5.6.2.3. Bats

No bat potential trees (being used as roosts) were found during survey as the Site is mostly Buddleia scrub and willow trees. However, should bats be noted as present during felling/scrub clearance, which is highly unlikely due to the low landscape suitability of the area for bats, the lack of suitable commuting and foraging habitat on Site, and the lack of bat activity/presence on the Site of the Proposed Development during both the April 2021 and March 2022 surveys, then works will cease immediately and a derogation licence from the National Parks and Wildlife Services (NPWS) acquired.

The majority of the buildings on the Site were deemed *Negligible* for bat roost suitability; however, a small number (No. 1, 2, 3, 6, 7, 8, 9 & 17) see Bat Report appended to this chapter) had 'Low' potential, i.e. "a structure with one or more potential roost sites that could be used by individual bats opportunistically." Therefore, as a cautionary recommendation a pre-demolition bat survey should be carried out on these buildings.

5.6.2.4. Birds

The warehouses and buildings designated for demolition will be checked by a qualified ecologist for nesting birds prior to demolition. Any clearance of vegetation will ideally be carried out outside the main breeding season, i.e. 1st March to 31st August, in compliance with the Wildlife Act 2000. Should any vegetation removal be required during this period, this vegetation will be checked for bird nests, and if any are noted during this evaluation prior to removal, a derogation licence will be required from the NPWS. Similarly, a derogation licence will be required for the removal of nests within the warehouses or buildings if found during the pre-demolition survey. This would note the section of habitat that is a nest site, the precise location within the hedgerow/trees/warehouses, the species of bird present; and also elaborate the means by which the birds would be protected prior to nest removal. If eggs have been laid, the nest will be protected until the young have fledged after which time the nest could be destroyed (under licence from the NPWS only). This would also require further compensatory measures including nesting sites for birds if practicable.

5.6.2.5. Fox

Although Foxes are not afforded legal protection in Ireland, care should be taken when disturbing the den and the area around it. Fox are protected from a variety of hunting/extermination techniques as per the **Wildlife Acts 1976 to 2012**; and from acts of cruelty as per the **Animal Health and Welfare Act 2013**.

The den should not be disturbed during the breeding/rearing season, which typically lasts from **March to June.** If destroying the den at other times, care should be taken to allow the occupant to escape.

5.6.2.6. Invasive Flora

To prevent the spread of Butterfly Bush within and outside the Site boundary management options for its removal are provided below:

The Butterfly Bush is a member of the Buddlejaceae family. It is very fast growing and can reach 2m in its first year, producing flowers and setting seed. As Butterfly Bush tolerates very poor soils, it is capable of growing on walls, rock outcrops or sub-soils (NRA, 2010). The following is based on NRA (2010) guidelines:

Management methods such as digging it out are applicable only to minor infestations at the initial stage of invasion. Hand-picking of young plants is feasible but should be undertaken with care to avoid soil disturbance which can give rise to a flush of new seedling. Grubbing of mature stands as a sole attempt at control is not recommended for the same reason. After uprooting, it is essential to plant the ground in order to prevent a flush of new seedling growth. When it is cut, Buddleia grows back from the stump very vigorously. Mowing of young plants does not provide control as they re-sprout with vigour. Where removal of mature plants is not feasible in the short term, the flower heads should be cut off in June before seed set. Chemical control recommended practice for the application of herbicides requires cutting back of plants to a basal stump during active growth (late spring to early summer) which is then treated (brushed on) immediately with a systemic weed killer mix (Starr et al, 2003). Foliar application of approved herbicides may be adequate for limited infestations of younger plants, but should be followed up at 6 monthly intervals. At this point it must be stressed that all Plant Protection Products must be used in accordance with the product label and with Good Plant Protection Practice as prescribed in the European Communities (Authorization, Placing on the Market, Use and Control of Plant Protection Products) Regulations, 2003 (S.I. No. 83 of 2003). Again, it should be noted that it is an offence to use Plant Protection Products in a manner other than that specified on the label. The methods outlined are not in accordance with the product label and so it will be necessary to discuss the use of such methods with the Pesticides Control Service with a view to seeking approval under the derogation procedures provided under the Plant Protection Regulations.

5.6.2.7. Biosecurity

The following will be adhered to, to avoid the introduction of invasive species to the Proposed Development site.

- Any material required on the site will be sourced from a stock that has been screened for the presence of any invasive species by a suitably qualified ecologist and where it is confirmed that none are present.
- All machinery will be thoroughly cleaned and disinfected prior to arrival on site to prevent the spread of invasive species.

5.6.3. Operational Phase

5.6.3.1. Bats

In order to preserve the commuting potential of the treelines/hedgerows remaining and to minimise disturbance to bats utilising the Site in general, the lighting of the Proposed Development has been designed to minimise light-spill onto habitats used by the local bat population for foraging or commuting (Hormon O'Brien, 2021). Specifically:

- Lighting has only been installed where necessary for public safety. These lights have been designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations while still providing the primary function of safely lighting the circulation routes.

- Reflectance's – Downward lighting can be reflected from bright surfaces. To minimize bat disturbance, the design avoids the use of bright surfaces and incorporates darker colour lamp heads and poles to reduce reflectance.

- Shielding of Luminaires & Light - To minimize bat disturbance, the design avoids the use of upward lighting by shielding or by downward directional focus.

- Type of Light – To minimize bat disturbance, the design avoids the use of strong UV lighting. The lighting design is based on the use of LED lighting which has minimal or no UV output of significance.

Furthermore, the planting of native Irish tree species has been incorporated into the landscape design. A series of 5+ bat boxes will be erected on trees around the Site to provide future roosting opportunities.

5.6.3.2. Birds

It is recommended that Swift Boxes or Bricks are incorporated into the Proposed Development where possible. The incorporation of Swift Boxes or Bricks would help recover the declining swift population, which are now Red Listed in Ireland (Gilbert et al., 2021). The following recommendations are extracted from "Saving Swifts" by Birdwatch Ireland[7].

Swift bricks/boxes:

- should be constructed of long-lasting material and securely fixed in position.
- should be erected at least five metres above ground level
- should be erected in sheltered cool areas out of the sun, or under an overhang and /or under the eaves. Bricks can be placed at any aspect, however, as they tend not to overheat the way that externally fitted boxes can.
- should have a clear airspace in front for access
- should be grouped (side by side in rows) as swifts are colony nesters
- should avoid sites which can be accessed by predators- cats, squirrels, magpies, rats.
- should avoid sites near plate glass windows because they are a known collision hazard for birds.
- should not be placed directly above ledges or other obstructions. Swifts drop before taking flight and can collide with obstacles below the nest entrance.
- should not be one above the other.
- should not be near spotlights or later fit spotlights near them.

It is advised to install a Swift calling system to attract Swifts and encourage them to take up residence at a new site.

5.7. Predicted Impact of the Proposed Development

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the Proposed Development may have, assuming all mitigation measures are fully and successfully applied.

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 5.11 provides a summary of the impact assessment for the identified Key Ecological Resources (KERs) and details the nature of the impacts identified, mitigation proposed and the classification of any residual impacts.

The majority of the residual impacts arising as a result of the Proposed Development are negligible. Negative, permanent, slight impacts will arise at the local scale due to the loss of the fox den at the Site. Positive impacts will arise as a result of the planting of hedgerows, shrub and tree species as part of project design, as well as the incorporation of SuDS measures into the project design.

[7] https://birdwatchireland.ie/app/uploads/2019/10/Saving-Swifts-Guide_pdf.pdf

Table 5.11. Summary of potential impacts on KERs, mitigation proposed and residual impacts.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Scrub (WS1) & Ornamental/non-native shrub (WS3)	Local Importance (higher value)	Loss of habitat at the Site	Negative	Local	Permanent	Moderate	Planting of a range of native and non-native shrub and tree species to take place as part of project design. Pollinator friendly species incorporated into the landscape plan Incorporation of 'green' components in the SuDS network, namely rain garden (bioswales) planting, wetland planting and sedum green roofs	**Negligible**
Aquatic Fauna in the Camac River (fish, crayfish, Otter)	Local Importance (higher value)	Deterioration in water quality due to surface water discharges associated with the Construction Phase	Negative	Local	Short-term	Moderate	Mitigation measures to protect surface waters as outlined in section 7.1.2	**Negligible**
Fox *Vulpes vulpes*	Local Importance (higher value)	Mortality of individuals if occupying the den at the Site during the Construction Phase	Negative	Local	Permanent	Moderate	The den should not be disturbed during the breeding/rearing season, which typically lasts from March to June. If destroying the den at other times, care should be taken to allow the occupant to escape.	**Permanent, Slight**
Bat assemblage	Local Importance (higher value)	Mortality during demolition Loss of sections of potential foraging and commuting habitat. Disturbance/removal of	Negative Negative	Local Local	Permanent Permanent	Moderate Slight	Pre-demolition bat survey to be carried out on 'Low Potential' buildings bui.	**Negligible**

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
		foraging routes/habitat due to increased lighting as a result of the Proposed Development.					Bat sensitive lighting measures incorporated into the public lighting design Placement and maintenance of bat boxes (minimum 5) on trees along the Site boundary.	**Positive; long-term**
Breeding-Bird assemblage	Local Importance (higher value)	Loss of potential foraging and nesting habitat. Disturbance due to noise generated during Construction Phase.	Negative	Local	Permanent Short-term	Moderate Short-Slight	Planting of shrub and tree species to take place as part of project design. No removal of vegetation to take place during the nesting season. Construction related noise control/minimisation measures to be implemented.	**Positive; Permanent.** **Negligible.**

5.8. Interactions

This section provides a description of impact interactions together with potential indirect, secondary and cumulative impacts.

The key environmental interactions of importance to biodiversity relate to Landscape & Visual, Water & Hydrology and Land & Soils. The mitigation measures for the Proposed Development have been designed to minimise the potential impact that the Construction and Operational phases may have on the receiving environment.

The landscape design for the Proposed Development takes into account the requirements to benefit biodiversity, both locally and within the wider landscape.

5.9. Monitoring

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant.

There is no requirement for monitoring.

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6.0 LAND AND SOILS

6.1 Introduction

This chapter assesses and evaluates the potential impacts of the proposed development on the land, soil, geological and hydrogeological aspects of the proposed development site and the surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely environmental effects.

This chapter has been prepared by Marcelo Allende (BSc BEng), Liam Bruen (BSc) and Teri Hayes (BSc MSc PGeol EurGeol). Marcelo is a Water Resources Engineer with over 15 years of experience in environmental consultancy and water resources studies. Marcelo is an Environmental Consultant with AWN Consulting, a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI). Liam is an Environmental Consultant with 1 years' experience working in the Environmental management sector. Liam holds a Bachelor of Science from Technological University Dublin in Environmental Management. Liam has worked on a number of different projects that have involved; New Raw water intake systems, IE licencing requirements, environmental reporting, desktop data surveys, mapping, EIAR & AER development. Liam is a member of the ESAI. Teri is a hydrogeologist with over 25 years of experience in water resource management and impact assessment. She has a Masters in Hydrogeology and is a former President of the Irish Group of the Association of Hydrogeologists (IAH) and has provided advisory services on water related environmental and planning issues to both public and private sector bodies. She is qualified as a competent person as recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons www.igi.ie). Her specialist area of expertise is water resource management eco-hydrogeology, hydrological assessment and environmental impact assessment.

6.2 Research Methodology

This chapter evaluates the effects, if any, which the proposed development will have on Land, Soils, Geology and Hydrogeology as defined in the Environmental Protection Agency (EPA) 'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2017) as well as in line with Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended) and Article 5 and Annex IV of the EIA Directive (2011/92/EU, as amended). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this geological and hydrogeological assessment and classification of environmental effects. Due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI 2013). Finally, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII) formerly National Roads Authority (NRA) (TII, 2009) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the Draft EPA Guidelines (2017) publication).

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII (2009) criteria for rating the magnitude and significance of impacts on the geological related attributes and the importance of hydrogeological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-5 in Appendix 6.1.

The principal attributes (and effects) to be assessed include the following:

- Geological heritage sites within the vicinity of/ within the perimeter of the proposed development site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural use(s) of subsoil around the site;
- Quarries or mines in the vicinity and the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well as any requirement to remove it off-site as waste for disposal (D) or recovery (R) options;
- High-yielding water supply wells/ springs in the vicinity of/ within the site boundary to within a 2km radius and the potential for increased risk presented by the proposed development;
- Classification (regionally important, locally important etc.) and extent of aquifers underlying the site boundary area;
- Increased risks presented to the groundwater bodies by the proposed development associated with aspects such as, for example, the removal of subsoil cover, removal of aquifer (in whole or part thereof), spatial drawdown in water levels, alteration in established flow regimes, and changes in local/ regional groundwater quality;
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally.

6.2.1 Source of Information

Desk-based geological information on the substrata (both Quaternary deposits and bedrock geology) underlying the extent of the site was obtained through accessing databases and other public archives where available. Data was sourced from the following:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping;
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information;
- National Parks and Wildlife Services (NPWS) – Protected Site Register; and
- South Dublin County Council - illegal landfill information.

Site-specific data was derived from the following sources:

- Ground Investigation Report, Greenhills Road, Lohan & Donnelly, March 2021.
- Engineering Services Report. Residential Development at Greenhills Road, Walkinstown, Dublin 12. Lohan & Donnelly Consulting Engineers. November 2021;
- Various design site plans and drawings; and

- Consultation with site engineers/ planners/ architects.

6.3 Receiving Environment

The receiving environment is discussed in terms of land geology, soils, hydrogeology and site history including potential for existing and historical contamination.

6.3.1 General Description of the Site

6.3.1.1 Site Setting

The surrounding environment can be described as industrial and enterprising in the immediate environs but mostly to the northwest. Residential, parkland and community uses occupy the majority

of land to the south, East and Northeast. The Greenhills community college is located c. 600 m south of the development. Tymon Park lies 1km south of the proposed development and is an important resource for the local community. There are also a number of national schools and communal building within the local environment. The site location map for the proposed development is presented in presented in Figure 6.1 below.

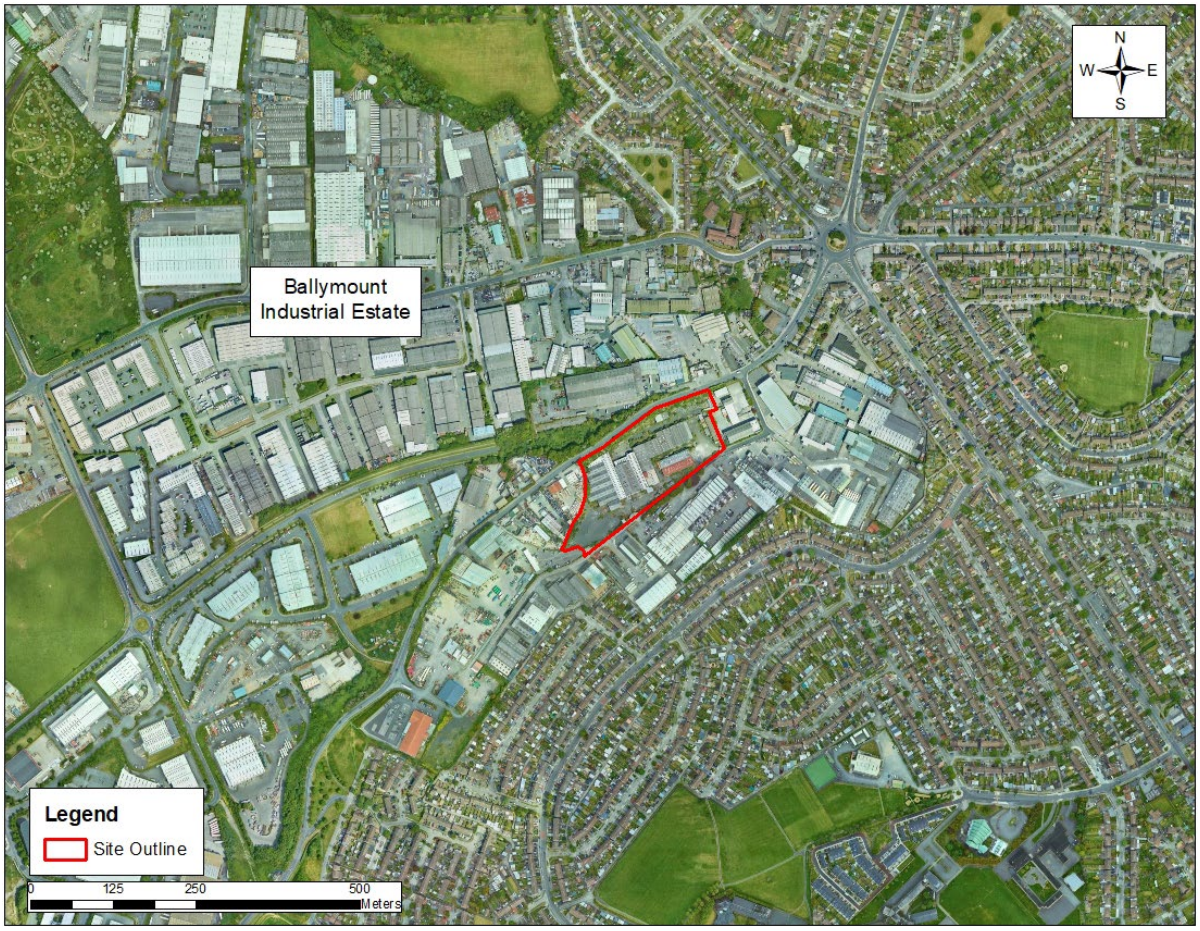


Figure 6.1 Site Location Map

6.3.1.2 Local Topography

Topographical survey of existing site indicates that the site is gradually sloping down from west to east and north to south with a very steep, in places almost vertical ascent/decent transition from the site to the Greenhills Road neighbouring the northern site boundary. The western site boundary, abutted to the boundary of the neighbouring development is separated via a retaining wall, with a level difference between the site in question and neighbouring development of approximately 6 meters.

The site is mostly flat at 57.0 m above Ordnance Datum (mAOD). The proposed Project gradient varies between 55 m mAOD in the East and 58 mAOD in the West. The site was historically used as a gravel quarry, with a large retaining wall structure marking the southwestern boundary of the site. The site is currently occupied by several derelict industrial/commercial buildings and is situated near the Walkinstown Roundabout.

There are industrial and commercial units adjacent to the south, east and west within the Greenhills industrial estate. The site is bounded to the north by Greenhills Road (R918). Brennan's Bread, Murray motorsport and Cullen car parts are among adjoining businesses.

Greenhills Community College and Community centre lie within Greenhills Park which is located just over 600m to the south of the proposed development. East of Greenhills Park lies the Holy Spirit

senior and primary schools as well as the Holy Spirit church c 750m South of the proposed development. St Pauls Secondary school is also located here.

6.3.1.3 Areas of Geological Interest and Historical Land Use

The GSI (2021) on-line mapping was reviewed to identify sites of geological heritage for the Site and surrounding area. There are no recorded sites on / at the Site of the proposed Project, or which could be considered suitable for protection under this programme or recorded in the South Dublin County Development Plan (2016 – 2022) or South Dublin County Development Plan (2022-2028).

The nearest Geological Heritage Site is the Greenhills Esker, which is located c. 1.20 km to the southwest of the site. Due to the distance and the rise in elevation there is a negligible risk to this heritage site.

Details of the Site history and previous land use are included in Chapter 13 -Archaeology & Cultural Heritage. The assessment of site history confirms that until recently, the site has been in use as a gravel pit since the earliest mapping available (1837 – 1842), refer to Figures 6.2 to 6.5 below.

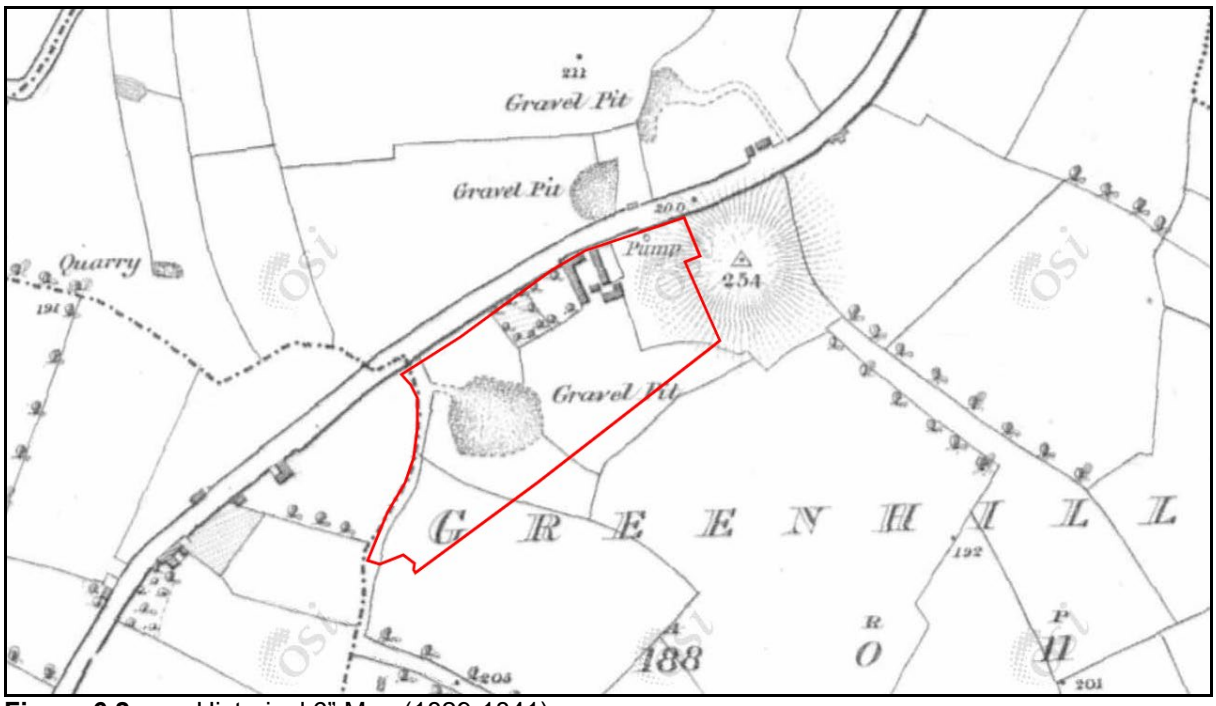


Figure 6.2 Historical 6" Map (1829-1841)

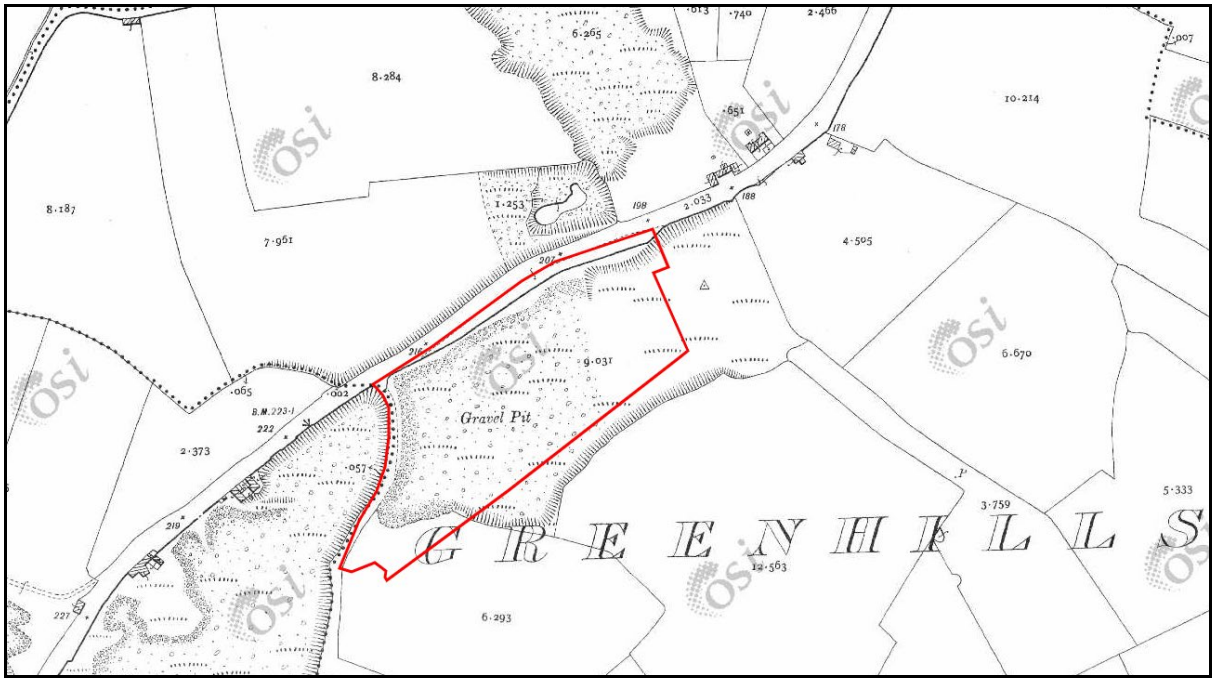


Figure 6.3 Historical 25" Map (1897-1913) (Source: OSi)

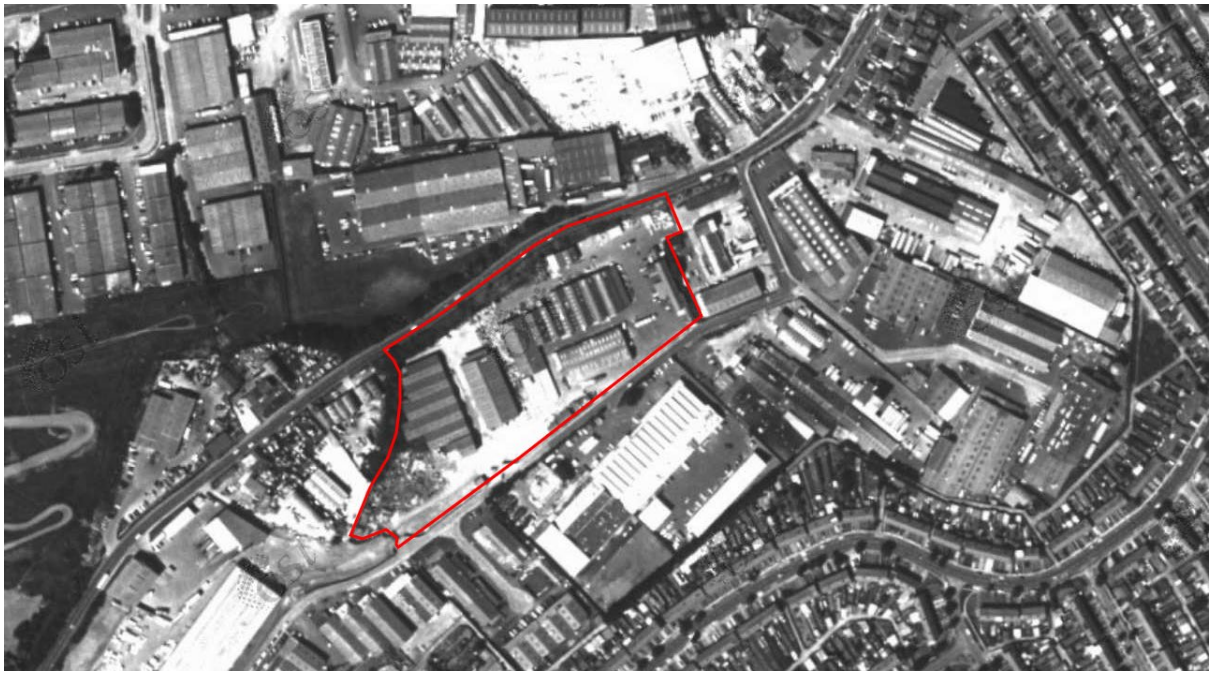


Figure 6.4 Aerial 1995 Map (Source: OSi)

Figure 6.5 Aerial 2000 Map (Source: OSi)

According to the EPA (2021), there are a number of licensed IPPC and IED facilities in the vicinity of the site. The nearest active IPPC licensed facility is registered to Plateco ZN Limited, license number P0277-01 and is located in the Mulcahy Keane Industrial estate, c. 150m northeast of the proposed development.

The nearest active IE licensed facility is registered to Hitech Plating, license number P0276-01 at Unit D3, Ballymount Industrial Estate, Walkinstown, Dublin 12, c. 200m northwest of the proposed development.

Any of these facilities are located upgradient of the proposed development site.

There is no record of any recorded landfills or licensed waste facilities in the vicinity of the site.

6.3.2 Soils

The Teagasc soil mapping indicates that the soils within the site boundary are comprised entirely of made ground. Areas of Shallow well drained mineral (BminSW) are located just above the northwest boundary and consist of mainly sands and gravels primarily derived from the limestone bedrock. Figure 6.6 below presents the soils map indicating the soil lithologies discussed above.

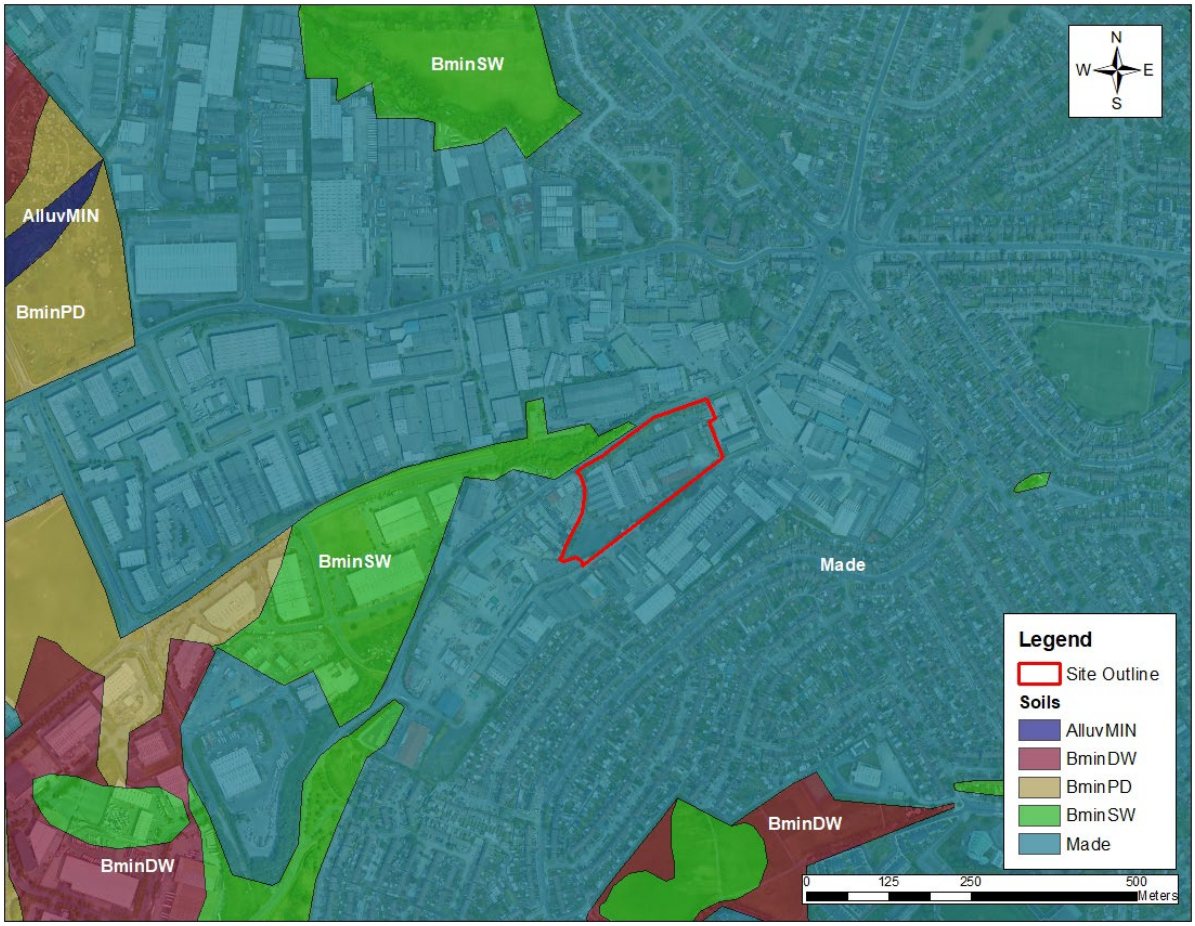


Figure 6.6 Soils Map with the proposed site layout (Source: EPA/ Teagasc, 2022)

6.3.3 Subsoils

The Quaternary geological period extends from about 1.5 million years ago to the present day and can be sub-divided into the Pleistocene Epoch, which covers the Ice Age period, and which extended up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day. The GSI/ Teagasc mapping database of the subsoils in the area of the proposed development site indicates one (1) no. principal soil type, as shown in Figure 6.7 below. The subsoil types present across the site are Gravels derived from Limestone (GLs). This till is made up of sands and gravels are less permeable than alluvium subsoils but more permeable than tills.

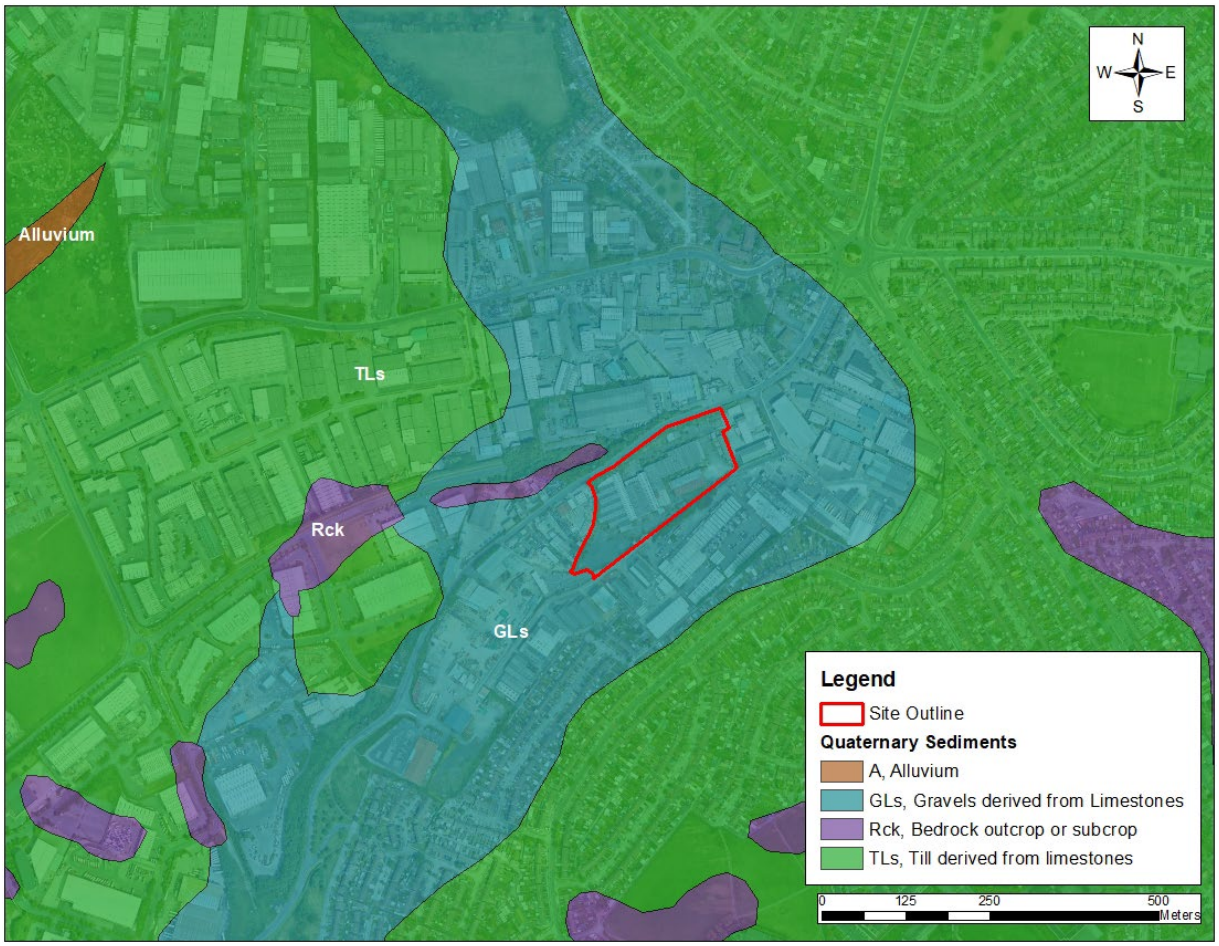


Figure 6.7 Soils Map with the proposed site layout (Source: EPA/ Teagasc, 2022)

Ground Investigations Ireland (GII) carried out an environmental site investigation of the proposed development site in January 2021. The scope of works included observations of existing conditions, borehole drilling, subsoil sampling, interpretation of chemical data and reporting. The sequence of subsoils deposits recorded during the site investigations are shown in Table 6.1 below. Figure 6.8 below also presents the location of the SI points. Site investigation locations are shown in Appendix 6.2. Site investigation works entailed the following:

- Carry out 14 No. Window Sample Boreholes to recover soil samples
- Carry out 10 No. Cable Percussion boreholes to a maximum depth of 4.50m BGL
- Installation of 3 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing

Table 6.1 Strata Noted from Onsite Investigations (GII, 2021)

Name	Depths/ Notes
Surfacing	Tarmacadam or Concrete surfacing was present in all exploratory holes and was present to a maximum depth of 0.30 mbgl (meters below ground level).
Made Ground	Made Ground and suspected Made Ground deposits were encountered beneath the surfacing and were present to a depth of between 0.40m and 2.40m BGL, with the full extent of these deposits not determined at BH02, BH02A, BH03, WS02, WS02A, WS02B, WS08, and WS08A. These deposits varied across the site but were generally were described as either a *brown clayey sandy subangular to subrounded fine to coarse Gravel* or a *greyish brown sandy gravelly Clay* and contained *rare fragments of red brick.*
Cohesive Deposits	Cohesive deposits were encountered beneath the made ground and/or surfacing at BH03A, BH04, BH05, BH06, WS03, WS04, WS05, WS09, WS10, and WS11. These deposits were described typically as *dark brown/grey slightly sandy gravelly CLAY with*

Name	Depths/ Notes
	occasional cobbles. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. These deposits had occasional, some or many cobble and boulder content were noted on the exploratory hole logs.
Granular Deposits	Granular deposits were encountered beneath the made ground and/or cohesive deposits at BH01, BH04, BH05, BH06, BH07, BH08, WS01, WS06, and WS07. These deposits were generally described as *grey/brown clayey subangular to subrounded fine to coarse GRAVEL with occasional cobble*s and *brown clayey gravelly fine to coarse SAND*. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional, some or many cobble and boulder content also present where noted on the exploratory hole logs. Based on the SPT N values the deposits are typically medium dense and become dense with depth.

Figure 6.8 Site Investigations Points (Source: GII, 2021)

The boreholes drilled encountered bedrock at depths between 3.1-4.5 mbgl with the exception of the south portion of the site where bedrock was found at 0.8-1.8 mbgl (at BH02 and BH03 respectively)

6.3.4 Bedrock Geology

Reference to the GSI Bedrock Geology Map indicates that the Site is underlain by Lower Carboniferous (Late Chadian to Asbian Stage) Limestones which is referred to as Lucan Formation

(Rock Unit code: CDLUCN). This geological formation comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. The Bedrock Geology Map is shown in Figure 6.9 below.

Figure 6.9 Bedrock Geology Map with the proposed site layout (Source: GSI, 2022)

There is no evidence of karstification at the vicinity of the Site according to the GSI Karst and well database.

6.3.5 Regional Hydrogeology

The GSI classifies the principal aquifer types as:

Bedrock Aquifer

- Lk - Locally Important Aquifer - Karstified.
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones.
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive. Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones.
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive.
- Rkd - Regionally Important Aquifer (karstified diffuse).

Gravel Aquifer

- Lg - Locally Important Aquifer - Sand & Gravel.
- Rg - Regionally Important Aquifer - Sand & Gravel.

Reference to the GSI National Draft Bedrock Aquifer Map for the Site (refer to Figure 6.10 below) indicates that the Site is underlain by a Locally Important Bedrock Aquifer (Ll), which is described by the GSI as bedrock as being “moderately productive only in local zones”.

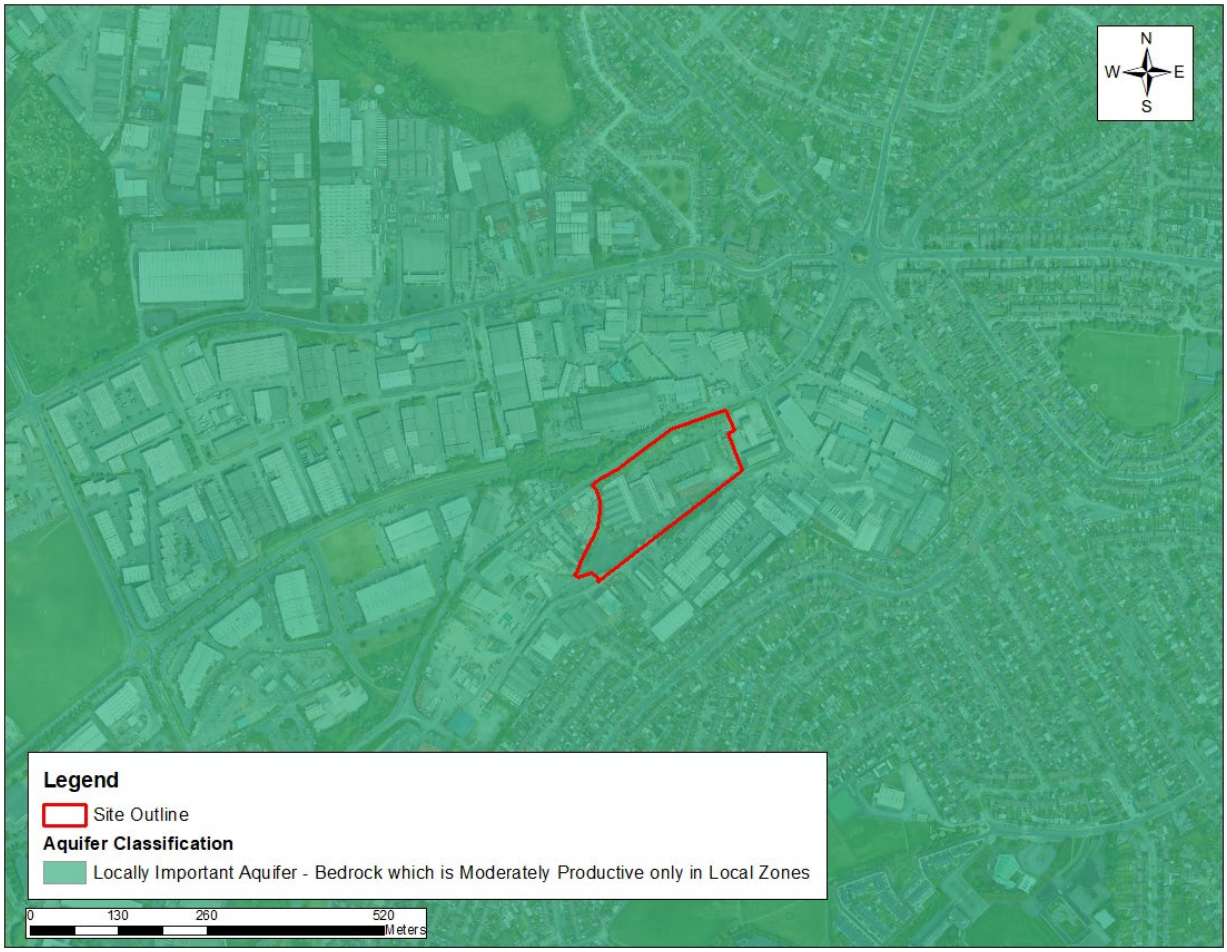


Figure 6.11 Bedrock Geology Map with the proposed site layout (Source: GSI, 2022)

6.3.6 Aquifer Vulnerability

Aquifer vulnerability' is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures / fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of or of mixtures of peat, sand, gravel, glacial till, clays or silts).

The GSI presently classifies the aquifer vulnerability in the region of the Site as 'Moderate' (M) to 'High' (H). As can be seen from Table 6.2 below, a Moderate to High vulnerability with clayey subsoil denotes a depth to bedrock of 3-10 m, indicating a moderate protection of the underlying aquifer by low permeability subsoil. It has to be noted that cohesive and granular deposits were encountered across the site during the site investigation works.

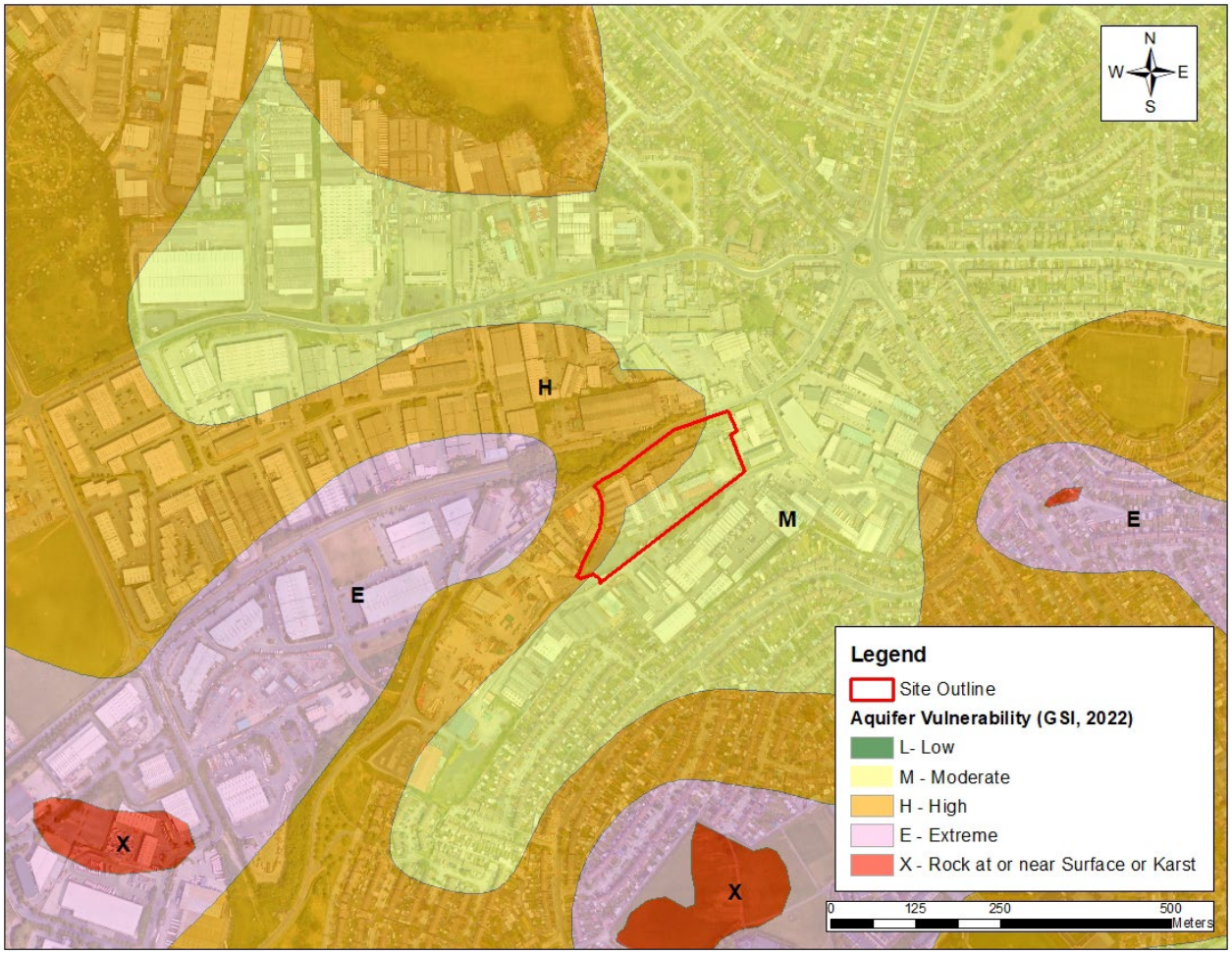


Figure 6.10 Aquifer Vulnerability Map with the proposed site layout (Source: GSI, 2022)

Table 6.2 below presents the GSI vulnerability mapping guidelines with specific reference to subsoil thickness and characteristics.

Table 6.2 Vulnerability Mapping Guidelines (Source: GSI, 2021)

Vulnerability Rating	Hydrogeological Condition				
	Subsoil Permeability (type) and Thickness			Unsaturated Zone	Karst Features
	High Permeability (sand/gravel)	Moderate Permeability (e.g. sandy subsoil)	Low Permeability (e.g. clayey subsoil, clay, peat)	(Sand/ gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3 m	0 - 3 m	0 - 3 m	0 - 3 m	-
High (H)	> 3 m	3 - 10 m	3 - 5 m	> 3 m	n/a
Moderate (M)	n/a	> 10 m	5 - 10 m	n/a	n/a
Low (L)	n/a	n/a	> 10 m	n/a	n/a

Notes: (1) n/a: Not applicable

(2) Precise permeability values cannot be given at present

(3) Release point of contaminants is assumed to be 1-2 below ground surface

According to site investigations carried out in the subject site, bedrock was encountered at depths between 3.1-4.5 mbgl with the exception of the south portion of the site where bedrock was found at 0.8-1.8 mbgl. This stratification is representative of a 'High' to 'Extreme' vulnerability classification.

6.3.7 Groundwater Wells and Flow Direction

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. This current index, however, indicates there are no groundwater wells, boreholes or dug wells within the Site boundary. In the immediate vicinity of the Site, specifically to the north, there is a borehole recorded in the GSI Well Card within 2 km of the Site, drilled in 1989. It had a good yield (414 m3/d) and a depth of 56.2 mbgl. Refer to Figure 6.11 below.

The flow direction in the overburden generally follows no fixed pattern or trend. Flows of this nature are typical of low permeability clay strata with discontinuous gravel lenses, where often the water level measures represent pore water seepages into the overburden monitoring well (opposed to bedrock wells) or perched groundwater conditions (not bedrock aquifer water). Bedrock was not drilled during the site investigation undertaken, so no accurate groundwater gradient can be derived. However, based on regional groundwater flow the flow direction will be north towards the Walkinstown Stream.

There is no risk to any public water supply as the nearest drinking water protection area is located 12.7 km southwest of the Site in Co. Kildare at Kilteel.

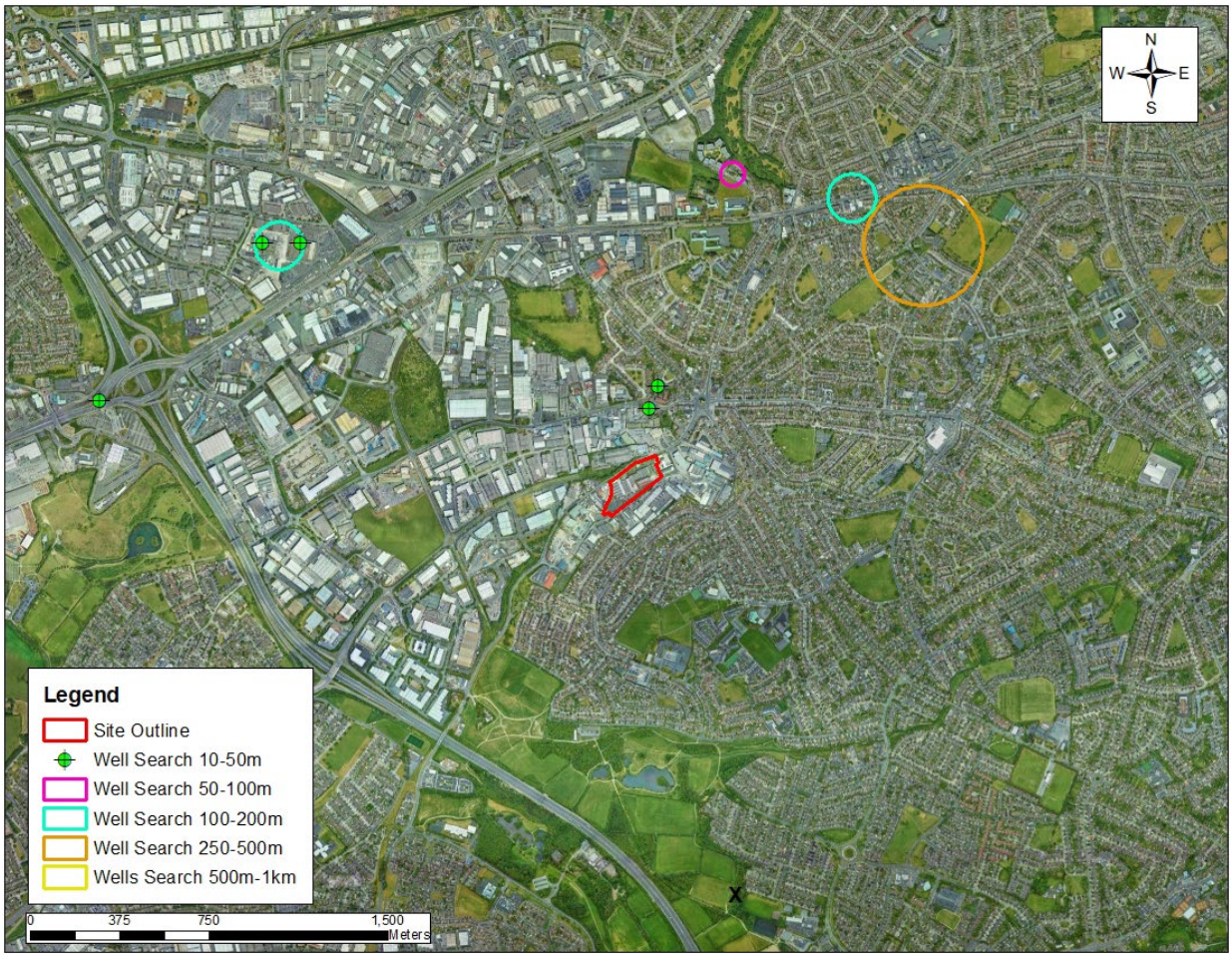


Figure 6.11 GSI Well Search Map (Source: GSI, 2022)

6.3.8 Soil Quality

There are no legislated threshold values for soils in Ireland. As such soil samples were compared to a Generic Assessment Criteria (GAC) derived to be protective of human health, water bodies (including groundwater) and also ecology for a resident and commercial/industrial end use.

Generic Assessment Criteria in the UK has been derived using the Contaminated Land Exposure Assessment (CLEA) model to be protective of human health for a number of different land uses. LQM (Land Quality Management) and the CIEH (Chartered Institute of Environmental Health) developed a document in July 2009 detailing their own research and derivation of their own 'LQM GACs'. A total of 82 substances including many organic substances had LQM GACs derived, for the standard land uses of residential, commercial/industrial and allotments. This was updated in 2015 following further research and the derived results are now called LQM/CIEH Suitable 4 Use Level (S4UL). The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant S4ULs have been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance the commercial scenario has been considered. Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content.

The UK values do not have any legal standing within the Republic of Ireland and no statutory guidance for assessing the significance of soil contamination currently exists. However, the values do provide a means of placing the data within context when considering magnitude of risk and have been used in that capacity for this assessment.

During the 2021 site investigations, samples were recovered from the on-site borehole locations and sent for analysis. In order to assess materials, which may be excavated and removed from Site, in terms of waste classification, a selection of samples collected were analysed for a suite of parameters which allows for the assessment of the soils in terms of total pollutant content for classification of materials as hazardous or non-hazardous referred to as the 'RILTA Suite'. In total, 17 no. soil samples were collected by GII in 2021 from window samples and boreholes drilled and were analysed throughout the subject site. The suite was selected due to the unknown origin of the material underlying the Site and no evidence of specific contaminants of concern highlighted in the Site history. The laboratory testing was completed by Element Materials Technology (EMT) in the UK; EMT is a UKAS accredited laboratory (BSM, 2021).

Full laboratory result tables for the soil samples are presented in Table 6.3. The soil samples were analysed for the following parameters:

- Metals (Sb, As, Ba, Cd, Cr, Cu, Pb, Hg, Mo, Ni, Se and Zn);
- Polychlorinated Biphenyls (PCB);
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Waste Acceptance Criteria (WAC) for inert waste landfills in accordance with the 2002 European Landfill Directive (2002/33/EC).
- BTEX compounds (benzene, toluene, ethylbenzene and xylenes) and methyl tert-butyl ether (MTBE);
- Total organic carbon (TOC); and
- Leachable component of a range of organic and inorganic parameters.
- Asbestos.

The laboratory analysis did not identify any asbestos containing materials (ACMs) in any of the samples tested. All of the samples collected at the site were categorised as inert (as per Council Decision annex 2003/33/EC). There was no evidence of waste deposited on-site during Site investigation works.

The full analytical laboratory report is presented in Appendix 6.2. Soil results were compared to the Generic Assessment Criteria (GAC) concentrations. GACs are soil concentrations that have been

derived for a defined set of generic assumptions and are used as trigger values in determining whether further risk management action is required in cases where detailed quantitative risk assessment is not being undertaken. There are no published Generic Assessment Criteria for soils in the Republic of Ireland. Instead reliance is often placed on criteria from the UK and the Netherlands.

As can be seen un Table 6.3 below, all parameter concentrations recorded values below the most conservative threshold value for the LQM/CIEH for HHRA (Human Health Risk Assessment) Residential and Commercial Threshold at 1% SOM.

Table 6.3 Soil Quality Results

Sample ID					WS01	WS03	WS04	WS05	WS06	WS09	WS10	WS11	WS08A
Laboratory					Element	Element	Element	Element	Element	Element	Element	Element	Element
Report					21/925	21/925	21/925	21/925	21/925	21/925	21/925	21/925	21/925
Sample Type					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth					0.5	1.5	1.3	2.1	1.0	1.7	0.5	2.5	1.0
Sample Date					18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021	20/01/2021	20/01/2021	20/01/2021
Parameters	**Units**	**LOD**	**LQM/CIEH S4ul for HHRA Residental Threshold (mg/kg)**	**LQM/CIEH S4ul for HHRA Commercial Threshold (mg/kg)**									
Metals													
Antimony	mg/kg	<1	nv	nv	2	1	2	2	2	2	2	2	1
Arsenic	mg/kg	<0.5	40	640	11.7	6.2	8.5	7.4	5.8	9.4	12.1	9.1	4.0
Barium	mg/kg	<1	nv	nv	67	51	49	43	40.0	50.0	66.0	64.0	30.0
Cadmium	mg/kg	<0.1	85	190	2.1	1	1.5	1.6	1.5	1.5	2.2	1.6	1
Chromium	mg/kg	<0.5	910	8,600	51	30.9	37.9	24.6	66.4	67.7	42.6	34.8	71.7
Copper	mg/kg	<1	7,100	68,000	27	14	19	21	15	25	29	22	11
Lead	mg/kg	<5	nv	nv	35	23	13	12	8	13	18	11	11
Mercury	mg/kg	<0.1	1.2	58vap (25.8)	-	-	-	-	-	-	-	-	-
Molybdenum	mg/kg	<0.1	nv	nv	4.6	2.4	3.3	3.1	5.4	5.9	5.1	4.7	5.8
Nickel	mg/kg	<0.7	180	980	34	17.6	26.1	25.6	21.7	44.4	37.9	31.3	13.4
Selenium	mg/kg	<1	430	12,000	-	-	-	5	-	1	1	-	-
Zinc	mg/kg	<5	40,000	730,000	94	47	72	64	62	87	102	83	45
PAH MS													
Naphthalene	mg/kg	<0.04	2.3	190(76.4)sol	-	0.08	-	-	-	-	-	-	-
Acenaphthylene	mg/kg	<0.03	170	83000(86.1)sol	-	0.08	-	-	-	-	-	-	-
Acenaphthene	mg/kg	<0.05	210	84000(57.0)	-	-	-	-	-	-	-	-	-
Fluorene	mg/kg	<0.04	170	63000(30.9)sol	-	0.18	-	-	-	-	-	0.06	-
Phenanthrene	mg/kg	<0.03	95	22,000	-	0.27	-	-	-	-	-	0.06	0.03
Anthracene	mg/kg	<0.04	2,400	520,000	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	<0.03	280	23,000	0.03	0.11	-	-	-	-	-	-	0.05
Pyrene	mg/kg	<0.03	620	54,000	0.03	0.11	-	-	-	-	-	-	0.04
Benzo(a)anthracene	mg/kg	<0.06	7.2	170	-	0.08	-	-	-	-	-	-	-
Chrysene	mg/kg	<0.02	15	350	0.02	0.07	-	-	-	-	-	-	-
Benzo(bk)fluoranthene	mg/kg	<0.07	nv	nv	-	0.12	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	<0.04	2.2	35	-	-	-	-	-	-	-	-	-
Indeno(123cd)pyrene	mg/kg	<0.04	nv	500	-	-	-	-	-	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	<0.04	0.24	4	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	<0.04	320	3,900	-	-	-	-	-	-	-	-	-
Coronene	mg/kg	<0.04	nv	nv	-	-	-	-	-	-	-	-	-
PAH 16 Total	mg/kg	<0.22	nv	nv	-	0.23	-	-	-	-	-	-	-
PAH 17 Total	mg/kg	<0.64	nv	nv	-	1.1	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	<0.05	2.6	44	-	0.09	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.02	77	1,200	-	0.03	-	-	-	-	-	-	-
Benzo(j)fluoranthene	mg/kg	<1	nv	nv	-	-	-	-	-	-	-	-	-
PAH Surrogate % Recovery	mg/kg	<0	nv	nv	91	95	96	100	97	98	93	108	111
Mineral Oil (C10-C40)	mg/kg	<30	nv	nv	-	116	-	-	-	-	-	225	-
TPH CWG													
Aliphatics													
>C5-C6	mg/kg	<0.1	42	3,200 (304) sol	-	-	-	-	-	-	-	-	-
>C6-C8	mg/kg	<0.1	100	7,800 (144)sol	-	0.5	-	-	-	-	-	-	-
>C8-C10	mg/kg	<0.1	27	2,000 (78)sol	-	9.1	-	-	-	-	-	2.3	-
>C10-C12	mg/kg	<0.2	130	9,700 (48)sol	-	18.2	-	-	-	-	-	21.8	-
>C12-C16	mg/kg	<4	1100	59,000 (24)sol	-	49	-	-	-	-	-	90	-
>C16-C21	mg/kg	<7	65,000 (combined)	1,600,000 (combined)	-	49	-	-	-	-	-	85	-
>C21-C35	mg/kg	<7	65,000	1,600,000	-	-	-	-	-	-	-	28	-
>C35-C40	mg/kg	<7	65,000	1,600,000	-	-	-	-	-	-	-	-	-
Total aliphatics C5-40	mg/kg	<26	nv	nv	-	126	-	-	-	-	-	227	-
Aromatics													
>C5-EC7	mg/kg	<0.1	370	26,000(1220)sol	-	-	-	-	-	-	-	-	-
>EC7-EC8	mg/kg	<0.1	860	56,000(869)vap	-	-	-	-	-	-	-	-	-
>EC8-EC10	mg/kg	<0.1	47	3,500(613)vap	-	0.5	-	-	-	-	-	-	-
>EC10-EC12	mg/kg	<0.2	250	16,000(364)sol	-	14.8	-	-	-	-	-	-	-
>EC12-EC16	mg/kg	<4	1800	36,000(169)sol	-	50	-	-	-	-	-	31	-
>EC16-EC21	mg/kg	<7	1900	28,000	-	49	-	-	-	-	-	52	-
>EC21-EC35	mg/kg	<7	1900	28,000	-	15	-	-	-	-	-	16	-
>EC35-EC40	mg/kg	<7	1900	28,000	-	-	-	-	-	-	-	-	-
Total aromatics C5-40	mg/kg	<26	nv	nv	-	129	-	-	-	-	-	99	-
Total aliphatics and aromatics(C5-40)	mg/kg	<52	nv	nv	-	255	-	-	-	-	-	326	-
Methyl Tertiary Butyl Ether	ug/kg	<5	nv	nv	-	11	-	-	-	-	-	-	-
Benzene	mg/kg	<0.005	0.38	27	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	<0.005	880(869)vap	56,000(869)vap	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	<0.005	83	5,700(518)vap	-	0.046	-	-	-	-	-	0.015	-
m/p-Xylene	mg/kg	<0.005	m: 820 p: 790	m: 6,200(625)vap p: 5,900(576)sol	-	0.182	-	-	-	-	-	0.042	-
o-Xylene	mg/kg	<0.005	88	6,600(478)sol	-	0.188	-	-	-	-	-	-	-
PCB 28	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-	-
PCB 52	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-	-
PCB 101	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-	-
PCB 118	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-	-
PCB 138	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-	-
PCB 153	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-	-
PCB 180	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-	-
Total 7 PCBs	ug/kg	<35	nv	nv	-	-	-	-	-	-	-	-	-
Natural Moisture Content	%	<0.1	nv	nv	14.2	18.4	7.2	12.5	11.9	8.7	14.3	13.8	6.6
Moisture Content (% Wet Weight)	%	<0.1	nv	nv	12.4	15.5	6.8	11.1	10.7	8	12.5	12.1	6.2
Hexavalent Chromium	mg/kg	<0.3	6	33	-	-	-	-	-	-	-	-	-
Chromium III	mg/kg	<0.5	910	8,600	51	30.9	37.9	24.6	66.4	67.7	42.6	34.8	71.7
Total Organic Carbon	%	<0.02	nv	nv	0.89	0.61	0.38	0.38	0.36	0.45	0.67	0.35	0.34
pH	pH units	<0.01	nv	nv	8.21	7.73	8.61	8.77	8.27	8.41	8.19	8.18	8.55

Legend

0.45 Results exceed LQM/CIEH S4ul for HHRA Residential Threshold without homegrown produce at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for HHRA Commercial Threshold at 1% SOM (mg/kg)

\- Results below LOD

nv Guideline threshold value not available

Notes

HHRA 2015 - LQM/CIEH Suitable 4 Use Levels based on 'Commercial' and/or 'residential' land use using 1% SOM. Metals are compared against a 6% SOM

Sol : sol S4UL presented exceed the solubility saturation limit, which is presented in brackets

Vap: vap S4UL presented exceed the vapour staturation limit which is presented in brackets

Table 6.3 Soil Quality Results (Part 2)

Sample ID					BH01	BH03	BH07	BH08	BH-02A	BH-04	BH-05	BH-06
Laboratory					Element	Element	Element	Element	Element	Element	Element	Element
Report					21/925	21/925	21/925	21/925	21/1882	21/1882	21/1882	21/1882
Sample Type					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth					0.2	1.0	1.0	2.0	0.00-0.50	0.00-1.70	0.50-2.40	3.00-3.30
Sample Date					27/01/2021	27/01/2021	27/01/2021	27/01/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Parameters	**Units**	**LOD**	**LQM/CIEH S4ul for HHRA Residental Threshold (mg/kg)**	**LQM/CIEH S4ul for HHRA Commercial Threshold (mg/kg)**								
Metals												
Antimony	mg/kg	<1	nv	nv	1	1	1	2	-	1	2	1
Arsenic	mg/kg	<0.5	40	640	14.0	7.0	6.1	7.4	6.2	11.1	9.7	5.0
Barium	mg/kg	<1	nv	nv	53.0	58.0	58.0	49.0	41.0	52.0	60.0	50.0
Cadmium	mg/kg	<0.1	85	190	1.4	2.1	1.8	2.2	1.5	0.9	1.8	1.2
Chromium	mg/kg	<0.5	910	8,600	37.7	35.8	36.9	39.2	32.6	51.1	35.9	30.1
Copper	mg/kg	<1	7,100	68,000	19	27	48	121	16	17	27	9
Lead	mg/kg	<5	nv	nv	10	11	12	16	12	16	16	7
Mercury	mg/kg	<0.1	1.2	58vap (25.8)	-	-	-	-	-	-	-	-
Molybdenum	mg/kg	<0.1	nv	nv	3.6	4.5	3.8	3.6	3	3.6	3.8	2.7
Nickel	mg/kg	<0.7	180	980	21.7	28.5	27.7	35.7	19.4	22.2	33.6	12.4
Selenium	mg/kg	<1	430	12,000	1	1	1	7	-	-	1	-
Zinc	mg/kg	<5	40,000	730,000	54	84	80	101	50	60	80	61
PAH MS												
Naphthalene	mg/kg	<0.04	2.3	190(76.4)sol	-	-	-	-	-	-	-	-
Acenaphthylene	mg/kg	<0.03	170	83000(86.1)sol	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	<0.05	210	84000(57.0)	-	-	-	-	-	-	-	-
Fluorene	mg/kg	<0.04	170	63000(30.9)sol	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	<0.03	95	22,000	-	-	-	-	-	-	-	-
Anthracene	mg/kg	<0.04	2,400	520,000	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	<0.03	280	23,000	-	-	-	-	-	-	0.11	-
Pyrene	mg/kg	<0.03	620	54,000	-	-	-	-	-	-	0.11	-
Benzo(a)anthracene	mg/kg	<0.06	7.2	170	-	-	-	-	-	-	0.1	-
Chrysene	mg/kg	<0.02	15	350	-	-	-	-	-	-	0.08	-
Benzo(bk)fluoranthene	mg/kg	<0.07	nv	nv	-	-	-	-	-	-	0.14	-
Benzo(a)pyrene	mg/kg	<0.04	2.2	35	-	-	-	-	-	-	0.06	-
Indeno(123cd)pyrene	mg/kg	<0.04	nv	500	-	-	-	-	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	<0.04	0.24	4	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	<0.04	320	3,900	-	-	-	-	-	-	-	-
Coronene	mg/kg	<0.04	nv	nv	-	-	-	-	-	-	-	-
PAH 16 Total	mg/kg	<0.22	nv	nv	-	-	-	-	-	-	0.31	-
PAH 17 Total	mg/kg	<0.64	nv	nv	-	-	-	-	-	-	0.67	-
Benzo(b)fluoranthene	mg/kg	<0.05	2.6	44	-	-	-	-	-	-	0.1	-
Benzo(k)fluoranthene	mg/kg	<0.02	77	1,200	-	-	-	-	-	-	0.04	-
Benzo(j)fluoranthene	mg/kg	<1	nv	nv	-	-	-	-	-	-	-	-
PAH Surrogate % Recovery	mg/kg	<0	nv	nv	93	88	93	94	91	90	88	92
Mineral Oil (C10-C40)	mg/kg	<30	nv	nv	73	-	-	-	42	-	-	160
TPH CWG												
Aliphatics												
>C5-C6	mg/kg	<0.1	42	3,200 (304) sol	-	-	-	-	-	-	-	-
>C6-C8	mg/kg	<0.1	100	7,800 (144)sol	-	-	-	-	-	-	-	-
>C8-C10	mg/kg	<0.1	27	2,000 (78)sol	-	-	-	-	-	-	-	0.1
>C10-C12	mg/kg	<0.2	130	9,700 (48)sol	-	-	-	-	-	-	-	10.2
>C12-C16	mg/kg	<4	1100	59,000 (24)sol	-	-	-	-	10	-	-	62
>C16-C21	mg/kg	<7	65,000 (combined)	1,600,000 (combined)	-	-	-	-	20	-	-	65
>C21-C35	mg/kg	<7	65,000	1,600,000	56	-	-	-	12	-	-	23
>C35-C40	mg/kg	<7	65,000	1,600,000	17	-	-	-	-	-	-	-
Total aliphatics C5-40	mg/kg	<26	nv	nv	73	-	-	-	42	-	-	160
Aromatics												
>C5-EC7	mg/kg	<0.1	370	26,000(1220)sol	-	-	-	-	-	-	-	-
>EC7-EC8	mg/kg	<0.1	860	56,000(869)vap	-	-	-	-	-	-	-	-
>EC8-EC10	mg/kg	<0.1	47	3,500(613)vap	-	-	-	-	-	-	-	-
>EC10-EC12	mg/kg	<0.2	250	16,000(364)sol	-	-	-	-	-	-	-	-
>EC12-EC16	mg/kg	<4	1800	36,000(169)sol	-	-	-	-	-	-	-	28
>EC16-EC21	mg/kg	<7	1900	28,000	12	-	-	-	-	-	-	52
>EC21-EC35	mg/kg	<7	1900	28,000	106	-	-	-	-	-	-	15
>EC35-EC40	mg/kg	<7	1900	28,000	40	-	-	-	-	-	-	-
Total aromatics C5-40	mg/kg	<26	nv	nv	158	-	-	-	-	-	-	95
Total aliphatics and aromatics(C5-40)	mg/kg	<52	nv	nv	231	-	-	-	-	-	-	255
Methyl Tertiary Butyl Ether	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
Benzene	mg/kg	<0.005	0.38	27	-	-	-	-	-	-	-	-
Toluene	mg/kg	<0.005	880(869)vap	56,000(869)vap	-	-	-	-	0.014	-	-	-
Ethylbenzene	mg/kg	<0.005	83	5,700(518)vap	-	-	-	-	-	-	-	-
m/p-Xylene	mg/kg	<0.005	m: 820 p: 790	m: 6,200(625)vap p: 5,900(576)sol	-	-	-	-	0.01	-	-	-
o-Xylene	mg/kg	<0.005	88	6,600(478)sol	-	-	-	-	-	-	-	-
PCB 28	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
PCB 52	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
PCB 101	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
PCB 118	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
PCB 138	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
PCB 153	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
PCB 180	ug/kg	<5	nv	nv	-	-	-	-	-	-	-	-
Total 7 PCBs	ug/kg	<35	nv	nv	-	-	-	-	-	-	-	-
Natural Moisture Content	%	<0.1	nv	nv	8.5	14.7	13.8	22	13.6	13.7	14.9	4.3
Moisture Content (% Wet Weight)	%	<0.1	nv	nv	7.8	12.8	12.1	18	12	12	13	4.1
Hexavalent Chromium	mg/kg	<0.3	6	33	-	-	-	-	-	-	-	-
Chromium III	mg/kg	<0.5	910	8,600	37.7	35.8	36.9	39.2	32.6	51.1	35.9	30.1
Total Organic Carbon	%	<0.02	nv	nv	0.34	0.32	0.3	0.29	0.38	0.24	0.35	0.34
pH	pH units	<0.01	nv	nv	8.78	8.73	8.6	8.09	8.44	9.17	8.65	8.75

Legend

0.45 Results exceed LQM/CIEH S4ul for HHRA Residential Threshold without homegrown produce at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for HHRA Commercial Threshold at 1% SOM (mg/kg)

\- Results below LOD

nv Guideline threshold value not available

Notes

HHRA 2015 - LQM/CIEH Suitable 4 Use Levels based on 'Commercial' and/or 'residential' land use using 1% SOM. Metals are compared against a 6% SOM

Sol : sol S4UL presented exceed the solubility saturation limit, which is presented in brackets

Vap: vap S4UL presented exceed the vapour stauration limit which is presented in brackets

6.3.9 Groundwater Quality

The Water Framework Directive (WFD) Directive 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in waterbodies that are of lesser status at present, and retaining 'Good Status' or better where such status exists at present. The EPA co-ordinates the activities of the River Basin Districts (ERBDs), Local Authorities and State agencies in implementing the WFD, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland (ROI).

Presently, the groundwater body in the region of the site (Dublin GWB, refer to Figure 6.12 below) is classified under review as per the WFD Risk Score system. The Dublin GWB achieved 'Good Status' in the period 2013 – 2018.

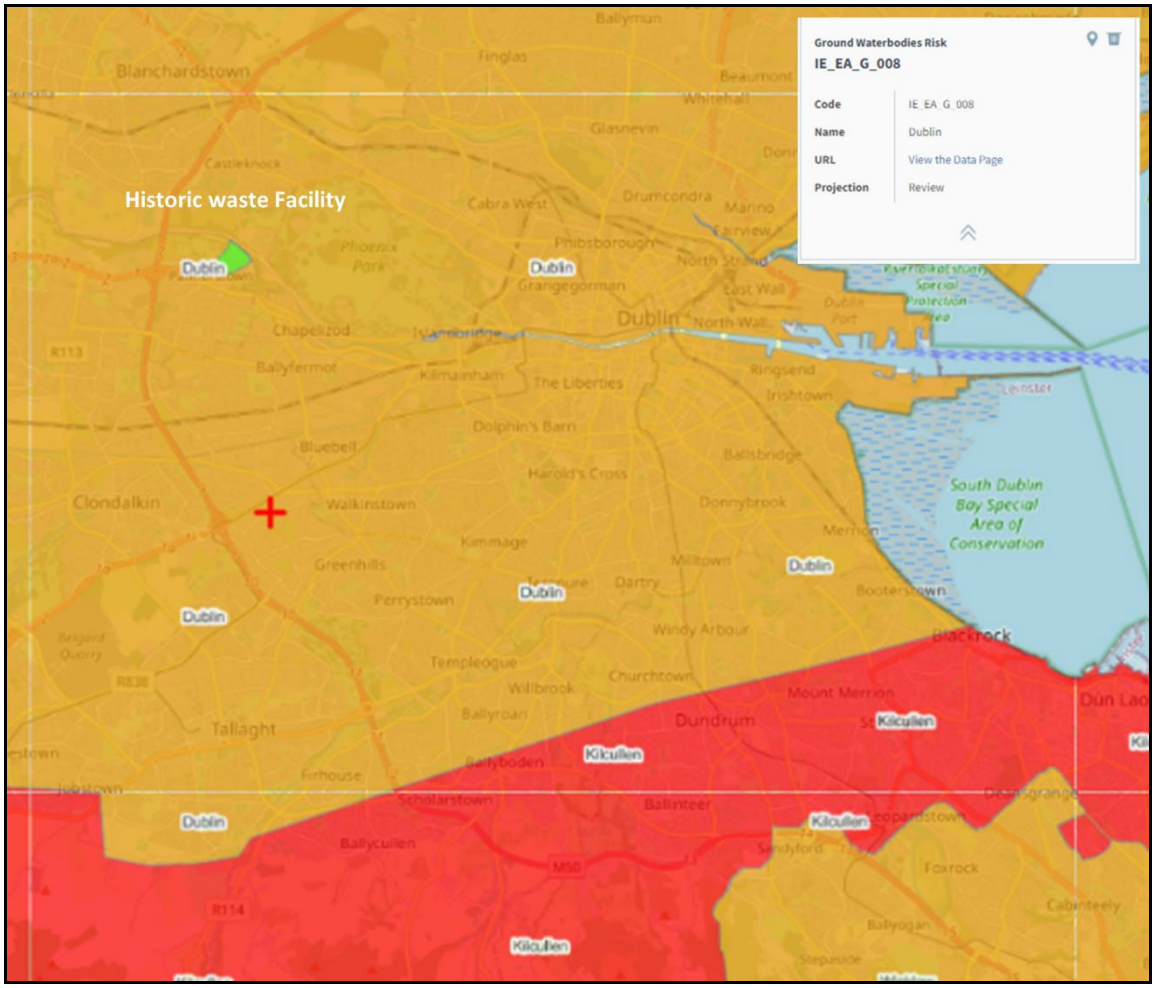


Figure 6.12 Groundwater Body Map (Source: EPA, 2022)

6.3.10 Economic Geology

The GSI (2021) mineral database was consulted to determine whether there were any mineral sites close to the study area. The Belgard Quarry is located in Tallaght c. 3.7 km to the west of the site and is an active limestone quarry.

6.3.11 Geological Heritage

The Geological Survey of Ireland (GSI) Public Viewer (www.gsi.ie/mapping) was reviewed to identify sites of geological heritage for the site and surrounding area. As mentioned above, the nearest Geological Heritage Site is the Greenhills Esker (Site Code SD005) which is located c. 1.2 km to the

southwest of the site. This site includes a large accumulation of sands and gravels. Due to the distance and the rise in elevation there is a negligible risk to this heritage site

6.3.12 Radon

According to the EPA (now incorporating the Radiological Protection Institute of Ireland) the site location is a Low Radon Area where is it estimated that less than 1-5% of dwellings will exceed the Reference Level of 200 Bq/m3.

6.3.13 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and leads to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the proposed development was 5.7 km to the south of the site, referred to as the Bohernabreena River valley which occurred in 2016. There have been no recorded landslide events at the site. Due to the local topography and the underlying strata there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. Currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish sea (1.0 – 2.0 Ml magnitude) and ~50 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the proposed development site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

6.3.14 Areas of Conservation

According to the NPWS (2022) on-line database there are no special protected area on or in the vicinity of the subject site. The closest Natura 2000 European sites are the South Dublin Bay Special Area of Conservation (SAC) and Proposed Natural Heritage Area (pNHA) and the South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) which are located c. 7.7 Km to the east of the subject site.

In addition, the Grand Canal pNHA is located c. 1.1 Km to the north of the subject site.

6.3.15 Conceptual Site Model

A local cross section of the Site is presented below in Figure 6.13 (A-A' south-west to north-east) and a regional cross section is presented in Figure 6.14 (B-B' north to south). These cross sections and the description below present the Conceptual Site Model (CSM). The CSM was developed in order to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development.

- The site is mostly flat at 57.0 m AOD and is gradually sloping down from west to east and north to south with a very steep. The regional gradient falls from south to north;
- During the site investigations undertaken by GII in 2021, bedrock was encountered at depths between 3.1-4.5 mbgl with the exception of the south portion of the site where bedrock was found at 0.8-1.8 mbgl;

- Bedrock comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones as per the GSI mapping. The limestone is classified by the GSI as a Locally Important Bedrock Aquifer (LI), which is described as 'moderately productive only in local zones'.
- The bedrock aquifer is protected by low permeability cohesive deposits (Clay) which in turn overlie granular deposits. Site investigations confirmed that the aquifer would have 'High' to 'Extreme' vulnerability.
- Groundwater flow within the bedrock unit is northward in line with the regional gradient. There is no continuous perched groundwater table on-site.
- The groundwater body in the region of the site (Dublin GWB) is classified under the WFD Risk Score system as currently 'Under Review'. Previously (2013-2018) the Dublin GWB was given 'Good Status'.

Review of the hydrogeology and geology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, Council Water Supplies/ Group Water Schemes or geological heritage sites which could be impacted by this development. No evidence of disposal of waste material was identified in the subject area. Collection and analysis of representative soil samples for a wide range of parameters shows no evidence of contamination.

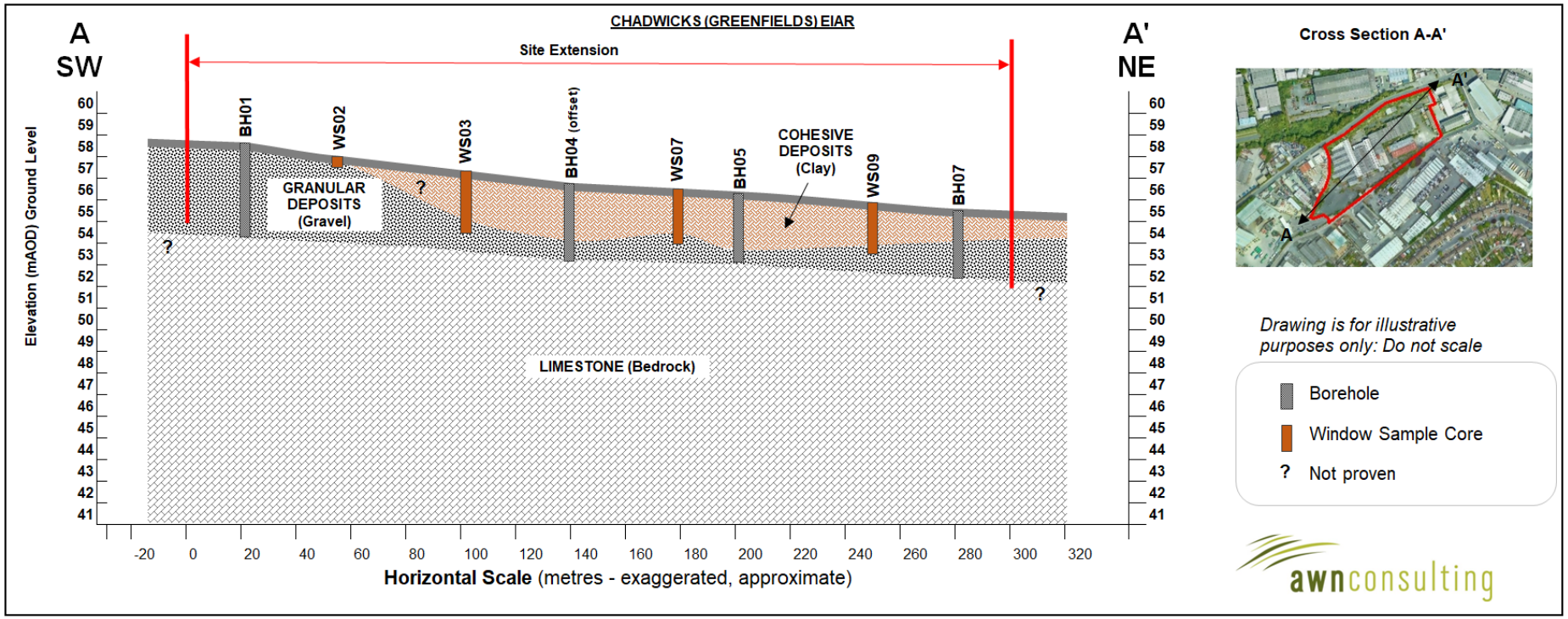


Figure 6.13 Local Cross Section A-A'

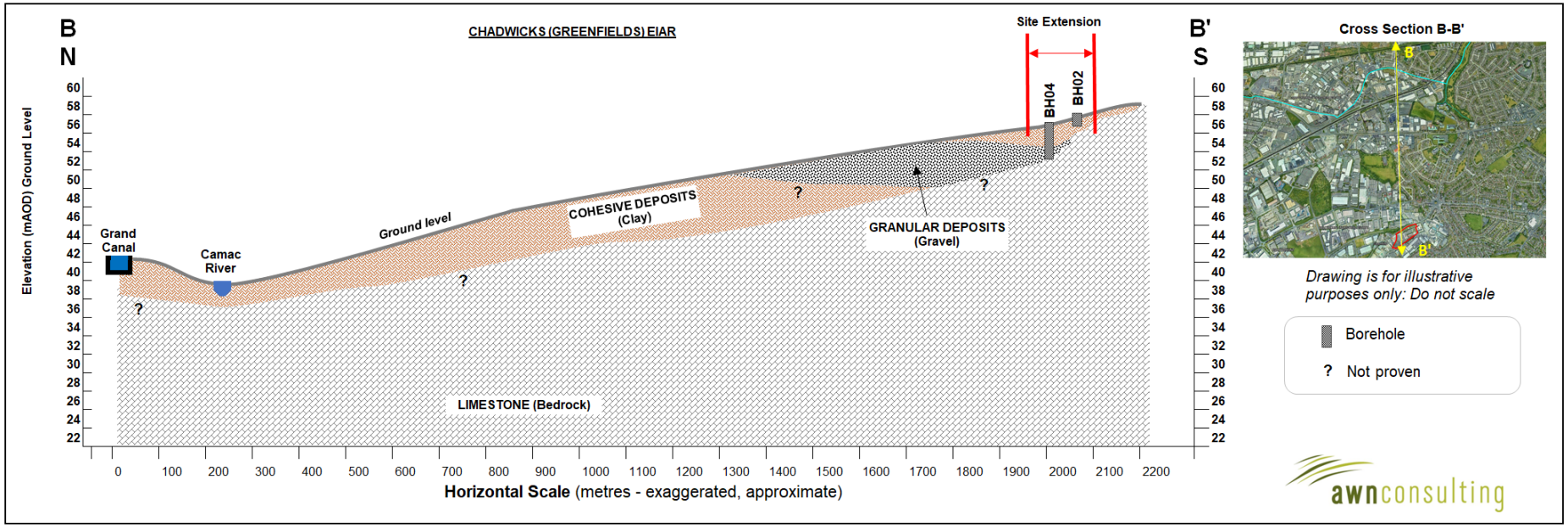


Figure 6.14 Regional Cross Section B-B'

6.3.16 Rating of Importance of Geological and Hydrogeological Attributes

Based on the TII methodology (2009) (See Appendix 6.1), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this site is rated as '*Low Importance*' with low quality, significance or value on a local scale.

Based on the TII methodology (2009) (See Appendix 6.1) the importance of the hydrogeological features at this site is rated as '*Medium Importance*' based on the assessment that the attribute has a medium quality significance or value on a local scale. The aquifer is a Locally Important aquifer but is not widely used for public water supply, or generally for potable use. In addition, there would not be direct or indirect hydrogeological connection between the site and any protected sites (SAC, SPA, NHA).

6.4 Characteristics of the Proposed Development

The proposed development comprises the following:

(i) The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3 m – 9.9 m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;

(ii) the construction of a mixed-use Build-to-Rent residential and commercial development comprising 633 no. build-to-rent apartment units (292 no. one-beds, 280 no. two-beds and 61 no. three-beds), 1 no. childcare facility and 10 no. commercial units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:

(a) Block A comprises 209 no. apartments (102 no. 1 bed-units, 106 no. 2 bed-units and 1 no. 3-bed units) measuring 5 - 10 storeys in height. (b) Block B comprises 121 no. apartments (53 no. 1 bed-units, 45 no. 2 bed-units and 23 no. 3 bed-units) measuring 8 - 10 storeys in height. (c) Block C comprises 130 no. apartments (38 no. 1-bed units, 71 no. 2-bed units and 21 no. 3-bed units) measuring 8 - 12 storeys in height. (d) Block D comprises 173 no. apartments (99 no. 1 bed-units, 58 no. 2 bed-units and 16 no. 3 bed-units) measuring 6 - 10 storeys in height. All apartments will be provided with private balconies/terraces;

(iii) provision of indoor communal residential amenity/management facilities including a co-working space, communal meeting room/ work space, foyer, toilets at ground floor of Block A; gym, changing rooms, toilets, resident's lounge, studio, laundry room, communal meeting room/ work space, multi-function space with kitchen at ground floor of Block B; games room with kitchenette, media room, co-working space, resident's lounge, communal meeting room/ work space, reception area, management office with ancillary staff room and toilets, toilets, parcel room at ground floor of Block C;

(iv) the construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block A;

(v) the construction of 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C as follows: Block A has 3 no. units at ground floor comprising 79.46 sq.m., 90.23 sq.m., and 121.39 sq.m., Block B has 1 no. unit at ground floor comprising 127.03 sq.m., Block C has two units at second floor comprising 120.85 sq.m. and 125.45 sq.m., and Block D has 4 no. units at ground floor comprising 84.45 sq.m., 149.77 sq.m., 155.48 sq.m. and 275.59 sq.m.;

(vi) the construction of 3 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 2 no. secondary entrances from the south for emergency access and services (access from existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

(vii) provision of 424 no. car parking spaces comprising 398 no. standard spaces, 21 no. mobility spaces and 5 no. car club spaces located at ground floor level car park located within Block A and accessed via the proposed entrance at Greenhills Road, a two-storey car park located within Blocks C and D also accessed from the proposed entrance at Greenhills Road and on-street parking at ground floor level adjacent to Blocks A and C. Provision of an additional 15 no. commercial/ unloading/ drop-off on-street parking spaces at ground floor level (providing for an overall total of 439 car parking spaces). Provision of 4 no. dedicated motorcycle spaces at ground floor level parking area within Blocks C and D;

(viii) provision of 1363 no. bicycle parking spaces comprising 1035 no. residents' bicycle spaces, 5 no. accessible bicycle spaces and 7 no. cargo bicycle spaces in 9 no. bicycle storerooms in ground and first floor parking areas within Blocks A, C and D, and 316 no. visitors' bicycle spaces located externally at ground floor level throughout the development;

(ix) provision of outdoor communal amenity space (5,020 sq.m.) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting, and scented gardens located on podiums at first and second floor levels; provision of a communal amenity roof garden in Block C with seating area and planting (176 sq.m.); and inclusion of centrally located public open space (3,380 sq.m.) adjacent to Blocks B and C comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space; and incidental open space/public realm;

(x) development also includes landscaping and infrastructural works, foul and surface water drainage, bin storage, ESB substations, plant rooms, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development.

The activities associated with the proposed Project which are relevant to the land, soils, geology and hydrogeological environment are detailed in Table 6.4 below.

Table 6.4 Summary of Site Activities

Phase	Activity	Description
Construction	Discharge to Ground	Stormwater run-off percolating to ground at the construction site.
	Earthworks: Excavation of Superficial Deposits	Cut and fill will be required to facilitate construction of the proposed project, basements and associated ancillary services. Excess material which cannot be re-used on-site will be disposed off-site at a suitably licensed facility in accordance with the Construction and Demolition Waste Management Plan (C&D WMP) (Appendix 12.1). The level of excavation required to facilitate installation of services, basements and foundations ranges from 54.5 mAOD to the northeast to 58.1 mAOD to the southeast, which means that the maximum depth of excavation, as specified by Project Engineers (Lohan & Donnelly Consulting Engineers) is c. 1.2 mbgl. To the south, where the bedrock is shallow, the required excavation depth is c. 0.5-0.7 mbgl. There will be no excavation of bedrock required; therefore, no aquifer dewatering required. Subsoil stripping and localised stockpiling of soil will be required during construction. It is estimated that approximately 24,008 m^3 of soils will be excavated to facilitate construction of the proposed project. It is anticipated that 1,200 m^3 of the excavated material can be reused onsite for landscaping purposes Approximately 22,808 m^3 of material will be removed from site. Volume of clean material to be imported to site (i.e. under roads, pavements, building, etc.) is approximately 5,500 m^3 Suitable excavated material will be reused for site levelling, roads, car parking areas, berms and other landscaping purposes. Material removed from site may be re-used off-site for beneficial use on other sites with appropriate planning / waste permissions / derogations (e.g. in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011) as amended, or will be reused, recovered and / or disposed off-site at appropriately authorised waste facilities

Phase	Activity	Description
	Storage of soils/aggregates	Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination. Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and solid matter. Materials will be sent off site for recycling where possible and, if not suitable for recycling, materials will be disposed of to an appropriate permitted/licensed waste disposal facility.
	Storage of hazardous Material	Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage. These will be stored within the contractor yard.
Operation	Increase/ Decrease in hardstanding area	Altering of local recharge (percolation to ground) only due to the modification in hard standing area. There will be an increase in hardstanding area of c. 11,984 m^2.The total impermeable area for the development amounts to 15,793 m^2
	Storage of hazardous Material	No bulk fuel or chemical storage at the Site. Only potential for minor fuel leaks from parked cars, service vehicles, HGV deliveries, etc.

As outlined in Table 6.4, the activities required for the construction phase of the proposed project represents the greatest risk of potential impact on the geological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to facilitate construction of the proposed project, and ancillary services.

The potential geological and hydrogeological impacts during the construction and operational phases are presented below. Remediation and mitigation measures included in the design of the proposed Project to address these potential impacts are presented in Section 6.6.

6.5 Potential Impact of the Proposed Development

An analysis of the potential impacts of the proposed development on the land, soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 6 and 7 (Hydrology) of the EIAR. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 6.6 below.

6.5.1 Construction Phase

In the absence of mitigation, the following potential effects to land, soil and groundwater (hydrogeology) have been considered

6.5.1.1 Excavations and Infilling

According to the Site Investigations carried out by GII in 2021, the risk of contaminated soils being present onsite is low and this was confirmed by onsite soil sampling and analysis. Nonetheless material, which is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments.

The excavation for foundations for the main buildings will require the excavation of topsoil (made ground), and subsoil (cohesive deposits). The maximum excavation level would be c. 1.2 mbgl and to the south area where the bedrock is shallow (i.e., 0.8-1.8 mbgl, refer to section 6.3 above), the required excavation level is c. 0.5-0.7 mbgl. Therefore, it is very unlikely that bedrock could be exposed due to planned earthworks as its depth is presumably >20 mbgl.

Excavated material could be reused on site for infilling and landscaping works where possible. Import of c. 5,000 m3 of fill will be required.

Site investigation and laboratory analysis has not identified any existing contamination. However, if contaminated soil/water is encountered, it will be required to be removed by a licensed waste contractor.

No groundwater is expected to ingress to the excavation area. However, given the characteristics of the subsoil it is expected during the excavation works that localised dewatering of the subsoils will be required to address perched groundwater.

It can be expected to encounter minor ingress of rainfall in the excavation during the construction phase.

6.5.1.2 Accidental Spills and Leaks

As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer.

During construction of the development, there is a risk of accidental pollution incidences from the following sources:

- Suspended solids (muddy water with increase turbidity) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoil's and impact the underlying groundwater. Groundwater vulnerability at the site is currently classified by the EPA 'Moderate' to 'High'; however, site investigations carried out in the subject site suggest that vulnerability throughout the site would be 'High' to 'Extreme'. Any soil stripping will also further reduce the thickness of subsoil and the natural protection they provide to the underlying aquifer; however, bedrock is assumed to be below the maximum projected excavation depths.

6.5.2 Operational Phase

There are no discharges to ground included in the design and no abstractions from the aquifer. The proposed development site includes car parking area at the site. Leakage of petrol/ diesel fuel may occur from these areas; run-off may contain a worst-case scenario of 70 litres for example. However, in the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed and any releases to drainage will be mitigated through hydrocarbon interceptors.

There will be an increase in hardstanding area (c. 11,984 m2) associated with the development area. This will have a minor effect on local recharge to ground; however, the impact on the overall hydrological regime will be insignificant.

The Site of the proposed Project is zoned for mixed Use, general development, opportunity/proposals and is not being used for agricultural purposes. There will be no local loss of agricultural soil, and no impact to mineral resources in the area as a result of the proposed Project.

6.6 Remedial and Reductive Measures

The design has taken account of the potential impacts of the development on the soils, geology and hydrogeology environment local to the area where construction is taking place and containment of

contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding soils, geology and hydrogeology. These are described below.

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures discussed will be considered applicable to all. Waste Management is also considered an interaction in some sections.

6.6.1 Construction Phase

In order to reduce impacts on the soils and geology environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation/ infill and export from site;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

6.6.1.1 Construction Environmental Management Plan (CEMP)

An Outline Construction Environmental Management Plan (CEMP) has been prepared by AWN (2022) for the proposed development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed CEMP. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

6.6.1.2 Control of Soil Excavation

Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services will require to excavate c. 24,008 m^3 and 5,500m^3 of imported material. Suitable soils could be reused on site as backfill, where possible. Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

According to onsite investigations, the bedrock vulnerability is ‘High’ to ‘Extreme’ throughout the site. Removal and reinstatement of subsoil cover will not alter the vulnerability category of the underlying

bedrock. The deposition of infill soil would increase the overburden thickness and thus may even decrease the groundwater vulnerability.

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.

Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Site investigations classified the subsoils as mostly 'inert' as presented in Section 6.3.8 above. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body. Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible.

Dust suppression measures (e.g., damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

6.6.1.3 Source of Fill and Aggregates

All fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company.

As mentioned above, it is anticipated that approximately 5,500 m^3 engineered fill will be required to facilitate construction. There will be no impact to mineral resources in the area as a result of the Proposed Development.

6.6.1.4 Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site), this should be sensitively located away from surface water, gulleys or drains. These refuelling areas are to be identified in the CEMP prepared by the construction contractor. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemicals which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

6.6.1.5 Control of Water during Construction

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the trenches are kept relatively dry. Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

There shall not be discharge of silty water from the works to any watercourse, should any discharge of construction water be required during the construction phase, discharge will be to foul sewer following agreement with SDCC/ Irish Water. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to water. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to water or sewer.

In order to minimise the risk of contamination, any stockpiled material designated for removal will be removed off-site as soon as possible. Surface water drain gratings in areas near or close to where stockpiles are located will be covered by appropriate durable polyurethane covers or similar. Active treatment systems such as siltbusters or similar may will be adopted, depending on turbidity levels and discharge limits.

6.6.2 Operational Phase

There are no discharges to ground included in the design and no abstractions from the aquifer. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.

6.7 Predicted Impact of the Proposed Development

6.7.1 Construction Phase

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the construction phase and that the residual impact will be **short term-imperceptible-neutral**. Following the TII criteria (refer to Appendix 6.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.7.1 Operational Phase

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the operational phase and that the residual impact will be **long term-imperceptible-neutral**. Following the TII criteria (refer to Appendix 6.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.8 Cumulative Impacts of the Proposed Development

This section considers the potential cumulative impacts or effects on the hydrogeological environment of the proposed development with other existing, planned and permitted developments in the locality.

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. The cumulative impact (as far as practically possible) of the proposed development with any/all relevant existing or permitted developments as set out in Chapter 3 (Planning and Development Context). The likelihood of cumulative effects are discussed in Sections 6.8.1 and 6.8.2 below for construction and operational phases.

6.8.1 Construction Phase

The review of the planned and permitted projects in the locality of the proposed development has identified 4 substantial permitted developments which may be undertaking construction works simultaneously to the proposed development. All developments will have to incorporate measures to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016).
As such, it can be concluded that the in-combination effects of groundwater arising from the Proposed Development taken together with that of other developments will not be significant based on the low potential chemical and sediment loading.

The residual cumulative impact on hydrogeology for the construction phase is anticipated to be ***neutral, imperceptible,*** and ***short term*** for the construction phase, once appropriate mitigation measures to manage potential contaminant sources in compliance with legislative requirement are put in place for each development.

6.8.2 Operational Phase

The existing and permitted projects set out in Chapter 3 (Planning and Development Context) have been considered in this assessment. Accidental releases from fuel storage/unloading could contaminate groundwater or soil environments unless mitigated adequately i.e. bunded tanks and delivery areas. Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless diverted to surface water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with relevant legislation (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016). As such, they would be required to manage runoff and fuel leakages.

The residual cumulative impact on water and hydrogeology for the operational phases is anticipated to be **neutral**, **imperceptible** and **long-term**, once appropriate mitigation measures to manage potential contaminant sources in compliance with legislative requirement are put in place for each development.

6.9 Monitoring

6.9.1.1 Construction Phase

Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 10 m from surface water receptors. 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. A log the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not occur.

6.9.1.2 Operational Phase

No future soil or groundwater monitoring is proposed as part of the proposed project as no bulk chemical storage on site. 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.

7.0 WATER

7.1 Introduction

AWN Consulting Ltd. (AWN) has carried out this chapter which assesses and evaluates the potential impacts of the development on the hydrological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

This chapter has been prepared by Marcelo Allende (BSc BEng), Liam Bruen (BSc) and Teri Hayes (BSc MSc PGeol EurGeol). Marcelo is a Water Resources Engineer with over 15 years of experience in environmental consultancy and water resources studies. Marcelo is an Environmental Consultant with AWN Consulting, a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI). Liam is an Environmental Consultant with 1 years' experience working in the Environmental management sector. Liam holds a Bachelor of Science from Technological University Dublin in Environmental Management. Liam has worked on a number of different projects that have involved; New Raw water intake systems, IE licencing requirements, environmental reporting, desktop data surveys, mapping, EIAR & AER development. Liam is a member of the ESAI. Teri is a hydrogeologist with over 25 years of experience in water resource management and impact assessment. She has a Masters in Hydrogeology and is a former President of the Irish Group of the Association of Hydrogeologists (IAH) and has provided advisory services on water related environmental and planning issues to both public and private sector bodies. She is qualified as a competent person as recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons www.igi.ie). Her specialist area of expertise is water resource management eco-hydrogeology, hydrological assessment and environmental impact assessment.

7.2 Research Methodology

This chapter evaluates the effects, if any, which the development has had or will have on Hydrology as defined in the Environmental Protection Agency (EPA) 'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2017). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this hydrological assessment and classification of environmental effects. In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the hydrological environment is based on the standard EIAR impact predictions table which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the Draft EPA Guidelines (2017) publication).

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 7.1.

The principal attributes (and impacts) to be assessed include the following:

- River and stream water quality in the vicinity of the site (where available);
- Surface watercourses near the site and potential impact on surface water quality arising from proposed development related works including any discharge of surface water run-off;

- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.

7.2.1 Sources of Information

Desk-based hydrological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- River Basin Management Plan for Ireland 2018-2021.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- South Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council;
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001);
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Information on the proposed design is based on the following sources:

- Engineering Services Report. Residential Development at Greenhills Road, Walkinstown, Dublin 12. Lohan & Donnelly Consulting Engineers. November 2021;
- Flood Risk Assessment. Residential Development at Greenhills Road, Walkinstown, Dublin 12. Lohan & Donnelly Consulting Engineers. May 2021;

- Ground Investigations Report. Greenhills Road. Ground Investigations Ireland. March 2021.

7.3 Receiving Environment

7.3.1 Site Area Description

The site is approximately 2.79 hectares in area, located within an industrially surrounded zone and comprises of existing low-rise disused industrial units which are to be demolished as part of the subject proposal. The site currently has 3 vehicular accesses all of which are located along the southern part of the site boundary. The existing development does not have any SuDS measures in place.

Topographical survey of existing site indicates that the site is gradually sloping down from west to east and north to south with a very steep, in places almost vertical ascent/decent transition from the site to the Greenhills Road neighbouring the northern site boundary. The western site boundary, abutted to the boundary of the neighbouring development is separated via a retaining wall, with a level difference between the site in question and neighbouring development of approximately 6 meters.

7.3.2 Hydrology

The proposed development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and Camac River sub-catchment (WFD name: Liffey_SC_090, Id 09_15) (EPA, 2022).

The Walkinstown Stream is located approx. 230m north of the subject development site and joins the Robinhood Stream which in turn discharges into the Ballymount Stream c. 1.1 Km from the site. The Ballymount Stream discharges into the Cama River c. 1.4 Km northwest of the subject site (refer to Figure 7.1 below). The Camac outfalls into the River Liffey c. 4.6Km from the site. The River Liffey outfalls into the Dublin Bay approximately 13 Km from the site. There is no hydrological connection between the site and the Camac River sub-catchment.

Figure 7.1 Site Location and Hydrological Environment

With regard to the local drainage, there is an existing 225mm diameter surface water sewer located on the access road east of the development, parallel to the Chadwicks Plumb Centre. The sewer commences near the junction of the access road and Greenhills Road and continuous towards the south-east direction presumably towards the Poddle River which is located c. 1.1 Km to the south of the subject site. Therefore, there would be an indirect hydrological connection between the site and this open watercourse through the local surface water drainage.

7.3.3 Existing Foul Water Service

There is an existing 225mm diameter foul water sewer located in close vicinity to the proposed development. The sewer originates from south-eastern direction, wraps around the outside of the southern and eastern site boundary and turns north-east, continuing towards the Walkinstown roundabout. This sewer eventually discharges into Ringsend WWTP. Refer to the Engineering Services Report for further details.

7.3.4 Surface Water Quality

The Water Framework Directive (WFD) Directive 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present.

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the ERBD River Basin Management Plan (RBMP) 2009-2015 was published. In the ERBD RBMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and

morphological pressures (e.g. water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). In more general terms, three key lessons have emerged from the first cycle and the public consultation processes. These lessons have been firmly integrated into the development of the second cycle RBMP. Firstly, the structure of multiple RBDs did not prove effective, either in terms of developing the plans efficiently or in terms of implementing those plans. Secondly, the governance and delivery structures in place for the first cycle were not as effective as expected. Thirdly, the targets set were too ambitious and were not grounded on a sufficiently developed evidence base. The second cycle RBMP has been developed to address these points.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011);
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988;
- Local Government (Water Pollution) Acts 1977-1990; and
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998

The local hydrological network (Walkinstown, Robinhood and Ballymount streams; and Camac River) is associated with the WFD surface waterbody Camac_040. The most recent published status (www.epa.ie – River Waterbody WFD Status 2013-2018) of this waterbody is '*Poor*' and its environmental risk is qualified by the WFD as '*At Risk of not achieving good status*'. This condition is due to a poor biological status (invertebrate status or potential) and moderate phosphorous conditions.

In addition, the Poddle River to the south is associated to the Poddle_010 WFD surface waterbody which has an '*Unassigned*' status and a risk score of '*At Risk of not achieving good status*'.

The Camac and Poddle rivers discharge into the Liffey Estuary Upper which has a WFD status (2013-2018) of 'Good'. The Dublin Bay has also a WFD status of '*Good*'. The Liffey Estuary Lower waterbody has a WFD risk score of '*At risk of not achieving good status*' while the Dublin Bay waterbody has a WFD risk score of 'Not at risk'. The most recent water quality assessment of Dublin Bay WFD Waterbody undertaken by the EPA (Water Quality in 2020: An Indicator Report, 2021) also shows that Dublin Bay on the whole, currently has an '*Unpolluted*' water quality status (refer to www.catchments.ie). Under the 2015 '*Trophic Status Assessment Scheme*' classification of the EPA, '*Unpolluted*' means there have been no breaches of the EPA's threshold values for nutrient enrichment, accelerated plant growth, or disturbance of the level of dissolved oxygen normally present.

The above status relates to data from 1 no. EPA active water quality station in the Camac River located c. 3.0 Km downstream of the subject site ('*Camac Close Emmet Road*', refer to Figure 7.2 below).

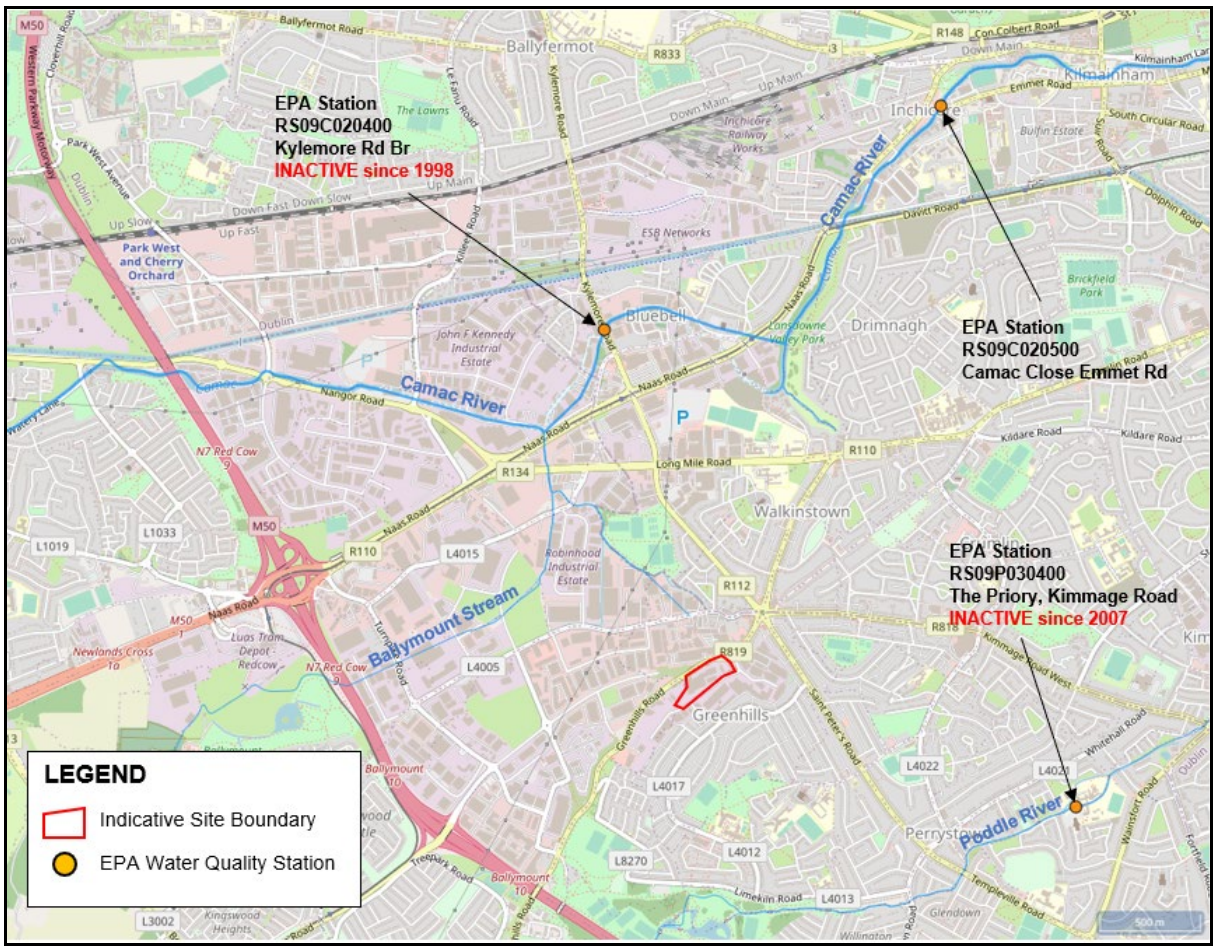


Figure 7.2 EPA Water Quality Stations near of the Subject Site (Source: EPA, 2022)

Q Values are used by the EPA to express biological water quality, based on changes in the macro invertebrate communities of riffle areas brought about by organic pollution. See Table 8.1 below for an explanation of the ratings. Q1 indicates a seriously polluted water body; Q5 indicates unpolluted water of high quality. Q Values for the Camac and Poddle rivers are shown in Table 8.2 below.

Table 8.1 EPA Biological Q Ratings

Quality ratings (Q)	Status	Water quality
Q5, Q4-5	High	Unpolluted
Q4	Good	Unpolluted
Q3-4	Moderate	Slightly polluted
Q3, Q2-3	Poor	Moderately polluted
Q2, Q1-2, Q1	Bad	Seriously polluted

Table 8.2 Q Ratings for Dodder River

RIVER	Station No.	Location	1990	1991	1994	1996	1998	2002	2005	2007	2008	2010	2013	2016	2019
Camac	RS09C020400	Kylemore Rd Br	1	2	1	1	3								
	RS09C020500	Camac Close Emmet Rd	1	2	1	1-2	1-2	1	2	2	2-3	3	3	3	3
Poddle	RS09P030400	The Priory, Kimmage Road								3					

7.3.5 Areas of Conservation

According to the NPWS (2022) on-line database there are no special protected area on or in the vicinity of the subject site. The closest Natura 2000 European sites are the South Dublin Bay Special Area of Conservation (SAC) and Proposed Natural Heritage Area (pNHA) and the South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) which are located c. 7.7 Km to the east of the subject site.

In addition, the Grand Canal pNHA is located c. 1.1 Km to the north of the subject site.

7.3.6 Flooding

According to the site specific Flood Risk Assessment carried out by Lohan & Donnelly Consulting Engineers (2021), the developed site is shown not to be at a significant risk from flooding and to not create a significant risk to adjoining areas or downstream.

The site is located within Flood Zone C (i.e., where the probability of flooding from rivers is less than 0.1% or 1 in 1000 years – probability of fluvial flooding is low risk). There are no reported incidents of flooding from the Walkinstown Stream or the local drainage network above mentioned in this area.

7.3.7 Rating of Importance of Hydrological Attributes

Based on the TII methodology (2009) (See Appendix 7.1), the importance of the hydrological features at this site is rated as 'Low Importance'. The Attribute has a low quality or value on a local scale.

7.4 Characteristics of the Proposed Development

The proposed development comprises the following:

> *(i) The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3 m – 9.9 m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;*
>
> *(ii) the construction of a mixed-use Build-to-Rent residential and commercial development comprising 633 no. build-to-rent apartment units (292 no. one-beds, 280 no. two-beds and 61 no. three-beds), 1 no. childcare facility and 10 no. commercial units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:*
>
> *(a) Block A comprises 209 no. apartments (102 no. 1 bed-units, 106 no. 2 bed-units and 1 no. 3-bed units) measuring 5 - 10 storeys in height. (b) Block B comprises 121 no. apartments (53 no. 1 bed-units, 45 no. 2 bed-units and 23 no. 3 bed-units) measuring 8 - 10 storeys in height. (c) Block C comprises 130 no. apartments (38 no. 1-bed units, 71 no. 2-bed units and 21 no. 3-bed units) measuring 8 - 12 storeys in height. (d) Block D comprises 173 no. apartments (99 no. 1 bed-units, 58 no. 2 bed-units and 16 no. 3 bed-units) measuring 6 - 10 storeys in height. All apartments will be provided with private balconies/terraces;*
>
> *(iii) provision of indoor communal residential amenity/management facilities including a co-working space, communal meeting room/ work space, foyer, toilets at ground floor of Block A; gym, changing rooms, toilets, resident's lounge, studio, laundry room, communal meeting room/ work space, multi-function space with kitchen at ground floor of Block B; games room with kitchenette, media room, co-working space, resident's lounge, communal meeting room/ work space, reception area,*

management office with ancillary staff room and toilets, toilets, parcel room at ground floor of Block C;

(iv) the construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block A;

(v) the construction of 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C as follows: Block A has 3 no. units at ground floor comprising 79.46 sq.m., 90.23 sq.m., and 121.39 sq.m., Block B has 1 no. unit at ground floor comprising 127.03 sq.m., Block C has two units at second floor comprising 120.85 sq.m. and 125.45 sq.m., and Block D has 4 no. units at ground floor comprising 84.45 sq.m., 149.77 sq.m., 155.48 sq.m. and 275.59 sq.m.;

(vi) the construction of 3 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 2 no. secondary entrances from the south for emergency access and services (access from existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

(vii) provision of 424 no. car parking spaces comprising 398 no. standard spaces, 21 no. mobility spaces and 5 no. car club spaces located at ground floor level car park located within Block A and accessed via the proposed entrance at Greenhills Road, a two-storey car park located within Blocks C and D also accessed from the proposed entrance at Greenhills Road and on-street parking at ground floor level adjacent to Blocks A and C. Provision of an additional 15 no. commercial/ unloading/ drop-off on-street parking spaces at ground floor level (providing for an overall total of 439 car parking spaces). Provision of 4 no. dedicated motorcycle spaces at ground floor level parking area within Blocks C and D;

(viii) provision of 1363 no. bicycle parking spaces comprising 1035 no. residents' bicycle spaces, 5 no. accessible bicycle spaces and 7 no. cargo bicycle spaces in 9 no. bicycle storerooms in ground and first floor parking areas within Blocks A, C and D, and 316 no. visitors' bicycle spaces located externally at ground floor level throughout the development;

(ix) provision of outdoor communal amenity space (5,020 sq.m.) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting, and scented gardens located on podiums at first and second floor levels; provision of a communal amenity roof garden in Block C with seating area and planting (176 sq.m.); and inclusion of centrally located public open space (3,380 sq.m.) adjacent to Blocks B and C comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space; and incidental open space/public realm;

(x) development also includes landscaping and infrastructural works, foul and surface water drainage, bin storage, ESB substations, plant rooms, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development.

This application is accompanied by an Environmental Impact Assessment Report (EIAR).

The principal aspects related to the hydrological environment are presented in the following sections.

7.4.1 Surface Water Drainage

7.4.1.1 Construction Phase

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed

site is complete. A temporary drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff by the site during construction.

It is envisaged that a number of geotextile lined settling basins and temporary mounding's and/or silt fences will be installed to ensure silts do not flow off site during the construction stage. This temporary surface water management facility will throttle runoff and allow suspended solids to be settled out and removed. All inlets to the settling basins will be 'riprapped' to prevent scour and erosion in the vicinity of the inlet.

No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavation is kept relatively dry.

The measures outlined in Section 7.6 will be put in place during the construction phase to ensure protection of surface waterbodies. Construction works are informed by best practice guidance from Inland Fisheries Ireland on the prevention of pollution during development projects:

- Control of Water Pollution from construction Sites, Guidance for consultants and contractors (C532); and
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016).
- Environmental Good Practice on Site (3rd edition) (C692).
-

7.4.1.2 Operational Phase

The surface water drainage infrastructure for the proposed development has been designed and is to be constructed in accordance to "Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Technical Document – Volume 2, New Developments, 2005, "Greater Dublin Regional Code of Practice Works" and the Building Regulation requirements.

It is proposed to provide a 225, 300 & 450mm diameter surface water pipes to service the development. Surface water collected from within the site boundary will flow into the last manhole on site ("SW02" refer to Engineering Services Report), from there the surface water will flow into an intermediate manhole ("SW01") in-between the last manhole on site and the existing surface water sewer. Finally the surface water will discharge into the existing 225mm surface water sewer located on the access road parallel to Chadwicks Plumb Centre, south of the proposed development via a saddle connection.

The proposed development will implement sustainable urban drainage system (SuDS) measures as an approach to manage the surface water within the site, reducing, delaying and purifying the run-off from the site, hence lowering the strain and the pollution content on the existing public sewer. These measures comprise the following:

- Extensive and intensive green roof;
- Rain gardens and tree pits
- Permeable paving;
- Petrol interceptors in undercroft car paks;
- Attenuation tank under the courtyard area;
- Hydrobrake run-off control, to restrict the discharge flow to the greenfield equivalent runoff for the catchment area.

7.4.2 Foul Water

The foul water drainage infrastructure for the proposed development has been designed and is to be constructed in accordance to Irish Water's "Code of Practice for Wastewater Infrastructure (Document IW-CDS-5030-03)", "Wastewater Infrastructure Standard Details (Document IW-CDS-5030-01)" and the Building Regulation requirements.

To service the development, a 225/300mm diameter foul water pipe will be provided, commencing from the south-west corner of the site, extending to the last foul water manhole of site 'FW01'. The foul water will then flow towards the existing foul water manhole 'EX.FW01' located south-east of the site, on the access road parallel to the southern site boundary, discharging all the foul water generated from the proposed development.

The foul water peak flow (dry weather flow) was estimated at 22.23 l/s. Refer to the Engineering Services Report for further details.

7.4.3 Water Supply

To service the development, it is proposed to provide a 200mm MDPE (medium density polyethylene) type PE-80 water main. The water main will be connected to the plant rooms where the water distribution system is located, distributing the water to the residing residents of the apartment complexes. To comply with guidance specification for fire hydrants, offline & on-line fire hydrants will be provided along the water main to provide full coverage of the proposed development in the event of a fire. The water main will exit the proposed development in the north-east corner and connect to the newly laid 200mm diameter water main as per the conditions set out in Irish Water's confirmation of feasibility letter (refer to Engineering Services Report, Appendix B).

7.5 Potential Impact of the Proposed Development

An analysis of the potential impacts of the Proposed Development on the hydrological environment during the construction and operation is outlined below. Due to the inter-relationship between land, soils, geology and hydrogeology and surface water the following impacts discussed will be considered applicable to Chapter 6.0. Waste Management is also considered an interaction.

7.5.1 Construction Phase

7.5.1.1 Increased Sediments Loading in Run-off

Surface water runoff during the construction phase may contain increased silt levels or become polluted from construction activities. Runoff containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from dewatering excavations, exposed ground, stockpiles and access roads. Mitigation measures highlighted in Section 7.6 below will be employed to remove the risk to affect the local hydrological environment.

If contaminated soil/water is encountered, it will be required to be removed by a licensed waste contractor. Further soil sampling will be undertaken during pre-development works. The contractor will be required to submit a Construction Waste Management Plan (CWMP) to the local authority for approval which will address all types of material to be disposed of. Site investigation and laboratory analysis carried out in 2021 has not identified any existing contamination.

7.5.1.2 Contamination of Local Water Course and Drainage

During construction of the development, there is a risk of accidental pollution incidences from the following sources if not adequately mitigated:

- Spillage or leakage of oils and fuels stored on site;
- Spillage or leakage of oils and fuels from construction machinery or site vehicles;
- Spillage of oil or fuel from refuelling machinery on site; and
- The use of concrete and cement during pad foundation construction.

The mitigation measures incorporated into the design comprise special bunded areas for storage of construction materials as fuels, oils, solvents and paints; refuelling area away from surface water or drains; a mobile double skinned tank for storage of fuel for vehicles; and the installation of silt and sediment barriers at the perimeter of earthworks construction areas to limit transport of erodible soils outside of the site.

Based on the points stated above in relation to the construction phase the potential impact on the surface water and hydrology during construction (EPA 2017) is considered to have a short term – imperceptible impact with a neutral impact on quality. i.e. an impact capable of measurement but without noticeable consequences. This is based on the expected low potential loading and high level of dilution in the surface water sewer and on the distance of c. 1.1 Km between the site and the Poddle River which is the nearest surface water receptor. Significant dilution in the surface water sewer will ensure any released contaminants are at background levels (i.e., with no likely impact above water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019).

7.5.2 Operational Phase

There are no discharges to any open water courses included in the design. The projected surface water network has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100 year event to the attenuation basins without any overland flooding. Discharge flow is restricted to the greenfield equivalent runoff for the catchment areas. Refer to the Engineering Services Report (Lohan & Donnelly, 2021) for further details.

There will be an increase in hardstanding area (c. 11,984 m2) associated with the development area. This will have a minor effect on local recharge to ground; however, the impact on the overall hydrological regime will be insignificant, considering the proportion of this area with respect to the entire catchment.

The site will be served by the existing water supply and foul water network. The foul water drainage infrastructure for the proposed development has been designed and is to be constructed in accordance to Irish Water's "Code of Practice for Wastewater Infrastructure (Document IW-CDS-5030-03)" Pre-connection enquiry form (Reference No. CDS20007999) was submitted on the 08th of December, 2020 to new connections department within Irish Water to determine whether a connection for the proposed development is feasible and could be established. Confirmation of feasibility from Irish Water has been received on the 18th of March, 2021 stating that a foul water connection for the proposed development is feasible, subject to upgrade works. Irish Water will be undertaking upgrade works for the existing public wastewater infrastructure system in the area of where the proposed development is located. The extent of required upgrades is yet to be determined by Irish Water however, it is likely to be in the form of replacing the existing 225mm diameter public wastewater sewer to a larger diameter sewer. The wastewater connection location for our proposed development into the upgraded public wastewater sewer will be identified by Irish Water post a New Connection Application form has been submitted to & reviewed by Irish Water. Refer to the Engineering Services Report (Lohan & Donnelly, 2021) for further details.

As mentioned above, the peak wastewater discharge is calculated at 22.23 l/s (Lohan & Donnelly, 2021). The foul discharge from the site will join the public sewer and will be treated at the Irish Water Ringsend Wastewater Treatment Plant (WWTP) prior to subsequent discharge to Dublin Bay. This WWTP is required to operate under an EPA licence (D0034-01) and meet environmental legislative requirements as set out in such licence. It is noted that an application for a new upgrade to this facility is currently in planning.

This plant operates under an EPA licence (D0034-01) and is currently in the process of being upgraded to a PE of 2.4million to meet the increased demand of the Dublin area. The most recent Annual Environmental Report (AER 2020) shows it is currently operating for a PE peak loading of 2.27million while originally designed for 1.64million. However, the current maximum hydraulic load (832,269 m3/day) is less than the Peak hydraulic capacity as constructed (959,040 m3/day) i.e. prior to any upgrade works. These upgrade works have commenced and comprise a number of phases and are ongoing and expected to be fully completed by 2025. The upgrade works will result in treatment of sewage to a higher quality than current, thereby ensuring effluent discharge to Dublin Bay will comply with the Urban Wastewater Treatment Directive by Q4 2023.

The project is being progressed in stages to ensure that the plant continues to treat wastewater to the current treatment levels throughout the delivery of the upgrade. The project comprises three key elements and underpinning these is a substantial programme of ancillary works:

- Provision of additional secondary treatment capacity with nutrient reduction (400,000 population equivalent);
- Upgrade of the 24 existing secondary treatment tanks to provide additional capacity and nutrient reduction, which is essential to protect the nutrient-sensitive Dublin Bay area; and
- Provision of a new phosphorous recovery process.

In February 2018, the work commenced on the first element, the construction of a new 400,000 population equivalent extension at the Ringsend Wastewater Treatment Plant. These works are at an advanced stage with testing and commissioning stages expected to be completed in the second half of 2021.

The 2019 planning permission facilitated upgrading works to meet nitrogen and phosphorus standards set out in the licence, which are temporarily exceeded currently. Works on the first of four contracts to retrofit the existing treatment tanks with aerobic granular sludge technology commenced in November 2020. Award of the second contract is due in Q3 2021 and the third and fourth contracts are scheduled to commence in late 2021 and mid 2023 respectively.

The application for the upgrade of the WWTP in 2012 and the revised upgrade in 2018 was supported by a detailed EIAR. As outlined in the EIAR, modelling of water quality in Dublin Bay has shown that the upgrades (which are now currently underway) will result in improved water quality within Dublin Bay. The 2018 EIAR predicts that the improvement in effluent quality achieved by the upgrade will compensate for the increase in flow through the plant. The ABP inspector's report summarises the positive findings of the modelling for the post WWTP upgrade scenario on Dublin Bay water quality in sections 12.3.5 and 12.3.12 of his report and the overall positive impact for human health and the environment in his conclusions in section 12.9.1.
In addition, the EIAR report acknowledges that under the do-nothing scenario "*the areas in the Tolka Estuary and North Bull Island channel will continue to be affected by the cumulative nutrient loads from the river Liffey and Tolka and the effluent from the Ringsend WWTP*", which could result in a deterioration of the biological status of Dublin Bay (Irish Water, 2018). Nevertheless, these negative impacts of nutrient over-enrichment are considered "unlikely" (Irish Water, 2018). This is because historical data suggests that pollution in Dublin Bay has had little or no effect on the composition and richness of the benthic macroinvertebrate fauna. Therefore, the do-nothing scenario predicts that nutrient and suspended solid loads from the WWTP will "*continue at the same levels and the impact of these loadings should maintain the same level of effects on marine biodiversity*". Therefore, it can be concluded that significant effects on the current status of the European sites within Dublin Bay from the current operation of Ringsend WWTP are unlikely. This conclusion is not dependent upon any future works to be undertaken at Ringsend.

Even without treatment at the Ringsend WWTP, the peak effluent discharge, calculated for the proposed development as 22.23 l/s (which would equate to 0.2% of the licensed discharge at Ringsend WWTP [peak hydraulic capacity]), would not have a measurable impact on the overall water quality within Dublin Bay and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive). This assessment is supported by hydrodynamic and chemical modelling within Dublin Bay which has shown that there is significant dilution for contaminants of concern (DIN and MRP) available quite close to the outfall for the treatment plant (Ringsend WWTP 2012 EIS, Ringsend WWTP 2018 EIAR; refer to Section 12.4.22, ABP-301798-18 Inspector's report). As mentioned above, the most recent water quality assessment of Dublin Bay WFD Waterbody undertaken by the EPA (Water Quality in 2020: An Indicator Report, 2021) also shows that Dublin Bay on the whole, currently has an 'Unpolluted' water quality status (refer to www.catchments.ie).

With regard to bathing waters in Dublin Bay, as mentioned above the Proposed Development will have no impact on the water quality in any overflow situation apart from a minor contribution (0.2% of the peak hydraulic capacity at Ringsend WWTP) from foul sewage.

It should be noted that the Ringsend WWTP upgrades has experienced capacity issues during rainfall events and therefore overflows can occur following periods of heavy rainfall. These overflows occur as a result of the impact on treatment capacity during heavy rainfall events due to surges primarily caused by the historical combined drainage system in Dublin. As the Proposed Development will not

contribute any additional stormwater drainage to the WWTP, the development will therefore have no measurable impact on the water quality in any overflow situation.

7.6 Remedial and Reductive Measures

The design has taken account of the potential impacts of the development on the hydrology environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the hydrology. These are described in Sections 7.6.1 and 7.6.2 below.

The site is drained by the public stormwater and foul water network. This network ultimately flows in a northerly direction towards the South Dublin Bay which hosts Natura Sites (SPA/SAC/pNHA) and is located c. 7.7 Km to the northeast of the site. Thus, the site would have an indirect hydrological connection with the Dublin Bay through the local drainage networks.

As stated above, no impacts are expected on South Dublin Bay SPA/SAC/pNHA, given the potential loading and the distance from source to the Natura 2000 sites. The potential risk is considered to be imperceptible as potential contaminant would be attenuated, diluted and dispersed below statutory guidelines (i.e., S.I. European Communities Environmental Objectives Regulations, 2009 [S.I. No. 272 of 2009 as amended by SI No. 77 of 2019]) within 500 m of the site.

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures discussed will be considered applicable to all. Waste Management is also considered as an interaction in some sections.

7.6.1 Construction Phase

7.6.1.1 Construction Environmental Management Plan (CEMP)

An Outline Construction Environmental Management Plan (CEMP) has been prepared by AWN (2022) for the proposed development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed CEMP. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

7.6.1.2 Surface Water Run-off

As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, mitigations will be put in place to manage run-off during the construction phase.

Any run-off will be intercepted on site, where the ground falls towards adjoining properties or public roads/footpaths. This will be achieved with open drains or French drains and collected for treatment based on the conditions of a SDCC and/or Irish Water licence, prior to pumping to the surface sewer network.

Direct uncontrolled run-off into the drainage ditch running through the site will not be allowed. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses/ stormwater sewer/ drainage ditch, refuelling of machinery off site) and hydrocarbon interceptors.

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing stormwater sewer network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the sewer. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated. Based on SI information (Ground Investigations Ireland, 2021), it is not anticipated that there will be rock removal required for the proposed single storey basements in the development, for building foundations, for service trenches or for any other works.

Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

7.6.1.3 Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be away from surface water gulleys, the existing open ditch or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and

hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

7.6.1.4 Soil Removal and Compaction

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust.

All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Site investigations carried out at the site in 2021 found no residual contamination on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

7.6.2 Operational Phase

The proposed development will provide a significant improvement to the local drainage catchment as it is proposed to provide full attenuation in compliance with the requirements of the Greater Dublin Strategic Drainage Study. A number of design measures (SuDS measures detailed in Section 7.4.1.2 above) will be put in place to minimise the likelihood of any spills entering the water environment to include the design of the car park with hydrocarbon interceptors (refer to Section 7.4.1.2 above). In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.

It is proposed to ultimately discharge surface water from the proposed development, post attenuation and outflow restrictions into the existing local drainage.

7.7 Predicted Impact of the Proposed Development

7.7.1 Construction Phase

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the hydrological environment do not occur during the construction phase and that the residual impact will be **short term-imperceptible-neutral**. Following the TII criteria (refer to Appendix 7.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

7.7.2 Operational Phase

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the hydrological environment do not occur during the operational phase and that the residual impact will be **long term-imperceptible-neutral**. Following the TII criteria (refer to Appendix 7.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

7.8 Cumulative Impacts of the Proposed Development

This section considers the potential cumulative impacts or effects on the hydrological environment of the proposed development with other existing, planned and permitted developments in the locality.

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. The cumulative impact (as far as practically possible) of the proposed development with any/all relevant existing or permitted developments as set out in Chapter 3 (Planning and Development Context). The likelihood of cumulative effects are discussed in Sections 7.8.1 and 7.8.2 below for construction and operational phases.

7.8.1 Construction Phase

The review of the planned and permitted projects in the locality of the proposed development has identified 4 substantial permitted developments which may be undertaking construction works simultaneously to the proposed development. All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (S.I No 77/2019 EU Environmental Objectives (Surface Waters) Amendment Regulations 2019) such that they would be required to manage runoff and fuel leakages. As such, it can be concluded that the in-combination effects of surface water arising from the Proposed Development taken together with that of other developments will not be significant based on the low potential chemical and sediment loading.

The residual cumulative impact on water and hydrology for the construction phase is anticipated to be ***neutral, imperceptible,*** and ***short term*** for the construction phase, once appropriate mitigation measures to manage water quality runoff in compliance with legislative requirement are put in place for each development.

7.8.2 Operational Phase

The existing and permitted projects set out in Chapter 3 (Planning and Development Context) have been considered in this assessment. Increase in wastewater loading and water supply requirement is an impact of all development: Each development will require approval from Irish Water confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure and water supply requirements for the Proposed Development has been designed to accommodate the future indicative substation development.

Each permitted development are required by the Local Authority to comply with the Greater Dublin Strategic Drainage Strategy (GDSDS) and Local Authority requirements by providing suitable attenuation on site to ensure greenfield run-off rates and ensure that there is no increase in offsite flooding as a result of development.

It can also be concluded that the cumulative or in-combination effects of effluent arising from the Proposed Development with that of other permitted proposed developments, or with development planned pursuant to statutory plans in the greater Dublin, Meath and Kildare areas, which will be discharged into Ringsend WWTP will not be significant having regard to the size of the calculated discharge from the Proposed Development and having regard to the following:

- Recent water quality assessment for Dublin Bay shows that they currently continue to meet the criteria for ‘Unpolluted’ water quality status (EPA, data until July 2021).

- The Ringsend WWTP upgrade which is currently being constructed will result in improved water quality by Q4 2023 to ensure compliance with Water Framework Directive requirements.
- All new developments are required to comply with SuDS which ensures management of run-off rate within the catchment of Ringsend WWTP.
- The natural characteristics of Dublin Bay result in enriched water rapidly mixing and degrading such that the plume has no appreciable effect on water quality at Natura 2000 sites.

The residual cumulative impact on water and hydrology for the operational phases is anticipated to be **neutral**, **imperceptible** and **long-term**, once appropriate mitigation measures to manage water quality runoff in compliance with legislative requirement are put in place for each development.

7.9 Monitoring

7.9.1.1 Construction Phase

During construction phase the following monitoring measures will be considered:

- Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off.
- Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling, etc.

7.9.1.2 Operational Phase

Maintenance of the surface water drainage system, including hydrocarbon interceptors, and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

8.0 NOISE AND VIBRATION

8.1 Introduction

This section of the EIAR has been prepared by AWN Consulting Ltd (AWN) to assess the potential noise and vibration impact of the proposed development in the context of current relevant standards and guidance.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impact associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment. An assessment of noise from existing sources inward on the development has also been completed.
Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

This assessment has been prepared by Leo Williams BAI MAI PgDip AMIOA, Acoustic Consultant at AWN Consulting who has over 5 years' experience as an environmental consultant specialising in Acoustics and Environmental Impact Assessment. He has authored numerous EIAR chapters for various developments including residential schemes, mixed-use developments, greenways and wind farms.

8.2 Research Methodology

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out in the following sections. In addition to specific noise and vibration guidance documents, the following Environmental Protection Agency (EPA) guidelines were considered and consulted in the preparation of this Chapter:

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

The study has been undertaken using the following methodology:

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

8.2.1 Construction Phase – Noise Impacts

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. South Dublin County Council (SDCC) typically controls construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

8.2.1.1 British Standard BS 5228 – 1: 2009+A1:2014

British Standard *BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise* (hereinafter referred to as BS 5228-1:2009+A1:2014) is referred to as appropriate criteria relating to permissible construction noise threshold levels for a development of this scale.

Potential noise impacts during the construction stage of a project are often assessed in accordance with BS 5228-1:2009+A1:2014. Various mechanisms are presented as examples of determining if an impact is occurring, these are discussed in the following paragraphs.

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

BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. Table 8.1 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Table 8.1 Example Threshold of Significant Effect at Dwellings

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

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

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

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

D. 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5 dB. If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur. It should be noted that this assessment method is only valid for residential properties and if applied to commercial premises without consideration of other factors may result in excessively onerous thresholds being set.

The closest neighbouring noise sensitive properties to the proposed development include dwellings approximately 90m to the south of the proposed development site. The closest commercial receptors are located adjacent to the eastern boundary with others located some 25m to 40m from the development site.

Fixed Limits
Several commercial units are located 20-30m to the west of the subject site.

When considering non-residential receptors, reference is made to BS 5228-1:2009+A1:2014, which gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. For example, paragraph E.2 states: -

> *"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."*

Paragraph E.2 goes on to state: -

> *"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed: -*
>
> > *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
> > *75 decibels (dBA) in urban areas near main roads in heavy industrial areas".*

Proposed Threshold Noise Levels

Taking into account the proposed criteria outlined above and making reference to the baseline noise environment monitored around the development site (see Section 8.3), BS 5228-1:2009+A1:2014 has been used to inform the assessment approach for construction noise at Noise Sensitive Locations (NSLs).

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development: -

- For residential NSLs it is considered appropriate to adopt 65 dB(A) CNT depending on location. Given the baseline monitoring carried out, it would indicate that Category A and C values are appropriate using the ABC method.
- For commercial NSLs it is considered appropriate to adopt the 75 dB(A) CNT, given the urban, industrial environment in which the closest commercial properties reside, in line with BS 5228-1:2009+A1:2014.

Interpretation of the CNT

In order to assist with interpretation of CNTs, Table 8.2 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of *DMRB: Noise and Vibration* and adapted to include the relevant significance effects from the *EPA Guidelines* (EPA 2017).

Table 8.2 Construction Noise Significance Ratings

Guidelines for Noise Impact Assessment Significance (DMRB)	CNT per Period	EPA EIAR Significance Effects	Determination
Negligible	Below or equal to baseline noise level	Not Significant	Depending on CNT, duration & baseline noise level
Minor	Above baseline noise level and below or equal to CNT	Slight to Moderate	
Moderate	Above CNT and below or equal to CNT +5 dB	Moderate to Significant	
Major	Above CNT +5 to +15 dB	Significant, to Very Significant	
	Above CNT +15 dB	Very Significant to Profound	

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

8.2.1.2 Construction Phase – Traffic Noise Impacts

In order to assist with the interpretation of construction traffic noise, Table 8.3 includes guidance as to the likely magnitude of impact associated with changes in traffic noise levels along an existing road. This is taken from Table 3.17 of the *DMRB Noise and Vibration* (UKHA 2020).

Table 8.3 Likely Effect Associated with Change in Traffic Noise Level – Construction Phase

Magnitude of Impact	Increase in Traffic Noise Level (dB)
Negligible	Less than 1.0
Minor	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major	Greater than or equal to 5.0

In accordance with the *DMRB Noise and Vibration*, construction noise and construction traffic noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights;
- A total number of days exceeding 40 in any six consecutive months.

8.2.2 Construction Phase – Vibration

Vibration standards address two aspects: those dealing with cosmetic or structural damage to buildings and those with human comfort. For the purpose of this scheme, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

8.2.2.1 Building Damage

With respect to vibration, *British Standard BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration* recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero. It is therefore common, on a cautious basis to use this lower value. Taking the above into consideration the vibration criteria in Table 8.4 are recommended.

Table 8.4 Recommended Vibration Criteria During Construction Phase

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

Expected vibration levels from the construction works will be discussed further in Section 9.5.

8.2.2.2 Human Perception

People are sensitive to vibration stimuli at levels orders of magnitude below those which have the potential to cause any cosmetic damage to buildings. There are no current standards which provide guidance on typical ranges of human response to vibration in terms of PPV for continuous or intermittent vibration sources.

BS5228-2:2009+A1:2014, provides a useful guide relating to the assessment of human response to vibration in terms of the PPV. Whilst the guide values are used to compare typical human response to construction works, they tend to relate closely to general levels of vibration perception from other general sources.

Table 8.5 below summarises the range of vibration values and the associated potential effects on humans.

Table 8.5 Guidance on Effects of Human Response to PPV Magnitudes

Vibration Level, PPV	Effect
0.140mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3mm/s	Vibration might be just perceptible in residential environments.
1mm/s	It is likely that a vibration level of this magnitude in residential environments will cause complaint.

Vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin and or the duration of vibration is known. For example, ground breaking can typically be tolerated at vibration levels up to 2.5 mm/s if adequate public relations are in place and timeframes are known. These values refer to the day-time periods only.

During surface construction works (demolition and ground breaking etc.) the vibration limits set within Table 8.5 would be perceptible to building occupants and have the potential to cause subjective effects. The level of effect is, however, greatly reduced when the origin and time frame of the works are known and limit values relating to structural integrity are adequately communicated. In this regard, the use of clear communication and information circulars relating to planned works, their duration and vibration monitoring can significantly reduce vibration effects to the neighbouring properties.

Interpretation of the Human Response to Vibration

In order to assist with interpretation of vibration thresholds, Table 8.6 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2:2009+A1:2014.

Table 8.6 Human Response Vibration Significance Ratings

Criteria	Impact Magnitude	Significance Rating
≥10 mm/s PPV	Very High	Very Significant
≥1 mm/s PPV	High	Moderate to Significant
≥0.3 mm/s PPV	Medium	Slight to Moderate
≥0.14 mm/s PPV	Low	Not significant to Slight
Less than 0.14 mm/s PPV	Very Low	Imperceptible to Not significant

8.2.3 Operational Phase

8.2.3.1 Mechanical Plant

Receptors Outside the Proposed Development

The most appropriate standard used to assess the impact of a new continuous source (i.e. plant items) to a residential environment is BS 4142 *Methods for rating and assessing industrial and commercial sound* (2014). This standard describes a method for assessing the impact of a specific noise source at a specific location with respect to the increase in "background" noise level that the specific noise source generates. The standard provides the following definitions that are pertinent to this application:

- "*Specific sound level,* $L_{Aeq,\ Tr}$" is equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *T*. This level has been determined with reference to manufacturers information for specific plant items.

- "*Rating level*" $L_{Ar,Tr}$ is the specific noise level plus adjustments for the character features of the sound (if any), and;

- *"Background noise level"* is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T.* This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

The assessment procedure in BS4142: 2014 is outlined as follows:

1. determine the specific noise level;
2. determine the rating level as appropriate;
3. determine the background noise level, and;
4. subtract the background noise level from the specific noise level in order to calculate the assessment level.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. A difference of +10 dB or more is likely to be an indication of a significant adverse impact. A difference of around +5 dB is likely to be an indication of an adverse impact, dependent on the context. Where the rated plant noise level is equivalent to the background noise level, noise impacts are typically considered to be neutral.

Receptors Inside the Proposed Development

In order to determine an appropriate noise criterion for residential receptors within the proposed development that will be built in future, guidance is taken from British Standard BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings.* Recommended internal noise levels for residential settings are set out in the standard as follows:

Table 8.7 BS 8233 Recommended Internal Noise Levels

Activity	Location	***Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$***	***Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$***
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

For the purposes of this assessment, it is appropriate to derive external limits based on the internal criteria noted in the above. This is done by factoring in the degree of noise reduction afforded by a partially open window and typical 15 dB attenuation is noted in this British Standard. Using this correction value across an open window, the following external noise levels would achieve the internal noise levels noted in Table 8.7 above.

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

8.2.3.2 Additional Vehicular Traffic on Surrounding Roads

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the development will make use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with the development. In order to assist with the interpretation of the noise associated with additional vehicular traffic on public roads, Table 8.8 is taken from DMRB Design Manual for Roads and Bridges (DMRB), Highways England Company Limited, Transport Scotland, The Welsh Government and The Department for Regional Development Northern Ireland, (2020).

Table 8.8 Significance in Change of Noise Level

Change in Sound Level (dB)	Subjective Reaction	Magnitude of Impact	EPA Significance Rating
10+	Over a doubling of loudness	Major	Significant
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate
3 – 4.9	Perceptible	Minor	Slight
0.1 – 2.9	Imperceptible	Negligible	Imperceptible
0	None	No Change	Neutral

The guidance outlined in Table 8.8 will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely long-term impacts during the operational phase.

8.2.3.3 Vibration

The development is residential in nature, therefore it is not anticipated that there will be any impact associated with vibration during the operational phase.

8.2.3.4 Inward Noise – ProPG Planning & Noise

The Professional Practice Guidance on Planning & Noise (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since its adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.
The ProPG outlines a systematic risk-based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,
- Stage 2 – Involves a full detailed appraisal of the proposed development covering four “key elements” that include:
    - Element 1 - Good Acoustic Design Process;
    - Element 2 - Noise Level Guidelines;
    - Element 3 - External Amenity Area Noise Assessment
    - Element 4 - Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 8.1 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

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

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 8.9 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

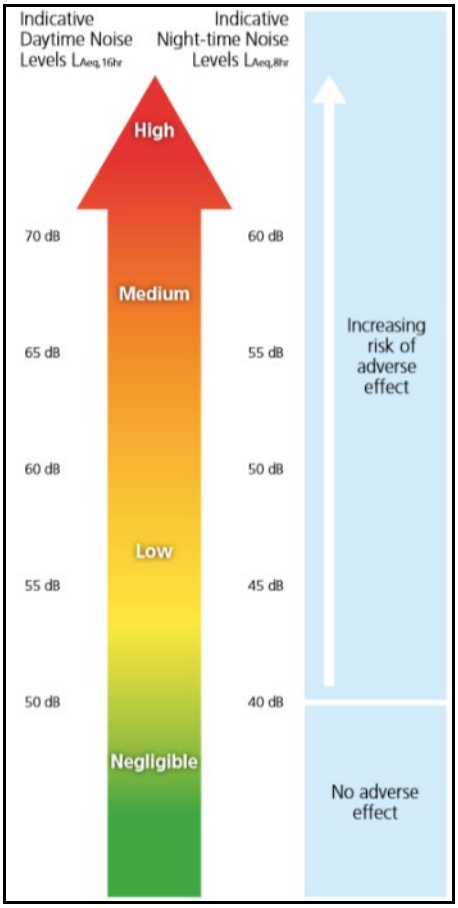


Figure 8.1 ProPG Stage 1 - Initial Noise Risk Assessment

Table 8.9 ProPG Internal Noise Levels

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

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

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

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

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

8.3 Receiving Environment

The subject site is located in Greenhills, Dublin 12, within the Greenhills Industrial Estate. The site is bound to the north by the Greenhills Road, and to the east, south and west by existing commercial

buildings. The surrounding environment in the vicinity of the development site is mixed in nature with manufacturing, retail units and warehousing making up the majority of the surrounding building uses.

8.3.1 Baseline Noise Environment

8.3.1.1 Environmental Noise Survey

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

Choice of Measurement Locations

The measurement locations are described below and shown in Figure 8.2.

N1 located in the northern portion of the site, approximately at the location of development building facades.
N2 located to the south of the site opposite a neighbouring manufacturing facility.
N3 located to the southwest of the site to the rear of houses at St Columba's Road.
N4 located to the south west of the site adjacent to the internal road.
N5 located north of the site adjacent to the Greenhills Road.

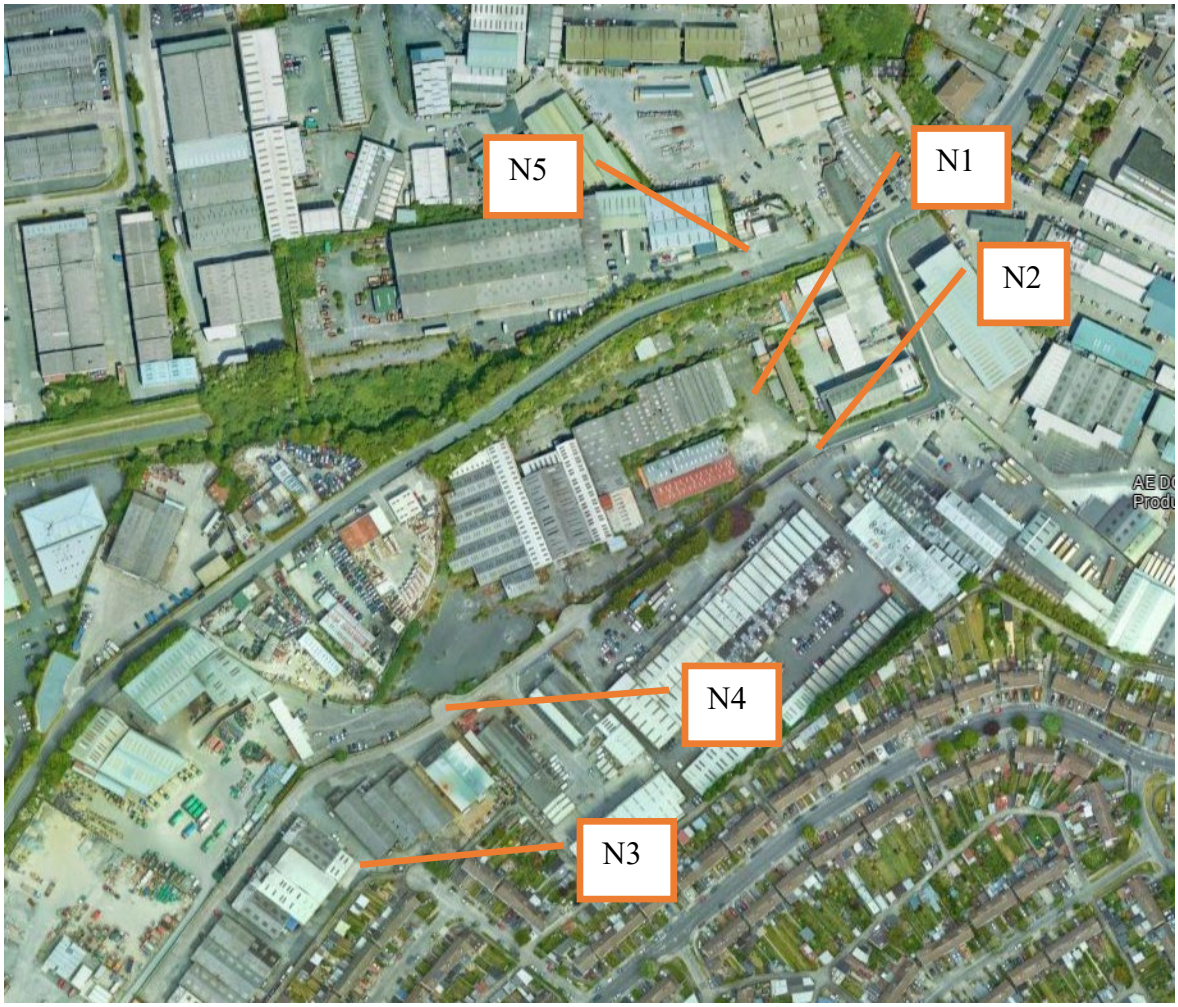


Figure 8.2 Noise Survey Locations

Survey Periods

The noise survey was carried out over the following periods:

Table 8.10 Survey Periods

Aspect	Survey Position	Survey Period
Noise	N1 (unattended)	13:45hrs on 25 May to 12:20hrs on 28 May 2021[NOTE A] Valid dataset comprises data from survey start to 19:00hrs on 27 May 2021
	N2	11:20hrs to 13:05hrs on 25 May 2021
	N3	
	N2	23:10 on 8 February to 01:13 on 9 February 2022.
	N4	
	N5	

NOTE A Evidence of interference was observed on collection of equipment. Data set has been reviewed and affected data excluded from the assessment.

Instrumentation

The noise measurements were carried out using the equipment listed below.

Table 8.11 Noise Monitoring Equipment Details

Measurement	Manufacturer	Equipment Model	Serial Number	Calibration date
Sound Level Meter	Rion	NL-52	575782	August 2019
Calibrator	Brüel & Kjær	Type 4231	2394086	March 2021

Measurement Parameters

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

- **L_{Aeq}** is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- **L_{AFmax}** is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.
- **L_{A90}** is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

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

Survey Results and Discussion

The results of the noise survey at three monitoring locations are summarised below.

Location N1

The unattended measurements collected over the survey period are summarised below. The unattended monitoring data was damage during the course of the noise survey and all data following the damage has been excluded from the assessment.

Table 8.12 Measured Noise Levels at N1

Date	Period	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
25 May 2021	Day	56	79	52
	Night	52	79	47
26 May 2021	Day	56	76	52
	Night	52	74	47
27 May 2021	Day	57	77	54
Average	Day	56	76 – 79	53
	Night	52	74 – 79	47

On installation and collection at this location the primary noise sources were observed to be traffic noise on the industrial estate road, traffic on Greenhills Road and steady plant noise and HGV movements at the manufacturing facility opposite. Activities relating to the day-to-day operation of a commercial trade business currently in operation on the site also contributed to daytime measured noise. Daytime ambient noise levels ranged from 56 to 57 dB L_{Aeq} with an average of 56 dB L_{Aeq}. Daytime background noise levels ranged from 52 to 54 dB L_{A90} with an average of 53 dB L_{A90}.

Night-time ambient noise levels were of the order of 52 dB L_{Aeq}. Night-time background noise levels were of the order of 47 dB L_{A90}. Night-time maximum noise levels were in the range of 74 to 79 dB L_{Amax}.

In addition, the L_{AFmax} values were measured over 15-minute intervals over the duration of the unattended monitoring survey.

Figure 8.3 presents the number of measured L_{AFmax} events for each decibel level during the night period measured at Location N1. On review of the maximum noise levels the value of 72 dB L_{AFmax} is not regularly exceeded on a given night (less than 10 events). This value has been used to determine the typical L_{Amax} levels experienced facades of future development buildings closer to the Greenhills Road.

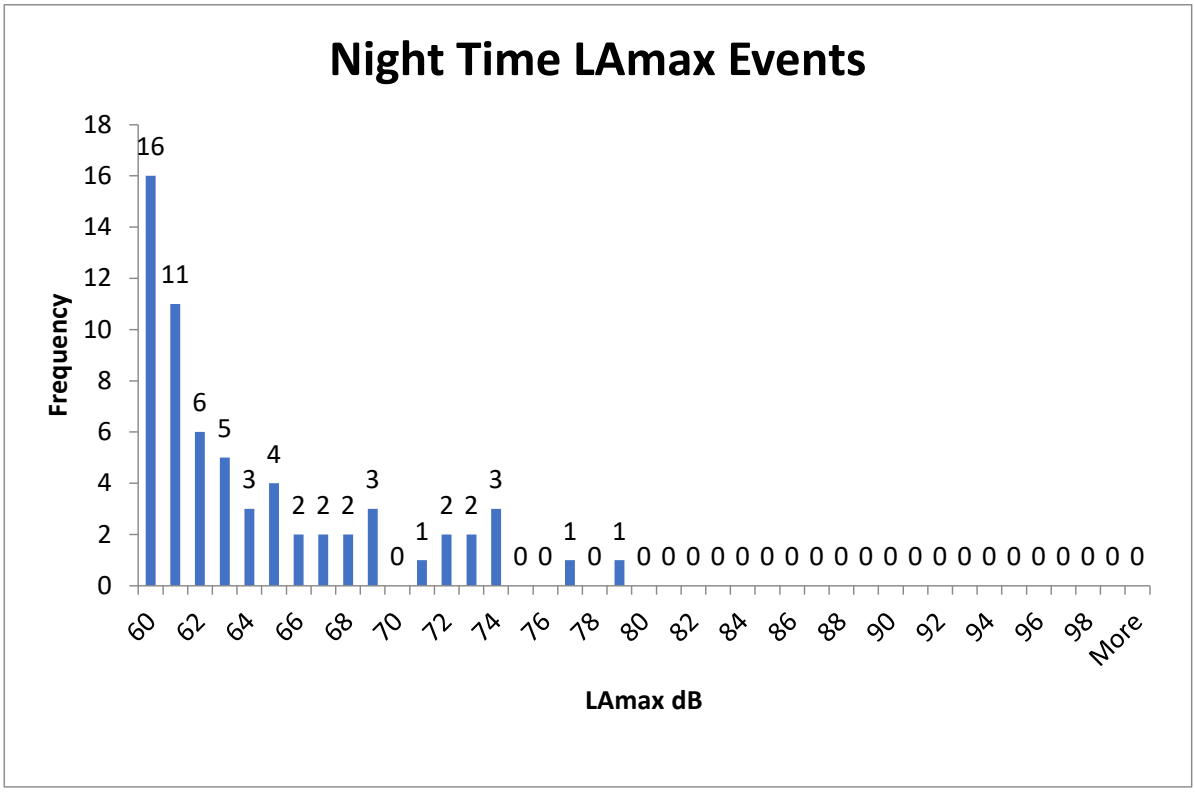


Figure 8.3 Distribution of L_{Amax} events – Night-time

Location N2

Table 8.13 Measured Noise Levels at N2

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
25/5/2021	11:20	56	76	49
	11:39	51	66	47
	12:33	56	86	46
8/2/2022	23:10	56	63	55
9/2/2022	00:17	56	67	55

Daytime measured noise levels at the survey location were dictated by nearby activity within the industrial estate. Noise sources included intermittent reverse alarms, forklift activity, plant noise, birdsong and distant traffic noise.

Daytime ambient noise levels were in the range of 51 to 56 dB L_{Aeq}. Background noise levels were in the range of 46 to 49 dB L_{A90}.

During the night-time period noise sources were noted to include steady plant noise from the opposite commercial facility, faint traffic noise, delivery vehicle and car movements on the industrial estate road. Other noise sources included faint traffic on the Greenhills Road and faint activity in nearby warehouse buildings.

Night-time ambient noise levels were 56 dB L_{Aeq}. Background noise levels were 55 dB L_{A90}.

Location N3

Table 8.14 Measured Noise Levels at N3

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
25/5/2021	11:58	64	77	62
	12:12	65	82	61
	12:50	64	77	60

Measured noise levels at the survey location were dictated by passing traffic, HGV movements and air brake noise and birdsong. Steady plant noise from the nearby manufacturing facility was observed throughout the survey period.

Ambient noise levels were in the range of 64 to 65 dB L_{Aeq}. Background noise levels were in the range of 60 to 61 dB L_{A90}.

Location N4

Table 8.15 Measured Noise Levels at N4

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
8/2/2022	23:35	48	66	46
9/2/2022	00:37	47	64	44

During the night-time period noise sources were noted to include faint traffic noise from the Greenhills Road, faint reverse alarms and truck movements. Nearby metal shutters were noted to be making noise due to the breeze at this location.

Night-time ambient noise levels were in the range of 47 to 48 dB L_{Aeq}. Background noise levels were in the range of 44 to 46 dB L_{A90}.

Location N5

Table 8.16 Measured Noise Levels at N5

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
8/2/2022	23:57	66	84	44
9/2/2022	00:58	67	86	45

During the night-time period noise sources were noted to include faint traffic noise from the Greenhills Road, faint reverse alarms and truck movements. Nearby metal shutters were noted to be making noise due to the breeze at this location.

Night-time ambient noise levels were in the range of 47 to 48 dB L_{Aeq}. Background noise levels were in the range of 44 to 46 dB L_{A90}.

8.3.1.2 Comment on Industrial Noise Environment

During the attended noise survey at the proposed development site, noise from the Brennan's manufacturing facility to the south of the site was observed. The noise included steady plant noise, HGV movements, HGV air brakes and tipping noise.

The development lands have been zoned REGEN under the South Dublin County Council Development Plan 2016 – 2022, i.e. zoned for enterprise / residential-led development.

Therefore, in order to present a robust assessment, the current noise environment has to be considered with respect to inward noise impact on the proposed development. During the course of the baseline noise surveys commercial noise from the facility to the south east of the proposed development was noted. Measured noise levels have been incorporated into the inward noise impact assessment in addition to the primary noise source, i.e. traffic noise on the Greenhills Road.

8.3.1.3 Do Nothing Scenario

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations will remain largely unchanged. The noise and vibration levels measured/noted during the baseline studies are considered representative of the Do-Nothing scenario. The Do-Nothing scenario is therefore considered neutral impact.

That said, if the proposed development were not to proceed, then a different development, similar in nature may be constructed as the land is zoned for development in keeping with the national policy for compact growth on brownfield sites.

8.4 Characteristics of the Proposed Development

The proposed development is located on the former Chadwicks Greenhills site and consists of circa 633 no. dwelling units, resident amenity spaces, creche and commercial spaces and all associated ancillary site development works. A detailed description of the development is provided in Chapter 2 (Project Description).

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

- Construction and demolition phase; and,
- Operational phase.

The construction phase will involve demolition, excavation over the development site, construction of foundations and buildings, landscaping, and vehicle movements to site using the local road network. This phase will generate the highest potential noise impact due to the works involved, however the time frame is short term in nature.

The primary sources of outward noise in the operational context are deemed to be long term in duration and will comprise traffic movements to the development site using the existing road network and plant noise emissions from the completed buildings. These issues are discussed in detailed in the following sections.

Inward noise incident on the development from existing noise sources, namely road traffic noise and commercial activity, has also been assessed.

8.5 Potential Impact of the Proposed Development

The potential noise and vibration impacts associated with the construction and operational phases of the proposed development are discussed in the following sections.

8.5.1 Construction Phase

8.5.1.1 Noise

During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, piling equipment, dumper trucks, compressors and generators. Due to the nature of daytime activities undertaken on a construction site such as this, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels.

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to site clearance, ground excavation and loading lorries (dozers, tracked excavators and wheeled loaders) reach a maximum of 81 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a worst-case scenario is assumed of 3 no. such items with a sound pressure level (SPL) of 81 dB at 10 m operating simultaneously along the closest works boundary. This would result in a total noise level of 86 dB at 10 m and an equivalent combined sound power level of 114 dB L_{WA}. This worst-case scenario is the typical assumption made for developments of this size, on the basis that it is unlikely that more than 3 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other.

Guidance on the approximate attenuation achieved by standard construction hoarding surrounding construction sites is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when the noise screen completely hides the sources from the receiver.

This scenario can be assumed in this case due to the proximity of the noise-sensitive locations, i.e. a hoarding height will be chosen so as to completely hide the source. Table 8.15 shows the potential noise levels calculated at various distances based on the assumed sound power level and attenuation provided by the barrier of 10 dB.

The closest noise sensitive locations have been identified as shown in Figure 8.4 and described below.

There are several residential receptors located surrounding the proposed development to the south and northeast. Houses are set back some 90m to 160m from areas of significant construction works.

The proposed development site is surrounded by existing commercial and industrial receptors. For the most part these buildings are warehouses with low noise sensitivity. The closest offices, showrooms and cafés are located between 25m and 40m from areas of significant works.

Review of the baseline noise survey, available noise mapping and the threshold values detailed in Table 8.1 indicates that the appropriate daytime noise criteria for construction noise are as follows:

- Residential receptors 65 dB $L_{Aeq,T}$
- Commercial/industrial receptors 75 dB $L_{Aeq,T}$

A night-time threshold is not included as construction work will not be taking place at night.

Legend	
Residential	
Commercial/industrial	

Figure 8.4 Noise Sensitive Locations

Table 8.17 Potential Construction Noise Levels at Varying Distances Assuming Attenuation of 10 dB from Site Hoarding

Description of Noise Source	Sound Power Level (dB $L_{w(A)}$)	Calculated noise levels at varying distances (dB $L_{Aeq,T}$)				
		10m	20m	30m	40m	50m
3 no. items each with SPL of 81 dB at 10 m operating simultaneously.	114	76	70	66	62	56

The calculated noise levels in Table 8.15 show that the criteria for residential receptors will not be exceeded at locations greater than ~30m from construction works. In this instance the nearest houses are located some 90m away and therefore the contribution of construction noise is predicted to be comfortably within the recommended criteria, therefore no significant impact is expected.

The calculated noise levels in Table 8.15 show that criteria for commercial receptors will be exceeded at distances up to approximately 10 m from construction works. For the most part, commercial receptors are set back at distances greater than 10m from the works. Therefore it is expected that a slight impact is associated with construction works.

In order to minimise the impact of construction activity good practice measures are detailed in Section 8.7.1.

Construction Traffic

During the construction phase of the proposed development there will be additional construction traffic on local roads. Traffic information is supplied by Lohan & Donnelly Consulting Engineers.

The HGV traffic volumes during the various construction stages are as follows:

- Excavation phase – 96 no. HGV per day.
- Concrete pour phase – 80 no. HGV per day.
- Standard construction phase – 7 no. HGV per day.

The background traffic flows for the Greenhills Road is 14541 vehicles Average Annual Daily Traffic (AADT).

Considering that in order to increase traffic noise levels by 1 dB, traffic volumes would need to increase by the order of 25%, it is considered that additional traffic introduced onto the local road network due to the construction phase will not result in a significant noise impact.

8.5.1.2 Construction Phase - Vibration

Potential for vibration impacts during the construction phase programme are associated with the ground breaking, piling and excavations required. There is potential for piling to be used for building and basement foundations for and the proposed development buildings. For the purposes of this assessment the expected vibration levels during piling assuming augured or bored piles have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: Vibration, publishes the measured magnitude of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

- 0.54 mm/s at a distance of 5 m, for auguring;
- 0.22 mm/s at a distance of 5 m, for twisting in casing;
- 0.42 mm/s at a distance of 5m, for spinning off, and;
- 0.43 mm/s at a distance of 5 m, for boring with rock auger.

Considering the low vibration levels at very close distances to the piling rigs, vibration levels at the nearest buildings are not expected to pose any significance in terms of cosmetic or structural damage. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of nearby buildings.

In this instance, taking account of the distance to the nearest sensitive off-site buildings, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 8.4 to avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants, as set out in Table 8.5. The potential vibration impact during the construction phase if of short-term, neutral and imperceptible impact.

During demolition and ground-breaking in the excavation phase, there is potential for vibration to propagate through the ground. Empirical data for this activity is not provided in the BS 5228-2:2009+A1:2014 standard, however the likely levels of vibration from this activity is expected to be below the vibration threshold for building damage on experience from other sites.

AWN have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator
- 6 tonne hydraulic breaker on large Liebherr tracked excavator

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25

PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

The range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the proposed site. This range of vibration magnitudes indicate vibration levels at the closest neighbouring buildings are likely to be below the limits set out in Table 8.4 to avoid any cosmetic damage to buildings.

In terms of disturbance to building occupants, works undertaken within close proximity to the commercial receptors on the eastern site perimeter have the potential to emit perceptible vibration levels.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration threshold set out in Table 8.4 during all activities. Further discussion on mitigation measures during this phase are discussed in Section 8.6.1.

It is anticipated that excavations will be made using standard excavation machinery, which typically do not generate appreciable levels of vibration close to the source. Taking this into account and considering the distance that these properties are from the works and the attenuation of vibration levels over distance, the resultant vibration levels are expected to be well below a level that would cause disturbance to building occupants or even be perceptible.

8.5.2 Operational Phase

8.5.2.1 Mechanical Plant

Building and mechanical services plant items are proposed that will serve the apartments and ground floor commercial/retail units.

The selection of building services plant will ensure that noise levels comply with the criteria described in Section 8.2.3.1. It is acknowledged that the selection of the specific plant items is subject to change during the detailed design stage, and this is normal industry practice. However, noise from any new plant items will be designed and/or controlled so as not to give rise to any adverse effects at the nearest noise sensitive locations.

Considering the large distances to the nearest residential receptors, it is expected that contribution of plant noise at these locations will be negligible. It is more relevant to consider the noise sensitive receptors within the proposed development. Once plant selections are designed so that there is no negative impact on the proposed development, this will ensure that at receptors external to the proposed development, the plant noise levels will not exceed the recommended criteria.

The effect associated with building services plant, once designed to achieve the relevant noise criteria, is categorised as negative, imperceptible and permanent.

8.5.2.2 Additional Traffic on Adjacent Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site on some surrounding roads.

A traffic impact assessment relating to the proposed development has been prepared by Lohan & Donnelly Consulting Engineers, as part of this EIAR. Using this information, the related noise impacts along the relevant road links has been assessed.

Table 8.18 below summarises the traffic flows and the predicted change in noise level on the Greenhills Road for the year of opening and the design year using the Annual Average Daily Traffic (AADT) flows along the road links under consideration.

Table 8.18 Predicted Change in Noise Level associated with Vehicular Traffic

Road Link	Opening Year (2024)		
	AADT Without Development	AADT With Development	Change in Noise Level (dB)
A	15,254	16,065	+0.2
Road Link	**Design Year (2039)**		
	AADT Without Development	**AADT With Development**	**Change in Noise Level (dB)**
A	17,638	18,449	+0.2

For the opening year (2024) traffic flows, the predicted change in noise level along the Greenhills Road is +0.2 dB. For the design year (2039) traffic flows, the predicted change in noise is +0.2 dB.

With reference to Table 8.8, the predicted change in noise level associated with additional traffic on the existing road network, is negligible in magnitude. The impact is therefore imperceptible and long term.

8.5.2.3 Mechanical Services Plant

It is expected that the principal items of building and mechanical services plant will be associated with ventilation and heating of the apartment blocks and those serving the retail units. These items will be selected at a later stage, however, they will be designed and located so that there is no negative impact on sensitive receivers in proximity to the proposed development. The services plant will be designed/attenuated to meet the relevant plant noise criteria for day and night-time periods at nearby sensitive receivers as set out in Section 8.2.3.1.

The effect associated with building services plant, once designed to achieve the relevant noise criteria, is categorised as negative, imperceptible and permanent.

8.5.2.4 Inward Noise Impact Assessment

The development lands are bound to the north by the Greenhills Road which dominates the noise environment along this boundary. In order to establish noise levels across the development site an acoustic noise model was developed and calibrated against noise levels measured during the baseline study on site.

Noise Model of Study Area

Proprietary noise calculation software was used for the purposes of establishing the prevailing noise levels on the proposed site. The selected software, Brüel & Kjær Type 7810 Predictor, calculates noise levels in accordance with the Calculation of Road Traffic Noise (CRTN - ISBN 0 11 550847 3) issued by the UK Department of Transport in 1988. This is the standard recognised for the prediction of road traffic noise by Transport Infrastructure Ireland (TII) and the Environmental Noise Regulations 2006 SI/140 2006.

Noise Model Validation

Noise levels recorded during the unattended survey were used to calibrate the noise model to within 1 dB of the calculated values. The resultant daytime levels output from the model calibration are slightly higher that the average measured levels (UN1) but are representative of periods of higher noise levels measured on site. This is regarded as very strong correlation in respect of predicted noise levels. Noise levels are calculated over daytime periods, i.e. 07:00 to 23:00hrs and night-time periods, 23:00 to 07:00 hrs.

Table 8.19 Calculated and Measured Noise Levels at Development Site

Location	Time Period	Measured Noise Level (dB)	Calculated Noise Level (dB)
N1	**Daytime, $L_{Aeq,16hr}$**	56	57
	Night-time, $L_{Aeq,8hr}$	52	52

Figures 8.5 and 8.6 display the calculated noise contours across the site for day and night-time periods at a height of 4m above ground, i.e. the typical height of a first floor window.

The results of the modelling exercise demonstrate that highest noise levels are experienced along the north of the site in proximity to the road edges and reduce considerably by 10 dB towards the south west of the site, in the absence of any development buildings.

Figure 8.5 Noise Initial Noise Risk Assessment – Daytime (4m height)

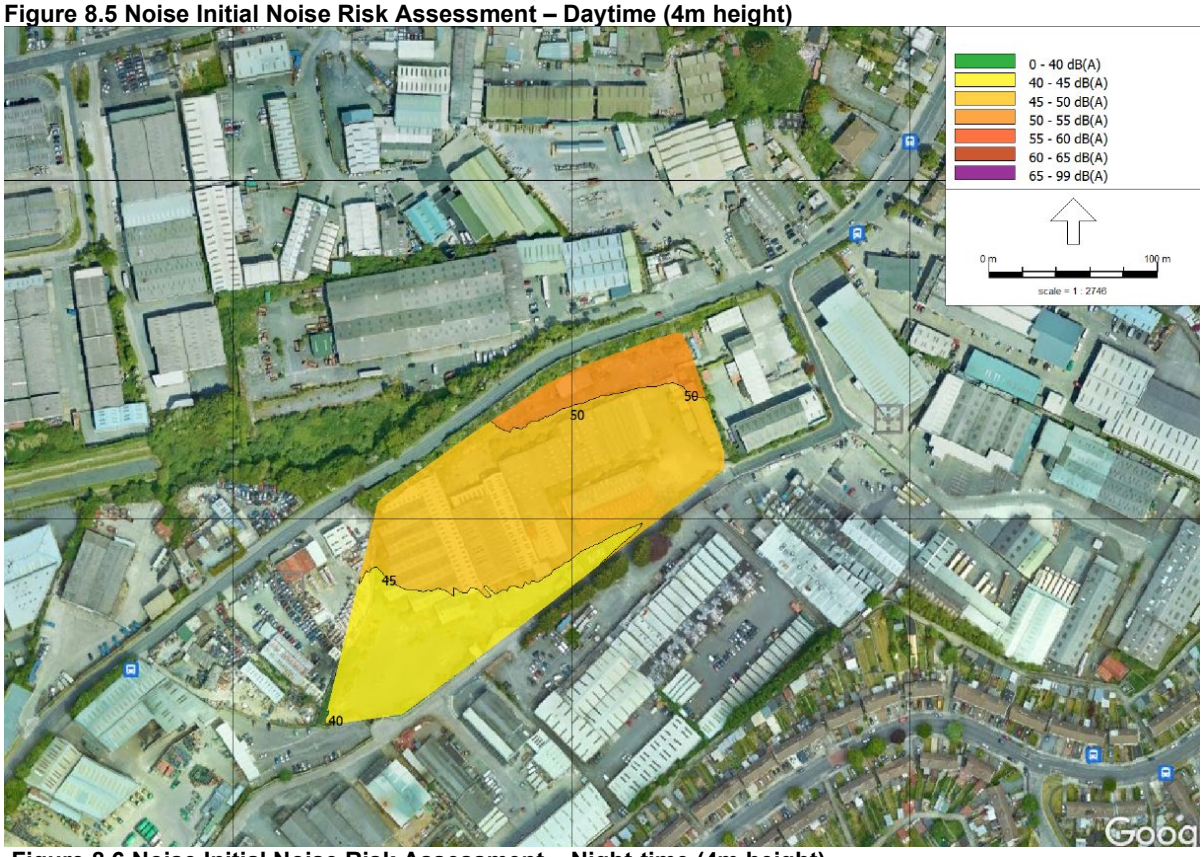


Figure 8.6 Noise Initial Noise Risk Assessment – Night-time (4m height)

Giving consideration to the noise levels presented in the previous sections the initial site noise risk assessment has concluded that the level of risk across the site lies within the Medium to High noise risk categories.

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

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

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

Given the above, it can be concluded that the development site may be categorised as *Medium* to *High* Noise Risk and as such the Acoustic Design Statement (following here and also in Section 8.6.3.4) is required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impacts will be avoided in the final development.

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

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

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

Acoustic Design Statement – Part 1

Façade Noise Levels

Noise levels have been predicted across the proposed development site during day and night-time periods using the noise model developed to include the development buildings. Figures 8.7 to 8.10 illustrate the predicted traffic noise levels for daytime and night-time at heights of 4m and 10m.

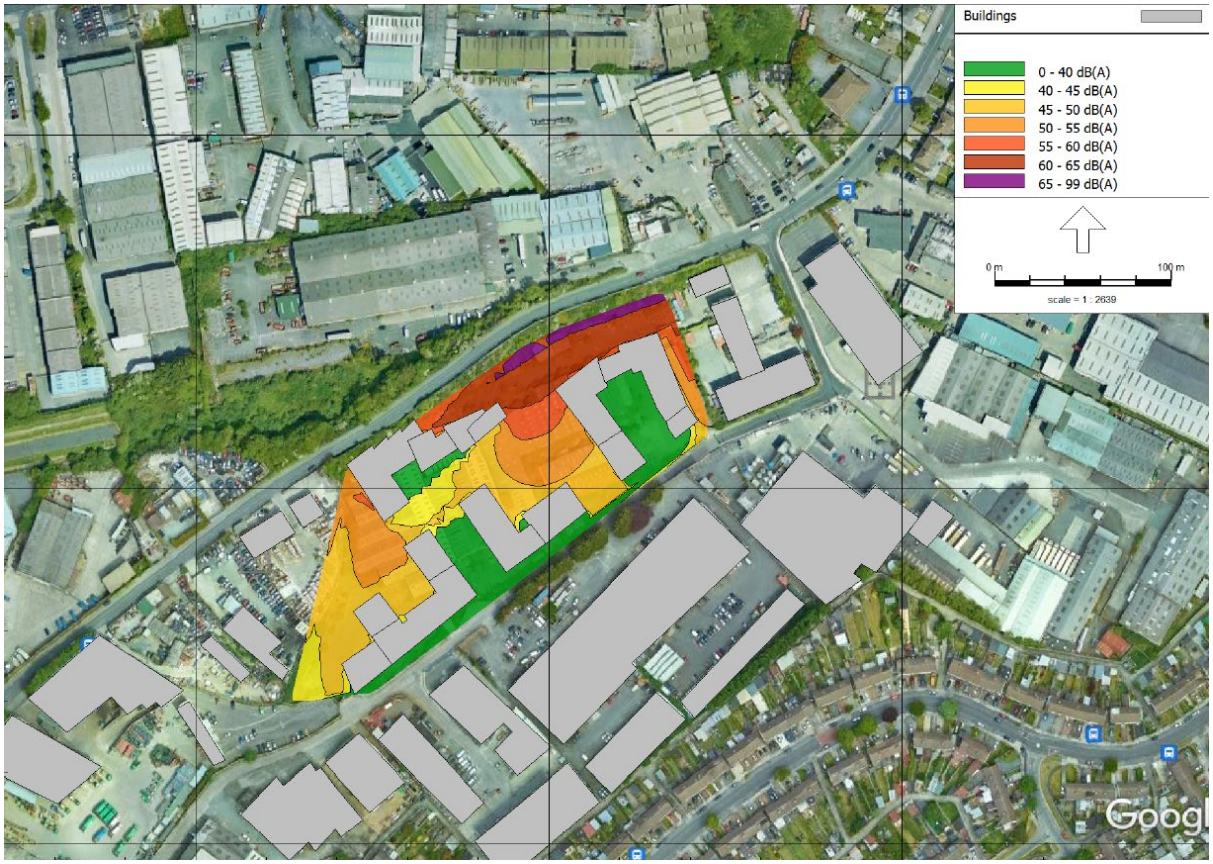


Figure 8.7 Predicted Noise Levels – Daytime 4m Height

Figure 8.8 Predicted Noise Levels – Daytime 10m Height

Predicted daytime noise levels across the site range from <35 dB in sheltered areas, screened from road traffic, to 68 dB along the northern boundary which faces on to Greenhills Road.

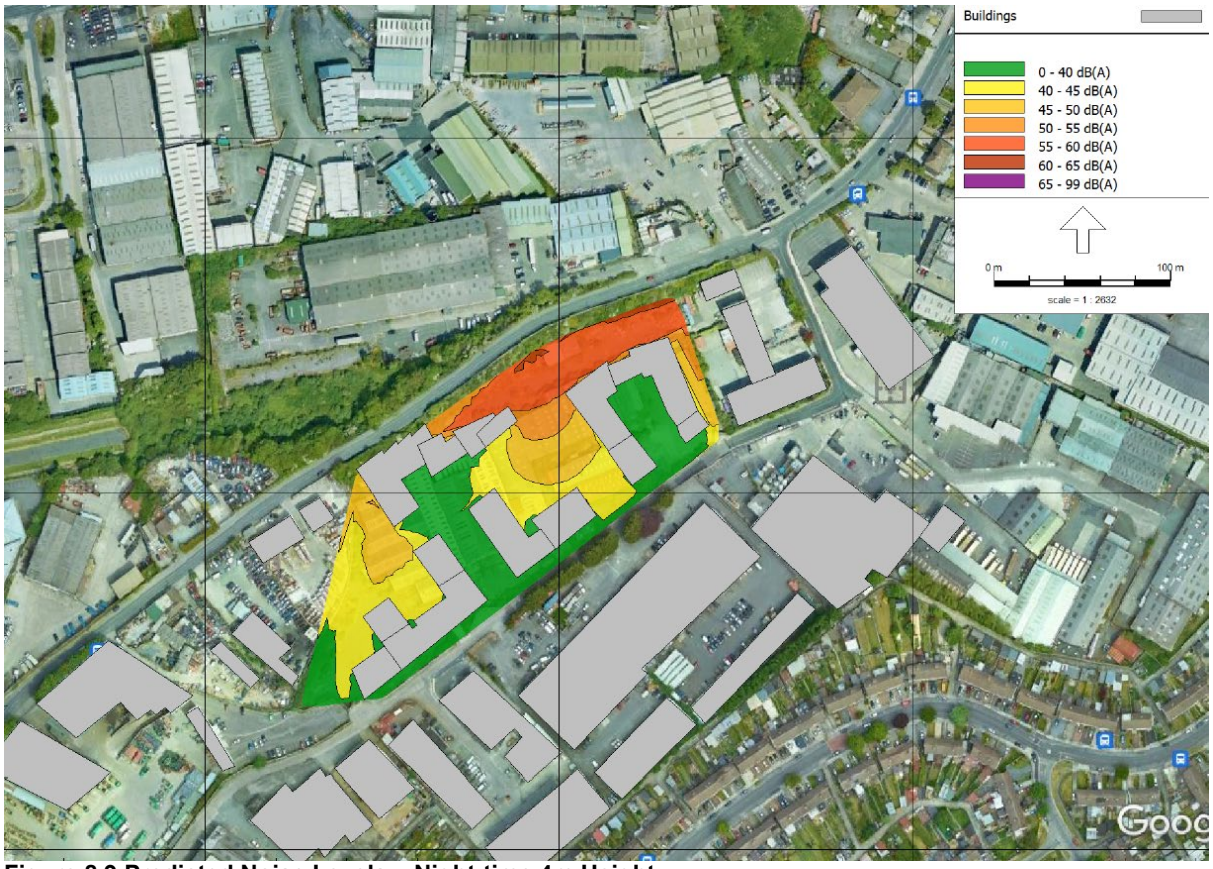


Figure 8.9 Predicted Noise Levels – Night-time 4m Height

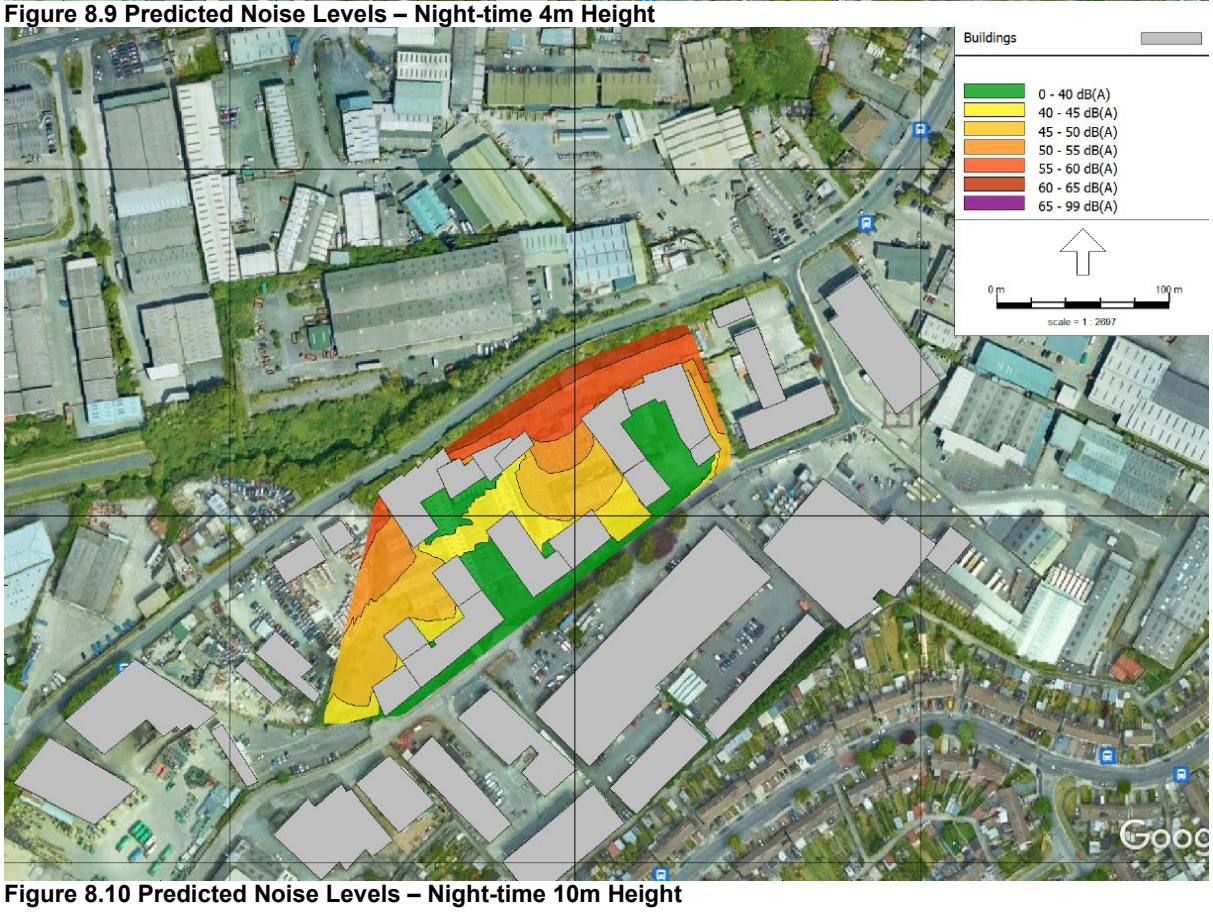


Figure 8.10 Predicted Noise Levels – Night-time 10m Height

Predicted daytime noise levels across the site range from <30 dB in sheltered areas, screened from road traffic, to 62 dB along the northern boundary which faces on to Greenhills Road.

Where façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal noise levels while also allowing for supplementary ventilation of dwellings with open windows. Therefore, for those properties where the façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night no further mitigation is required, e.g. Blocks B, C, D, E and the western facades of Block A and F.

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

Predicted noise levels on several facades are above a level whereby internal noise levels are achieved with standard double glazing and therefore mitigation in the form of enhanced glazing and ventilators will be required. These facades include north west façade of Blocks C1, C2, A1 and A2, and the south east facades of Blocks A1 and A2.

The specification of this enhanced façade is discussed in Section 8.6.3.4.

An external assessment maximum level of 71 dB L_{AFmax} has been assumed in the noise intrusion calculations, correcting the measured value for distance. Further assessment in this regard is recommended during the detail design stage of the Proposed Project.

Noise from Industrial/Commercial Sources

With reference to baseline noise levels set out in Section 3.1, commercial noise from a neighbouring facility has been assessed as part of the inward noise impact assessment. Specifically, noise in the area adjacent to the south eastern facades of Blocks A1 and A2 has been assessed in order to determine appropriate mitigation measures to ensure the required internal noise levels in residential units is achieved. These mitigation measures are set out in Section 8.6.3.4.

External Noise Levels

Figure 8.11 presents the calculated day time noise levels across the site with the development buildings in place. The existing boundary wall will be retained along sections of the eastern and northern site boundary. The contours are calculated for a height of 1.5m.

External noise levels within the majority of communal open spaces, communal terraces and private balconies across the development site are within the recommended range of noise levels from ProPG of between 50 – 55 dB $L_{Aeq,16hr}$ as illustrated in Figure 8.11.

Outdoor space along the northern boundary experience higher noise levels due to proximity to local roads however this is offset somewhat by the desirability of proximity to urban surroundings and proximity and accessibility of public transport and local amenities. There is also provision of internal l amenity space within the development itself.

It is considered that the objectives of achieving suitable external noise levels is achieved within the overall site, therefore no further mitigation is required to control external noise levels across amenity areas.

Figure 8.11 Predicted Noise Levels – External Amenity Areas – 1.5m height

8.6 Remedial and Reductive Measures

The construction noise assessment has determined that there are no significant impacts expected on nearby residential and commercial receptors. In order to reduce the risk of negative noise impacts the following good practice measures are presented.

8.6.1 Construction Phase – Noise

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites* Parts 1 and 2. Whist construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

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

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

8.6.1.2 Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

8.6.1.3 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered by the contractor:

- Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant should be switched off when not in use and not left idling.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

8.6.1.4 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound attenuation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

8.6.1.5 Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged by the contractor and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate

outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

8.6.1.6 Monitoring

Where required, construction noise monitoring will be undertaken by the contractor at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

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

8.6.1.7 Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. In the case that excavation, piling or other high noise-generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

8.6.2 Construction Phase – Vibration

The vibration from construction activities will be limited to the values set out in Section 8.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage. Limit values have been provided for soundly constructed residential and commercial properties.

8.6.3 Operational Phase – Noise

8.6.3.2 Additional Traffic on Adjacent Roads

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

8.6.3.3 Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria are achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

8.6.3.4 Inward Noise Impact – Design Statement Part 2

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

In this instance residential units on the facades highlighted in Figure 8.12 will be provided with glazing and ventilation that achieves the minimum sound insulation performances as set out in Table 8.20 and Table 8.21. Other facades in the development have no minimum requirement for sound insulation.

Table 8.20 Sound Insulation Performance Requirements for Glazing, SRI (dB)

Mark-up	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
Red	27	26	33	39	39	47	37
Orange	19	27	34	39	35	40	35

The overall R_w and $D_{ne,w}$ outlined in this section are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing and ventilation configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 8.20.

The following performance requirements apply to all ventilation paths from outside the building. This can be achieved by passive acoustic wall or window vents or via mechanical ventilation systems.

Table 8.21 Sound Insulation Performance Requirements for Ventilation, Dn,e,w (dB)

Mark-up	Octave Band Centre Frequency (Hz)						$D_{n,e,w}$
	125	250	500	1k	2k	4k	
Red	35	34	33	38	49	45	39
Orange	29	32	37	36	35	40	37

Figure 8.12 Façade Acoustic Requirements

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing and ventilation systems. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component

parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria will be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.

8.6.4 Operational Phase – Vibration

Based on the nature of the proposed development there are no appreciable sources of vibration during the operational phase of the development. No mitigation is deemed necessary.

8.7 Residual Impact of the Proposed Development

8.7.1 Construction Phase

During the construction phase of the project there is the potential for slight to moderate impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impacts are reduced.

It is predicted that construction activity will have a ***negative***, ***moderate*** to ***significant*** and ***short-term*** impact on commercial receptors at distances up to 10m from the works.

At distances greater than 10m it is predicted that construction activity will have a ***negative***, ***slight*** to ***moderate*** and ***short-term*** impact.

Noise levels associated with construction vehicles moving to and from the site are predicted to have an impact that is ***negative***, ***not significant*** and ***short-term***.

8.7.2 Operational Phase

8.7.2.2 Additional Traffic on Adjacent Roads

The predicted change noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network. In the context of the existing noise environment, the contribution of induced traffic on the Greenhills Road is considered to be of ***neutral***, ***imperceptible*** and ***permanent*** impact to nearby residential locations.

8.7.2.3 Mechanical Services Plant

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

8.7.2.4 Inward Noise

Noise levels inwards on the proposed development have been measure and assessed. Mitigation measures have been specified to ensure that internal noise levels are achieved. The resultant residual noise impact from this source will be of ***negative***, ***not significant*** and ***permanent*** impact.

8.8 Cumulative Impacts

During the construction phase of the proposed development, construction noise on site will be localised and will therefore likely the primary noise source at the nearest noise sensitive receivers. In the case that a nearby future development be approved and should construction of both sites occur

simultaneously there is potential for cumulative noise impacts at noise sensitive receivers equidistant from the sites.

In this scenario, it is recommended that liaison between construction sites is on-going throughout the duration of the construction phase. Contractors should schedule work in a co-operative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors. Cumulative construction noise impacts have the potential to be negative, moderate to significant and short-term at times of high activity on both sites.

The contractor will be required to control noise impacts associated with the construction of this future development in line with the guidance levels included in Table 8.1 and follow the best practice control measures within BS 5228 -1.

In the context of the operational phase, permitted developments are included in the traffic impact and therefore the potential for a cumulative impact has been assessed (and found to be negative, imperceptible and long-term).

Any large-scale future projects that are not yet proposed or permitted would also need to be the subject of EIA in turn, to ensure that no significant impacts resulting from noise and vibration will occur as a result of those developments.

8.9 Conclusion

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

The assessment of construction noise and vibration and has been conducted in accordance best practice guidance contained in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration. Subject to good working practice as recommended in the EIAR Chapter, noise associated with the construction phase is not expected to exceed the recommended limit values for residential noise-sensitive locations beyond 30m from the site boundary and therefore no significant effects are expected. Noise associated with the construction phase is expected to exceed the recommended limit values for commercial noise-sensitive locations 10m from the site boundary however the majority of commercial receptors are located at distances greater than this and therefore for the majority no significant effects are expected. A variety of standard proven best practice noise & vibration mitigation is proposed together with noise & vibration monitoring to ensure that limit values are adhered to.

This chapter demonstrates that the predicted noise levels associated with the operational phase of the proposed development will be within best practice noise limits recommended in Irish guidance, therefore it is not considered that a significant effect is associated with the development.

No significant vibration effects are associated with the operation of the site.

Noise levels at the proposed development site have been measured and the noise impact inwards on the proposed development has been assessed. Mitigation measures have been presented to ensure that internal noise requirements are met.

8.10 References

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017);
- BSI (1993). BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration;
- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound;
- BSI (2014). BS 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of

construction and open sites - Part 1: Noise;
- BSI (2014). BS 5228-2:2009+A:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration;
- DCC; FCC; SDCC; DLRCC (2018). Dublin Agglomeration Third Environmental Noise Action Plan December 2018 – July 2023;
- EPA (2015). Advice Notes for Preparing Environmental Impact Statements. Draft. September 2015;
- EPA (2017). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Draft. August 2017;
- EPA (2020). EPA Maps [Online] Available from gis.epa.ie/EPAMaps;
- ISO (2016). ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures;
- UK Department of Transport (1998). Calculation of Road Traffic Noise;
- UKHA (2020). Design Manual for Roads and Bridges Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2; and
- (IoA, 2017). Professional Practice Guidance on Planning & Noise (ProPG).

9.0 AIR QUALITY AND CLIMATE

9.1 Introduction

This chapter assesses the likely air quality and climate impacts associated with the proposed development located at the former Chadwicks site, Greenhills Road, Walkinstown, Dublin 12. A full description of the development is available in Chapter 3.

This chapter was completed by Niamh Nolan, an environmental consultant in the air quality section of AWN Consulting Ltd. She holds a BSocSci (Hons) in Social Policy and Geography from University College Dublin. She is an Associate Member of both the Institute of Air Quality Management and the Institution of Environmental Science. She has experience in mapping software primarily in QGIS and she specialises in the area of air quality, climate and sustainability.

9.2 Assessment Methodology

9.2.1 Criteria for Rating of Impacts

9.2.1.1 Ambient Air Quality Standards

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

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate European Commission Directive 2008/50/EC which has set limit values for a number of pollutants with the limit values for NO_2, PM_{10} and $PM_{2.5}$ being relevant to this assessment (see Table 9.1). Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC).

Table 9.1 Ambient Air Quality Standards

Pollutant	Regulation [Note 1]	Limit Type	Value
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/(m^2*day)
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3 $PM_{2.5}$

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

9.2.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust which are less than 10 microns and the EU ambient air quality standards outlined in Section 9.2.1.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.
With regard 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.

However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m^2*day) averaged over a one year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the Bergerhoff limit of 350 mg/(m^2*day) be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the proposed development.

9.2.1.3 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'. The Act made provision for, inter alia, a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019a). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas.

The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a). The plan contains similar elements as the 2019 CAP and aims to set out how Ireland can reduce our greenhouse gas emissions by 51% by 2030 (compared to 2018 levels) which is in line with the EU ambitions, and a longer-term goal of to achieving net-zero emissions no later than 2050.

The 2021 CAP outlines that emissions from the Built Environment sector must be reduced to 4 - 5 $MtCO_2e$ by 2030 in order to meet our climate targets. This will require further measures in addition to those committed to in the 2019 CAP. This will include phasing out the use of fossil fuels for the space and water heating of buildings, improving the fabric and energy of our buildings, and promoting the use of lower carbon alternatives in construction.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019 (Government of Ireland 2019b) followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (hereafter referred to as the 2021 Climate Act) in July 2021 (Government of Ireland, 2021b). The 2021 Climate Act was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*'. The 2021 Climate Act will also '*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy*'. The 2021 Climate Act defines the carbon budget as '*the total amount of greenhouse gas emissions that are permitted during the budget period'*. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a '*local authority climate action plan'* lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

The 2019 National Planning Framework outlined the need to transition to a low carbon and climate resilient society. There was an emphasis placed housing to be located in places that can support sustainable development and help tackle climate change. While also integrating greener energies and climate considerations into statutory plans and guidelines. In July 2021, the European Climate Law came into force. This law sets a legally binding target of net zero greenhouse gas emissions by 2050. The EU Institutions and the Member States are bound to take the necessary measures at EU and national level to meet the target. A number of measures have been put in place to track progress with reviews to take place every five years.

9.2.2 Construction Phase

9.2.2.1 Air Quality

The assessment focuses on identifying the existing baseline levels of PM_{10} and $PM_{2.5}$ in the region of the proposed development by an assessment of EPA monitoring data. Thereafter, the impact of the construction phase of the development on air quality was determined by a qualitative assessment of the nature and scale of dust generating construction activities associated with the proposed development. Construction phase traffic also has the potential to impact air quality. The UK Highways Agency Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency, 2019a), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The use of the UK guidance is recommended by the TII (2011) in the absence of specific Irish guidance, this approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The construction stage traffic does not meet the above scoping criteria. Therefore, a detailed air quality modelling assessment has been scoped out as there is no potential for significant impacts to air quality during construction as a result of traffic emissions.

9.2.2.2 Climate

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the proposed development.

9.2.3 Operational Phase

9.2.3.1 Air Quality

Operational phase traffic has the potential to impact air quality. The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2017) and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). Transport Infrastructure Ireland (TII) reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

The UK Highways Agency guidance LA 150 (2019a) scoping criteria outlined in Section 9.2.2 was used to determine the road links required for inclusion in the modelling assessment. As none of the road links impacted by the proposed development met the scoping criteria a detailed assessment was scoped out as there is no potential for significant impacts to air quality from traffic emissions.

9.2.3.2 Climate

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013, which has set a target of 30% reduction in non-ETS sector GHG emissions by 2030 relative to 2005 levels. After the publication of the 2021 Climate Act in July 2021 and the 2021 CAP, carbon budgets and sectoral ceilings for the built environment sector will be adopted in the coming months and will be outlined in the 2022 CAP which will allow a comparison with the net CO_2 project GHG emissions.

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section 9.3.3). The impact of the proposed development on climate is determined in relation to this baseline. Road traffic associated with the proposed Project will emit certain volumes of carbon dioxide (CO_2) and, to a lesser degree, methane (CH_4), nitrous oxide (N_2O) and, potentially, hydrofluorocarbons, all of which have global warming potential.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meet or exceed the below criteria, then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

The proposed development will not increase traffic by more than 10% AADT on any nearby road links, therefore, none of the above scoping criteria are met and a detailed climate assessment is not required as there is no potential for significant impacts to climate as a result of traffic emissions.

The EU guidance (2013) also states that indirect GHG emissions as a result of a proposed development must be considered. These include emissions associated with energy usage. The Building Lifecycle Report and Sustainability Report for the proposed development has been reviewed to inform the operational phase climate assessment. A number of measures have been incorporated into the overall design of the development to reduce the impact to climate, where possible.

9.2.3.3 Air Quality Impact on Ecological Sites

For routes that pass within 2 km of a designated area of conservation (either Irish or European designation) the TII requires consultation with an ecologist (TII, 2011). However, in practice the potential for impact to an ecological site is highest within 200m of the proposed scheme and when significant changes in AADT (>5%) occur. Only sites that are sensitive to nitrogen deposition should be included in the assessment. In addition, the UK Highways Agency (2019) states that a detailed assessment does not need to be conducted for areas that have been designated for geological features or watercourses.

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

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

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

There are no sites within 200m of the proposed development or any impacted road links and there is no significant change in AADT flows. As a result a detailed assessment has been scoped out as there is no potential for significant impacts to any sites.

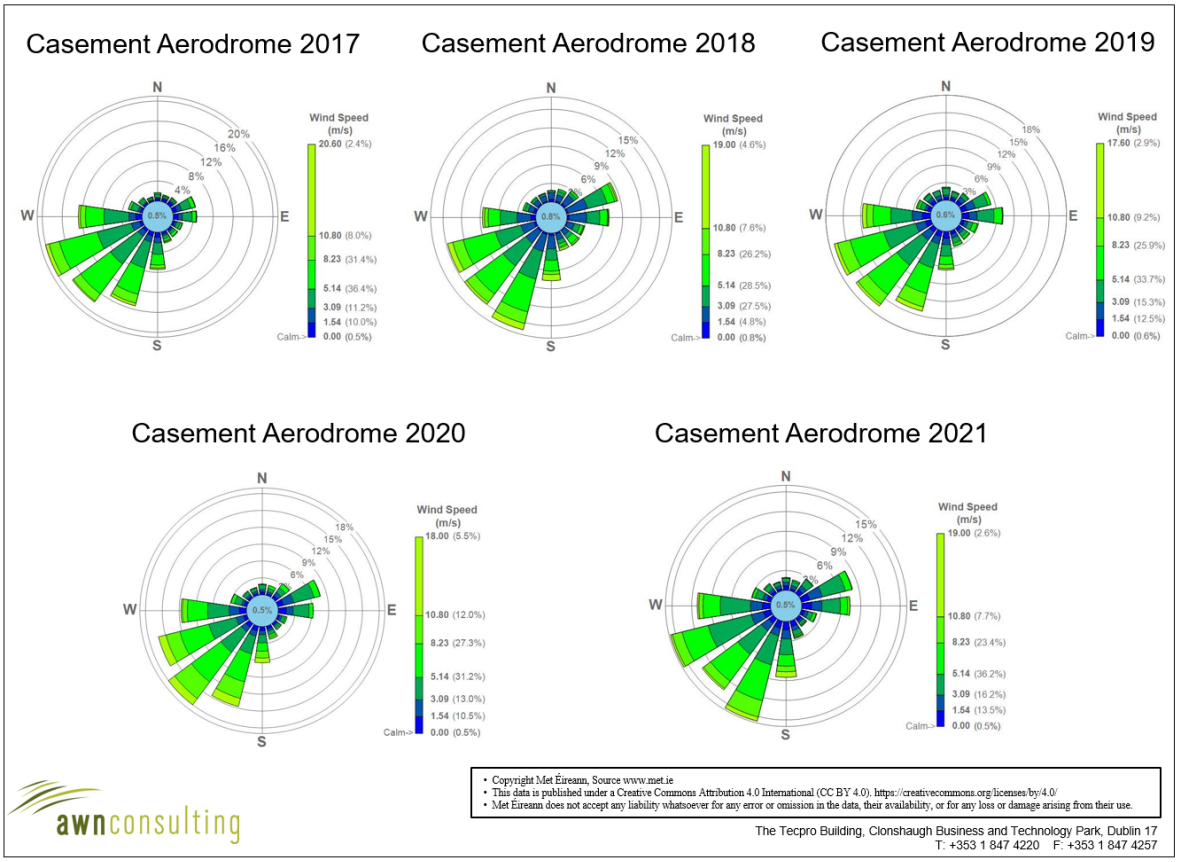
9.3 Baseline Environment

9.3.1 Meteorological Data

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

The nearest representative weather station collating detailed weather records is Casement Aerodrome meteorological station, which is located approximately 7.7 km west of the site. Casement Aerodrome met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 9.1). For data collated during five representative years (2017 - 2021), the predominant wind direction is south-westerly with generally moderate wind speeds (Met Eireann, 2022).

Figure 9.1 – Casement Aerodrome Met Station Windrose 2017 – 2021 (Met Eireann, 2022)



9.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent EPA published annual report on air quality "*Air Quality In Ireland 2020*" (EPA 2021a) details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes as outlined within the EPA document titled 'Air Quality In Ireland 2020' (EPA 2021a). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, the area of the proposed development is categorised as Zone A.

In 2020 the EPA reported (EPA 2021a) that Ireland was compliant with EU legal air quality limits at all air monitoring locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA report '*Air Quality in Ireland 2020*' details the effect that the Covid-19 restrictions had on monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that CSO figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. For this reason, they have not been included in the baseline section. Long-term monitoring data from previous years has been used to inform estimated background concentrations for this assessment.

NO_2

With regard to NO_2, continuous monitoring data from the EPA (EPA, 2021a) at suburban Zone A locations in Ballyfermot, Dun Laoghaire, Swords and Rathmines show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15 – 22 µg/m^3 in 2019 (see Table 9.2). Sufficient data is available for all stations to observe the long-term trend

since 2015 (EPA, 2021a) (see Table 9.2), with results ranging from 13 – 22 µg/m^3 and few exceedances of the one-hour limit value. The station in Ballyfermot is approximately 3 km north of the proposed development site and monitored background concentrations would be representative of the site location. Concentrations of NO_2 at the Ballyfermot site over the period 2015 – 2019 ranged from 16 - 20 µg/m^3. Based on the above information, an estimate of the background NO_2 concentration in the region of the proposed development is 20 µg/m^3.

Table 9.2 Background NO_2 Concentrations In Zone A Locations (µg/m^3)

Station	Averaging Period Note 1,2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean NO_2 (µg/m^3)	18	20	17	20	22
	Max 1-hr NO_2 (µg/m^3)	106	102	116	138	183
Dún Laoghaire	Annual Mean NO_2 (µg/m^3)	16	19	17	19	15
	Max 1-hr NO_2 (µg/m^3)	103	142	153	135	104
Swords	Annual Mean NO_2 (µg/m^3)	13	16	14	16	15
	Max 1-hr NO_2 (µg/m^3)	170	206	107	112	108
Ballyfermot	Annual Mean NO_2 (µg/m^3)	16	17	17	17	20
	Max 1-hr NO_2 (µg/m^3)	142	127	148	217	124

Note 1 Annual average limit value of 40 µg/m^3 and hourly limit value of 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

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

PM_{10}

Continuous PM_{10} monitoring carried out at the Zone A locations of Rathmines, Phoenix Park and Dún Laoghaire showed 2015 – 2019 annual mean concentrations ranging from 9 – 15 µg/m^3 (Table 9.3), with at most 9 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year). The most representative location is Phoenix Park which had an average annual mean concentration of 10.8 µg/m^3 over the five year period. Based on the EPA data (Table 9.3) a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 13 µg/m^3.

Table 9.3 Background PM_{10} Concentrations In Zone A Locations (µg/m^3)

Station	Averaging Period Note 1,2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean PM_{10} (µg/m^3)	15	15	13	15	15
	24-hr Mean > 50 µg/m^3 (days)	5	3	5	2	9
Phoenix Park	Annual Mean PM_{10} (µg/m^3)	12	11	9	11	11
	24-hr Mean > 50 µg/m^3 (days)	2	0	1	0	2
Dún Laoghaire	Annual Mean PM_{10} (µg/m^3)	13	13	12	13	12
	24-hr Mean > 50 µg/m^3 (days)	3	0	2	0	2

Note 1 Annual average limit value of 40 µg/m^3 and 24-hour limit value of 50 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

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

$PM_{2.5}$

Continuous $PM_{2.5}$ monitoring carried out at the Zone A location of Rathmines showed $PM_{2.5}/PM_{10}$ ratios ranging from 0.60 – 0.68 over the period 2015 – 2019. Based on this information, a conservative ratio of 0.7 was used to generate a background $PM_{2.5}$ concentration in the region of the proposed development of 9.1 µg/m^3.

9.3.3 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details provisional emissions up to 2020 (EPA, 2021b). The data published in 2021 states that Ireland will exceed its 2020 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.73 Mt. For 2021, total national greenhouse gas emissions are estimated to be 57.70 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 44.38 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2021 at 37.1% of the total, with the transport sector accounting for 17.9% of emissions of CO_2.

GHG emissions for 2020 are estimated to be 3.6% lower than those recorded in 2019. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for five years in a row. Emissions from 2016 – 2020 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq, 6.85 MtCO_2eq and 6.73 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2020 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021c) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a "With Additional Measures scenario" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2MtCO_2eq under the "With Existing Measures" scenario and under the "With Additional Measures" scenario. The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available (EPA, 2021c).

9.3.4 Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) prior to assessing the impact of dust from a proposed development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

In terms of receptor sensitivity to dust soiling, there are a number of commercial properties in the area and approximately 15 high sensitivity residential properties within 100m of the main works area of the proposed development site. Based on the IAQM criteria outlined in Table 9.4, the worst case sensitivity of the area to dust soiling is considered **low**.

Table 9.4 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 13 µg/m^3. While there are a number of medium sensitivity receptors (commercial properties) in the area there are only approximately 15 high sensitivity residential properties within 100m of the main works area of the proposed development site. Based on the IAQM criteria outlined in Table 9.5, the worst case sensitivity of the area to human health impacts from dust emissions is considered **low**.

Table 9.5 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	< 24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low	Low

9.4 Impact Assessment

9.4.1 Do Nothing

In the Do Nothing scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc). The Do Nothing scenario is considered neutral in terms of air quality and climate.

9.4.1.1 Construction Phase

9.4.1.2 Air Quality

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 9.3.4). The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts.

These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

Demolition will primarily involve the removal of buildings or structures currently on the site in a potentially dusty manner. This may also involve dust generation at heights. Dust emission magnitude from demolition can be classified as small, medium and large and are described below.

- **Large**: Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;
- **Medium**: Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- **Small**: Total building volume less than 20,000 m^3.

As per the outline above the dust emission magnitude for the proposed demolition activities can be classified as 'large' as a worst-case due to the total building volume involved. As the overall sensitivity of the area to dust soiling impacts is low, there is a medium risk of dust soiling impacts from the proposed demolition activities according to the IAQM guidance (see Table 9.6). There is an overall medium risk of human health impacts as a result of the demolition activities as the overall sensitivity of the area to human health impacts is low (Section 9.3.4).

Table 9.6 Risk of Dust Impacts - Demolition

Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes;
- **Small:** Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

Following the IAQM guidance (2014), the proposed earthworks can be classified as 'large' as a worst-case assessment. The total site area is approximately 2.79 Ha. This results in an overall low risk of dust soiling impacts and a low risk of human health impacts as a result of earthworks activities (see Table 9.7).

Table 9.7 Risk of Dust Impacts - Earthworks

Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total building volume > 100,000 m^3, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small:** Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude from construction associated with the proposed works can be classified as 'large' as a worst-case. Therefore, there is an overall low risk of dust soiling impacts and a low risk of human health impacts as a result of the proposed construction activities (Table 9.8).

Table 9.8 Risk of Dust Impacts - Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium:** 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;
- **Small:** < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as 'large' as a worst-case. As outlined in Table 9.9, combining this with a low sensitivity to dust soiling results in an overall low risk of impacts as a result of the proposed trackout activities in the absence of mitigation. There is an overall low risk of human health impacts as a result of trackout activities as the overall sensitivity of the area to human health impacts is low (Section 9.3.4).

Table 9.9 Risk of Dust Impacts - Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Dust Emission Risk

The risk of dust impacts as a result of the proposed development are summarised in Table 9.10 for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

Overall, in order to ensure that no dust nuisance occurs during the earthworks, construction and trackout activities, a range of dust mitigation measures associated with a medium risk of dust impacts must be implemented. When the dust mitigation measures detailed in the mitigation section of this chapter (Section 9.5) and Appendix 9.2 are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors. In the absence of mitigation, there is the potential for short-term, localised, slight dust related impacts to air quality as a result of the proposed development.

Table 9.10 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	Medium Risk	Low Risk	Low Risk	Low Risk
Human Health	Medium Risk	Low Risk	Low Risk	Low Risk

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the DMRB assessment criteria in Section 9.2.2.

It can therefore be determined that the construction stage traffic will have an imperceptible, neutral and short-term impact on air quality.

9.4.1.3 Climate

There is the potential for a number of greenhouse gas emissions to enter the atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document "*Guidance on the Assessment of Dust from Demolition and Construction"* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is considered to be imperceptible, neutral and short term.

9.4.2 Operational Phase

9.4.2.1 Air Quality

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

Traffic flow information obtained from the consulting engineers on this project, was reviewed prior to assessing the impact of the proposed development. It was concluded that further assessment of impacts from the aforementioned pollutant emissions can be screened out using the UK DMRB guidance (UK Highways Agency, 2019a), on which the TII guidance was based.

The proposed development will not increase traffic levels by more than the scoping criteria (see Section 9.2.2), therefore, an assessment of the impact of traffic emissions during the operational phase on ambient air quality is not necessary as no significant impacts are likely. It can be concluded that the impact of the proposed development in terms of air quality is long-term, localised, neutral and imperceptible.

9.4.2.2 Climate

The impact of the proposed development on emissions of CO_2 impacting climate were assessed using the DMRB screening criteria as outlined in Section 9.2.3.2 (UK Highways Agency, 2019b). As with the air quality assessment impacts on climate can be screened out due to no road links being classed as impacted.

Therefore, the likely overall magnitude of the changes on climate in the operational stage is imperceptible, neutral and long-term.

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. A detailed flood risk assessment has been undertaken as part of this planning application and

adequate attenuation and drainage have been provided for to account for increased rainfall in future years. Therefore, the impact will be imperceptible.

In addition, the proposed development has been designed to reduce the impact to climate where possible by incorporating a number of measures into the design of the development. The development will be Nearly Zero Energy Building (NZEB) compliant and will achieve a Building Energy Rating (BER) of A2/A3 for the majority of residential units as per the requirements of Part L of the Building Regulations TGDL 2021. Air source heat pumps are being considered for the development to satisfy the renewable energy contribution under Part L. Lighting will be in the form of low energy LEDs and flow restrictors will be fitted to sanitary fixtures to reduce water consumption. Natural daylight and natural ventilation will be utilised where possible to reduce the requirement for artificial or mechanical systems. In addition bicycle parking for residents and visitors will be provided as well as E-car charging infrastructure. This will promote the use of more sustainable modes of transport and reduce traffic related CO_2 emissions. Full details of the measures incorporated are outlined within the Building Lifecycle Report and Sustainability Report prepared by Homan O'Brien in respect of this planning application.

9.5 Mitigation Measures

9.5.1 Construction Phase

9.5.1.1 Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the Dust Management Plan. The key aspects of controlling dust are listed below. Full details of the Dust Management Plan can be found in Appendix 9.2. These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

In summary the measures which will be implemented will include:

- Prior to demolition blocks will be soft stripped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).

- During the demolition process, water suppression will be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction will be used.

- Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised, if necessary fine water sprays should be employed.

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.

- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.

- Vehicles exiting the site will make use of a wheel wash facility where appropriate, prior to entering onto public roads.

- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.

- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.

- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

- During movement of materials especially soil, both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

9.5.1.2 Climate

Construction stage traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the development. Construction vehicles, generators etc., may give rise to some CO_2 emissions. However, due to short-term nature of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are reduced further. The prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

9.5.2 Operational Phase

The impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site specific mitigation measures are required.

The proposed development has been designed to minimise the impact to climate where possible during operation. Details of the measures to be incorporated into the design of the development are outlined in Section 9.4.3.2 and within the Building Lifecycle Report and Sustainability Report prepared in support of this planning application.

9.6 Cumulative Impact

9.6.1 Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other developments within 350m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. However, provided the mitigation measures outlined in Section 9.5 and Appendix 9.2 are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted.

Due to the short-term duration of the construction phase and the low potential for significant CO_2 emissions cumulative impacts to climate are considered imperceptible.

There are no significant cumulative impacts to air quality or climate predicted for the construction phase.

9.6.2 Operational Phase

The traffic data used to assess the operational stage impacts to air quality and climate included the cumulative traffic associated with the proposed development as well as other existing and permitted developments in the local area where such information was available. This traffic model used is

intended to predict and assess future growth and is not a static model. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term and imperceptible with regards to air quality and climate.

9.7 Residual Impact

9.7.1 Construction Phase

9.7.1.1 Air Quality

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a Dust Minimisation Plan (Appendix 9.2). Provided the dust minimisation measures outlined in the plan are adhered to, the predicted residual air quality impacts during the construction phase are short-term, negative, localised and imperceptible.

9.7.1.2 Climate

According to the IAQM guidance (2014), site traffic and plant are unlikely to make a significant impact on climate during the construction phase. Therefore, the predicted residual impact on climate of the construction phase is considered to be imperceptible, neutral and short-term.

9.7.1.3 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact complies with all EU ambient air quality legislative limit values which are based on the protection of human health (see Table 9.1). Therefore, the predicted residual impact of construction of the proposed development is negative, short-term and imperceptible with respect to human health.

9.7.2 Operational Phase

9.7.2.1 Air Quality

As the traffic generated by the proposed development does not meet the criteria detailed in Section 9.2.2 for requiring a detailed air quality assessment, the residual impact to air quality from traffic emissions during the operational stage is neutral, long-term and imperceptible.

9.7.2.2 Climate

The traffic associated with the operational phase of the proposed development is below the criteria requiring a detailed climate assessment. As detailed above, the design of the proposed development includes numerous features that are expected to mitigate its operational carbon footprint, including energy efficiency measures and bicycle-friendly design. The residual impact to climate during the operational phase is long-term, neutral and imperceptible.

9.7.2.3 Human Health

Emissions of air pollutants are predicted to be significantly below the ambient air quality standards, which are based on the protection of human health. Accordingly, residual impacts to human health during the operational phase are long-term, neutral and imperceptible.

9.8 Monitoring

9.8.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development will take place to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in

accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/(m2*day) during the monitoring period between 28 – 32 days.

9.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the proposed development as impacts to air quality and climate are predicted to be imperceptible.

9.9 Interactions

An adverse impact due to air quality in either the construction or operational phase has the potential to cause human health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact complies with all ambient air quality legislative limits and, therefore, that the predicted residual impact is short-term, negative and imperceptible during the construction phase, and long-term, neutral and imperceptible during the operational phase.

Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in AADT on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality during both construction and operational phases, are considered to be imperceptible.

With the appropriate mitigation measures to prevent fugitive dust emissions (refer to Appendix 9.2), it is predicted that there will be no significant interaction between air quality and land and soils.

As discussed above, climate change has the potential to increase flood risk over time. However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years, as part of the design of the proposed development, and it has been concluded that the associated impact will be long-term, localised, neutral and imperceptible.

No other noteworthy interactions with air quality and climate have been identified.

9.10 References

- BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites
- Department of the Environment Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities
- Dublin City Council (2018) Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition
- Environmental Protection Agency (2015) Advice Notes for Preparing Environmental Impact Statements – Draft
- Environmental Protection Agency (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft
- Environmental Protection Agency (2021c) GHG Emissions Projections Report - Ireland's Greenhouse Gas Emissions Projections 2020 - 2040
- Environmental Protection Agency (2021a) Air Quality Monitoring Report 2020 (& previous annual reports)
- Environmental Protection Agency (2021b) Ireland's Provisional Greenhouse Gas Emissions 1990 – 2020
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- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
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- UK Highways Agency (2019a) UK Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality
- UK Highways Agency (2019b) UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate
- UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)

10.0 WIND AND MICROCLIMATE

10.1 Introduction

This section of the EIAR has been prepared by AWN Consulting Ltd (AWN) to assess the potential microclimate impact of the proposed development in the context of current relevant standards and guidance.

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

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

This assessment has been prepared by Dr Fergal Callaghan at AWN Consulting who has over 30 years' experience as an environmental consultant specialising in Microclimate and Environmental Impact Assessment. He has authored numerous Reports EIAR chapters for various developments including residential schemes, mixed-use developments, and commercial developments.

10.2 Research Methodology

The assessment has been undertaken with reference to the most appropriate guidance documents relating to Microclimate and EIA which are set out in the following sections. In addition, the following Environmental Protection Agency (EPA) guidelines were considered and consulted in the preparation of this Chapter:

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

The study has been undertaken using the following methodology (It should be noted the local area is a low rise un-complicated area from a wind point of view, it is not a complicated city centre location where existing tall buildings may create turbulence or unusual local wind patterns which would require modelling, on that basis we have completed a desk-top assessment and modelling studies were not deemed to be required.):

- Determination from available data of the baseline (current) classification of the site with respect to The Beaufort Scale for Wind on Land.
- Examination of the proposed development and the potential for wind-speed amplification factors.
- Assessment of the impacts with regard to Microclimate

10.3 Receiving Environment

The subject site is located in Greenhills, Dublin 12, within the Greenhills Industrial Estate. The site is bound to the north by the Greenhills Road, and to the east, south and west by existing commercial buildings. The surrounding environment in the vicinity of the development site is mixed in nature with manufacturing, retail units and warehousing making up the majority of the surrounding building uses.

10.3.1 Baseline Environment

The nearest representative weather station collating detailed weather records is Dublin Airport, which is located approximately 13.5km north of the site and is considered to be the appropriate weather station for providing weather data for Dublin City. Dublin Airport meterological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 10.1 below). For data collated during five representative years (2016-2020), the predominant wind direction is south-westerly with an average wind speed of approximately 3-5 m/s, measured at a height of 10m above ground.

The Beaufort scale and its relationship to wind speed in metres/second is shown in Table 10.1 below. It can be seen that the site typically experiences Beaufort 3 (B3) wind conditions for much of the time.

Beaufort Scale	Wind speed(m/s)
0	<0.3
1	0.3-1.5
2	1.6-3.3
3	3.4-5.4
4	5.5-7.9
5	8.0-10.7
6	10.8-13.8
7	13.9-17.1
8	17.2-20.7
9	20.8-24.4
10	24.5-28.4
11	28.5-32.6
12	>32.7

Table 10.1 Beaufort Scale and Wind speed

The site of the proposed development can therefore be characterised as a site which experiences average wind speeds of B3, which corresponds to gentle breeze on the Beaufort Scale.

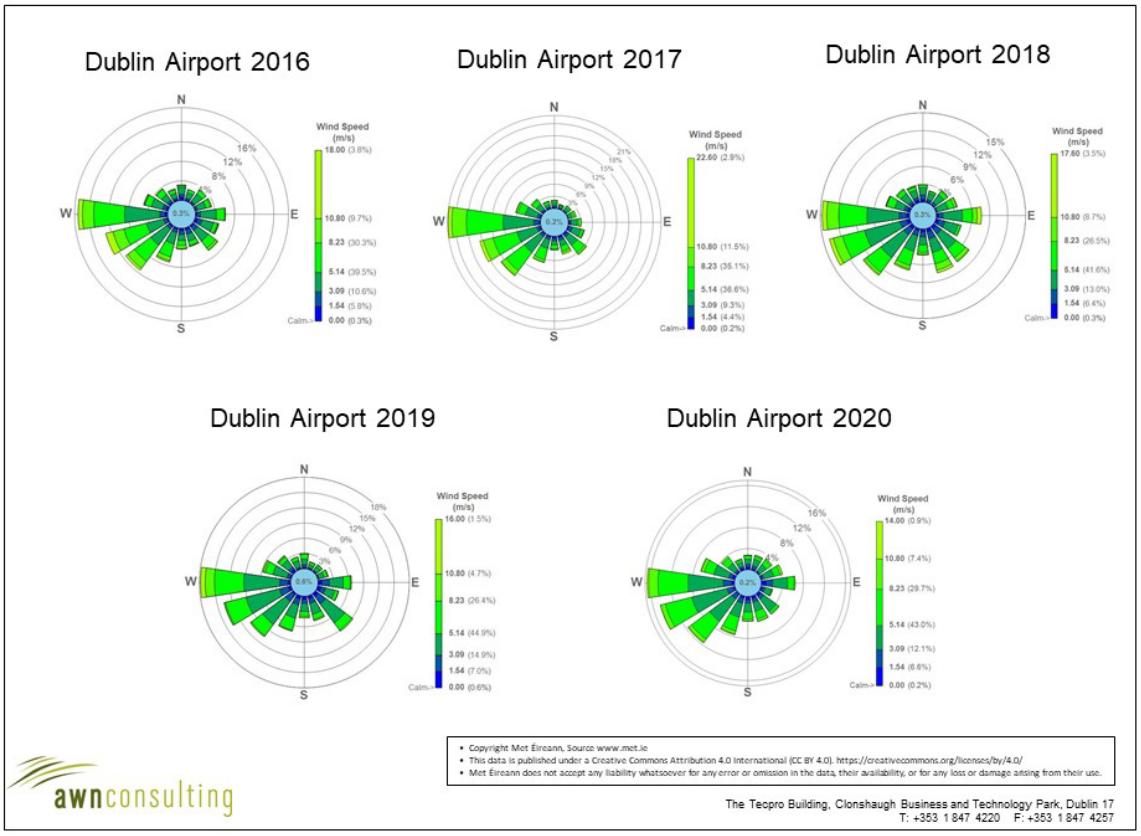


Figure 10.1 Dublin Airport Windrose

10.3.2 Do Nothing Scenario

In the absence of the proposed development being constructed, the microclimate environment will remain largely unchanged. The microclimate baseline described above is considered representative of the Do-Nothing scenario. The Do-Nothing scenario is therefore considered neutral impact.

That said, if the proposed development were not to proceed, then a different development, similar in nature may be constructed as the land is zoned for development in keeping with the national policy for compact growth on brownfield sites.

10.4 Characteristics of the Proposed Development

The proposed development is located on the former Chadwick's Greenhills site and consists of circa 633 no. dwelling units, resident amenity spaces, creche and retail spaces and all associated ancillary site development works. A detailed description of the development is provided in Chapter 3 (Project Description).

When considering a development of this nature, the potential impact on the surroundings is considered for each of two distinct stages:

Construction and demolition phase; and,
Operational phase.

The construction phase will involve demolition, excavation over the development site, construction of foundations and buildings, landscaping, and vehicle movements to site using the local road network.

The proposed construction works are not expected to lead to any microclimate impacts of significance the time frame is short term in nature.

10.5 Potential Impact of the Proposed Development

The potential microclimate impacts associated with the construction and operational phases of the proposed development are discussed in the following sections.

10.6 Construction Phase

Given the short term nature of the construction phase there are no expected microclimate impacts.

Construction involves the erection of scaffolding and the development of a structure starting with steelwork and rising walls, with window and door openings. Structures under construction are therefore porous to wind and tend to allow wind to flow through the structure with little interference with wind flow patterns and hence there are no expected microclimate impacts.

10.7 Operational Phase

Wind is normally described by its speed, either as a mean or gust speed. However, people sense the effect of the wind force, which is what we can feel, see and hear during windy conditions. Wind force is proportional to wind speed squared, therefore a relatively small increase in the wind speed can have a large effect on pedestrian comfort.

All buildings obstruct the free flow of the wind, causing it to be deflected and accelerated, resulting in very complex flow patterns. When the wind strikes the front face of a building, it will produce positive pressures that reach a maximum value at a point between about two thirds and three-quarters of the building height.

Below this height the wind will tend to be deflected down the front face towards the ground, often called ‘downwash’, and accelerated around the corners at ground level potentially producing areas of high wind speed and strong negative pressure. Above this height the wind will be deflected upwards and accelerated over the roof, again causing areas of high wind speed and increased turbulence. This can be a concern for roof gardens and roof terraces. A significant proportion of the wind will also spill around the side faces. Downwind, the flows around the building will recombine into a region of negative pressure known as the ‘wake’.

Wind speed increases with height above ground; it follows, therefore, that the taller a building the higher the wind speeds acting on it. However, not all tall (where tall is greater than 10 storeys) buildings cause wind problems; what is important is the relative height of the building compared with that of neighbouring buildings.

A tall building in a group of tall buildings might not cause problems whereas a mid-rise building can cause unacceptable conditions if it is adjacent to an open area or has features or openings at ground level which can accelerate wind speed. When the wind strikes a building, it will generate positive pressures on the windward face and suction on the side, roof and leeward faces.

The wind will flow in the direction of decreasing pressure gradient, that is, from areas of high pressure to areas of lower pressure. As noted above, this causes wind flow down the front face, which brings high-speed wind from higher levels down to ground level. This can significantly increase ground-level wind speeds. The downwash on the windward face will tend to ‘roll up’ in front of a building, creating a windward vortex. The highest wind speed-up will occur near the centre of the face a short distance in front of the building, where the wind speed-up factor, S, can vary between about 1.2 and 2.0 depending on the building height. The flow then accelerates around the sides towards the low-pressure area in the wake. The S factor can reach 2.0 to 2.5 close to the corners of tall buildings, although values closer to 1.5 are likely for mid-rise buildings.

In general, tall, rectangular, sharp-edged buildings will generate the highest local ground-level wind speeds and the largest ‘footprint’ area of unpleasant wind speeds.

The UK Buildings Research Establishment (BRE DG 520: Wind Microclimate Around Buildings) has noted that wind speeds in the vortex between a tall building and a lower building (this occurs in the space in front of a tall building behind the lower building) can be up to 1.5 times the free wind speed (free wind speed being that measured in an open area with no buildings).

Wind speeds in the corner streams around either side of a tall building can be up to 2.5 times the free wind speed.

A useful document on wind speeds and tall buildings notes that tall buildings are generally taken to mean buildings more than 10 storeys high, "Sustainable Design and Construction, The London Plan Supplementary Planning Guidance, 2006, Mayor of London's Office". Section 2.4.5 notes that a wind environment assessment should be carried out for every tall building (e.g. a building over 10 storeys)". *Sustainable Design and Construction, Supplementary Planning Guidance, April 2014*" published by the Mayor of London's office provides further guidance in this regard.

The proposed development is up to twelve storeys in height and is classed as a tall building and it is considered appropriate to examine the wind effects with regard to microclimate.

It is acknowledged that the construction of new buildings can lead to changes to the local wind environment around the building. Generally elevated wind speeds around tall buildings are generated at three main points, either at ground level in the space behind a lower building and in front of a tall building, at an opening within the building envelope at ground level such as a tunnel or mall through the building or at building corners. Elevated wind speed can also be generated where a street runs between two tall buildings, leading to a "canyon effect".

T.V. Lawson in Building Aerodynamics, Imperial College London, Imperial College Press, 2001, has noted that when wind approaches a built-up area it is displaced upwards to roof level and generally flows across landscape at roof level, with gusts down to street level that are a function of the relative height to width of the street canyon.

It will be noted from the windrose presented as Figure 10.1 that as the predominant wind directions are from the west and from the south west, wind striking the proposed development will therefore already have travelled across the built-up landscape of the western and south-western environs of Dublin City and therefore wind-flow across the landscape will be tend to be predominantly at 2-storey roof level.

Oke (T.R. Oke, Boundary Layer Climates, Routledge, 1987) has noted when the Height to Width Ratio is greater than 0.7, the Skimming Flow Regime tends to predominate, with little in the way of wind flow down to street level.

When the H to W ratio drops to 0.4 or less, the wind speed at ground level tends to increase and the street behaves more as if it were in open country, with much more of the wind now gusting down into the street.

Similarly, the BRE DG 520 document notes that H to W ratio of > 0.65 should be a target to minimise any wind related impacts.

The area downwind of the proposed development is dominated by mainly two storey residential development, given that the proposed development is not a tall building, minimal disturbance to wind-flow is expected and the wind-flow will remain predominantly at 2-storey height.

The proposed building height is up to 12-storeys and circa. 36 metres above ground. The area immediately downwind to the east and north east is dominated by 2/3-storey commercial development with little in the way of open space.

As was noted above, the general pattern of wind-flow in the area upwind is likely to be above street-level (predominantly defined by the mainly 2-storey structures up-wind). The proposed development will be up to 12-storeys in height, so wind incident to this structure will tend to be deflected both upwards and downwards. Based on the above it can be expected that the skimming regime will dominate, with little in the way of wind flow down to street level and therefore the proposed

development is not expected to lead to elevated windspeeds at street level. Given the scale and nature of the proposed development and the existing low-rise buildings in the area, accelerated windspeeds at ground level are not expected and therefore down-draft effects at ground-level are not to be expected when the proposed development is completed.

It is also noted that a roof garden is proposed on the 11th Storey of Block C, which will be circa 35 metres above ground. The wind-rose data points are measured wind-speeds at 10m above ground at Dublin Airport. Windspeed is known to increase as one travels vertically from the ground.

The Danish Wind Industry Association Online windspeed calculator :

http://xn--drmstrre-64ad.dk/wp-content/wind/miller/windpower%20web/en/

indicates that for a Roughness Class 3 landscape (a landscape defined by low rise buildings as opposed to a city scape defined by tall buildings) a windspeed range of 3-5 m/sec at 10m above ground will be a windspeed of circa. 4 to 6 m/second at circa. 35m above ground – the approximate height above ground of the roof garden. This corresponds to Beaufort B4 (Moderate Wind Speed, will raise dust and papers and move small branches on trees) – it is therefore considered that this is a relatively minor increase in wind-speed likely to be experienced and it is considered to be acceptable with regard to the proposed roof garden use.

10.8 Remedial and Reductive Measures

10.8.1 Construction Phase

No mitigation measures are required during the construction phase

10.8.2 Operational Phase

No mitigation measures are proposed for the operational phase.

10.9 Predicted Impact of the Proposed Development

10.9.1 Construction Phase

It is predicted that construction activity will have a ***neutral***, ***slight*** to ***significant*** and ***short-term*** impact, based on the fact that the construction phase is short term in nature and the structure under construction will be largely porous to wind and will not tend to interfere with wind patterns.

10.9.2 Operational Phase

The predicted of the operational phase is *neutral*, *imperceptible* and *permanent* , based on the fact that significant amplification of windspeed is not expected due to the nature of the building and the 2/3 storey building nature of the surrounding area.

10.10 Cumulative Impacts

No cumulative impacts are predicted based on the predicted impacts of the proposed development being neutral, imperceptible and permanent.

11.0 MATERIAL ASSETS - UTILITIES

11.1 Introduction

This chapter evaluates the impacts, if any, which the proposed development at the Former Chadwick's Site, Greenhills Road, Walkinstown, Dublin 12 may have on built services and infrastructure.

This Chapter has been prepared by David Doran, an Environmental Consultant in the Environment Team at AWN Consulting with ongoing roles in impact assessment, environmental compliance and waste management. David holds a MSc in Environmental and Energy Management from the University of Twente. David has experience in preparing Material Assets chapters for Environmental Impact Assessments (EIA), as well as Construction, Demolition, and Operational Waste Management Plans.

11.2 Research Methodology

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, ("the EIA Directive") The Directive 2011/92/EU provides that an EIA shall identify, describe and assess the likely significant effects of a project on material assets.

The EPA *' Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (2017) state that material assets are now taken to mean "*built services and infrastructure, roads and traffic and waste management*". The European Commission Guidance (2017) refers to a number of examples of material assets including buildings, other structures, mineral resources and water resources.

This chapter of the EIAR assesses built services and infrastructure, which are matters that have not already been addressed elsewhere in this EIA Report. The potential impacts on built services and infrastructure, if any, are assessed in terms of the following:

- Power and Electrical Supply;
- Telecommunications;
- Surface water infrastructure;
- Foul drainage infrastructure; and
- Water supply.

The proposed development will not impact on any other structures or water resources.

Assessment of impact on utilities has been undertaken by confirmation of supply with the utility supplier. Mitigation measures are proposed where required.

11.3 Receiving Environment

The proposed drainage infrastructure has been described in Chapter 2 (Project Description and Alternatives Examined) and Chapter 7 (Water and Hydrology). Detailed water supply and drainage design information is provided in the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers, which accompanies the planning application.

The associated built services and infrastructure in the vicinity of the site are summarised in the following sections.

11.3.1 Power and Electrical Supply

The proposed development site has an existing connection into the local ESB network.

There are no known existing ESB overground and underground infrastructure crossing through the proposed development site (Lohan & Donnelly, 2021). There are ESB 10 kV Underground Cables adjacent to the Site that will not be impacted by the proposed development.

There is an existing ESB Substation on the proposed development site, reference “Chadwicks 316 S 400”. This Substation will be relocated as part of the proposed development works.

The power supply infrastructure for the operational development will require an extension of the existing power supply infrastructure that is currently in place. This planning application includes for the construction of a three ESB substation(s).

11.3.2 Telecommunications

The proposed development site currently has live telecommunications network supply around the perimeter of the site. A connection will be made to the existing network.

11.3.3 Surface Water Infrastructure

Irish Water drainage record map shows an existing 225mm diameter surface water sewer located on the access road east of the development, parallel to the Chadwicks Plumb Centre. The sewer commences near the junction of the access road and Greenhills Road and continuous towards the south-east direction. Irish Water drainage record map can be found in the *Engineering Services Report* accompanying this application prepared by Lohan & Donnelly Consulting Engineers, and can also be found in Appendix 11.1

11.3.4 Foul Drainage Infrastructure

Irish Water drainage record map shows an existing 225mm diameter foul water sewer located in close vicinity to the proposed development. The sewer originates from south-eastern direction, wraps around the outside of the southern and eastern site boundary and turns north-east, continuing towards the Walkinstown roundabout. Irish Water drainage record map can be found in the *Engineering Services Report* accompanying this application prepared by Lohan & Donnelly Consulting Engineers.

11.3.5 Water Supply

Irish Water drainage record maps indicates a 101.6mm uPVC water main inside the site boundary, situated within the western part of the development. The water main is shown to have two separate extensions, one extension connected perpendicularly to the existing water main parallel to the southern site boundary, the other connected to the existing water main south-west of the development.

The existing water main was serving the previous development which is to be demolished for the following reasons:

1. Existing water main layout is not compliant with Irish Water’s code of practice or the structural layout of the proposed development (i.e. existing water main is currently located under the proposed structures).
2. Existing water main does not have sufficient capacity to service the new proposed development.

Furthermore, another existing water main is present in the northern part of the development. This water main is 1200mm in diameter and traverses the site, entering from middle-north and exiting in the north-east corner of the development.

The layout of the development ensures that this existing pipe is protected, and adequate separation distances are provided between Irish Water infrastructure and any structures on site. To achieve this a 7.5m, unobstructed wayleave either side of the pipe will be provided, to ensure that the existing water main is accessible for any potential future maintenance. For details, refer to drawing “20189-LDE-07-00-DR-SC-1C01a”.

11.4 Characteristics of the Proposed Development

11.4.1 Construction Phase

Power and Electrical Supply
The current electricity facilities on the site of the proposed development are supplied by the ESB through a ring network. All electrical works, including connection to the ESB network will be carried out by a suitably qualified contractor.

Telecommunications
Telecommunications including fibre required during the construction phase will be provided via a mobile connection or temporary connection to the nearby telephone network.

Surface Water, Foul Drainage Infrastructure and Water Supply
Welfare facilities (canteens, toilets etc.) will be available within the construction compound and this will remain in place for the construction of the proposed development. Foul water from the offices and welfare facilities on the site will discharge into the existing sewer via a temporary connection from the proposed development site

The works contractor will be required to apply for connection to discharge any contaminated surface water which collects in excavations, if it is required. The works contractor will be obliged to comply with any conditions of the discharge license to control discharge quality and rate of flow.

Before connections are established to the water supply it may need to be trucked onto site. As with electrical works, this will be carried out by a suitably qualified contractor. It will be necessary to service the site with a reliable and safe water supply. Approval for temporary connections to the water supply will be sought from Irish Water by the contactor.

If any stormwater collects in the excavations during construction, it will need to be discharged to sewer. Any discharge water will be treated using a Siltbuster or similar to removed suspended solids prior to discharge.

11.4.2 Operational Phase

Power and Electrical Supply
As stated in Section 11.3.1, the power supply for the proposed development (once operational) will be provided via an extension of the existing power supply infrastructure currently in place. This planning application include the construction of 3 no. new ESB substations, The proposed ESB substation(s) will provide the power supply to the proposed development. A formal application to confirm the nature of the ESB supply is made once the formal address of the residential development is agreed with South Dublin County Council. The power from the substation(s) will distribute underground to service the apartment blocks.

As per the *Building Life Cycle Report* prepared by Homan O'Brien Engineering, which has been submitted with the documents for the planning application, the proposed development will be constructed to high building standards and will provide a sustainable, energy efficient area for future occupants.

Telecommunications
New Telecom Distribution Ductwork will be installed on the site to facilitate Telecom Connections to the proposed development.

Surface water infrastructure
The surface water drainage infrastructure for the proposed development has been designed and will be constructed in accordance to "Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Technical Document – Volume 2, New Developments, 2005, "Greater Dublin Regional Code of Practice Works" and the Building Regulation requirements. It is proposed to provide a 225, 300 and 450mm diameter surface water pipes to service the proposed development. Surface water collected from hardstanding areas will ultimately discharge into an existing 225mm surface water sewer . For connection details, refer to drawing "20189-LDE-07-00-DR-SC-1C01a".

Lohan & Donnelly Consulting Engineers have estimated the peak dry weather flow (6DWF) is 22.229 l/s.

The proposed development will implement sustainable urban drainage systems (SuDS) as an approach to manage the surface water within the site in accordance with current guidance document for "Greater Dublin Regional Code of Practice for Drainage Works". These SuDS reduce, delay and purify the run-off from the site, hence lowering the strain and the pollution content on the existing public sewer. Measures being incorporated into the design include Extensive Green Roofs, Intensive Green Roofs, Permeable Paving, Porous Asphalt, Petrol Interceptor, a Attenuation Tank, Rain Gardens, Tree Pits and Hydrobrakes.

To ensure that the existing surface water sewer is not over capacitated, the flow of surface water leaving the last manhole "SW02" on site (as per Greater Dublin Regional Code of Practice for Drainage Works, Rev 6) will be limited to 8.021 l/s via a hydro-brake, a flow control device capable of managing the flow rate of water. Refer to Appendix E & F for Q-Bar and run-off calculations.

For full details refer to see the *Engineering Services Report* accompanying this application prepared by Lohan & Donnelly Consulting Engineers.

Foul drainage infrastructure
The foul water drainage infrastructure for the proposed development has been designed and is to be constructed in accordance to Irish Water's "Code of Practice for Wastewater Infrastructure (Document IW-CDS-5030-03)", "Wastewater Infrastructure Standard Details (Document IW-CDS-5030-01)" and the Building Regulation requirements.

To service the development, a 225/300mm diameter foul water pipe will be installed, commencing from the south-west corner of the site. The foul water flows towards the existing foul water main located south-east of the site, on the access road parallel to the southern site boundary, discharging all the foul water generated from the proposed development. For connection details, refer to drawing "20189-LDE-07-00-DR-SC-1C01a". Lohan & Donnelly Consulting Engineers have estimated the peak dry weather flow (6DWF) for the foul water as 22.229 l/s. For full flow rate calculations refer to the *Engineering Services Report* accompanying this application prepared by Lohan & Donnelly Consulting Engineers.

A pre-connection enquiry has been submitted to Irish Water (Reference No. CDS20007999) on the 08th of December, 2020 for connection to the mains foul water. Irish water responded on 18th of March, 2021 to confirm that the connection is feasible subject to upgrades.

Water supply
The water main infrastructure for the proposed development has been designed and is to be constructed in accordance to Irish Water's "Code of Practice for Water Infrastructure (Document IW-CDS-5020-01)", "Water Infrastructure Standard Details (Document IW-CDS-5020-03)" and the Building Regulation requirements.

To service the development, it is proposed to provide a 200mm MDPE (medium density polyethylene) type PE-80 water main. The water main will be connected to the plant rooms in each building where the water distribution system is located, distributing the water to the apartment complexes. To comply with guidance specification for fire hydrants, offline and on-line fire hydrants will be provided along the water main to provide full coverage of the proposed development in the event of a fire. The water main will exit the proposed development in the north-east corner and connect to the newly laid 200mm diameter water main as per the conditions set out in Irish Water's confirmation of feasibility letter. Prior to exiting the site, a boundary box and telemetry kiosk will be installed to measure the water usage for the development.

A pre-connection enquiry has been submitted to Irish Water (Reference No. CDS20007999) on the 08th of December, 2020 for connection to the mains water supply. Irish water responded on 18th of March, 2021 to confirm that the connection is feasible subject to upgrades.

In order to achieve a feasible water main connection for the development, a new 200mm ID ductile iron water main is to be laid for approximately 280 meters. The new water main is to be parallel to the existing 150mm uPVC water main located on Greenhills road. The newly laid water main will be used as a connection point for the proposed development.

The applicant will enter into agreement to contribute to the extension works, that will be undertaken by Irish Water

For further details on water supply please refer to the *Engineering Services Report* accompanying this application prepared by Lohan & Donnelly Consulting Engineers.

11.5 Potential Impact of The Proposed Development

11.5.1 Construction Phase

Power and Electrical Supply
During construction, contractors will require power for heating and lighting of the site and their onsite accommodation. In addition, some on site equipment/plant will require power.

A construction compound, including a materials and equipment storage area, a site office, and staff welfare facilities will be established for the construction phase. Electricity will be provided to the site via temporary connection . The power requirements for the construction phase will be relatively minor and therefore the power demand for the construction phase would have a potential ***short term, neutral and imperceptible*** impact.

Telecommunications
Telecommunications including fibre required during the construction phase will be provided via a mobile connection or temporary connection to the nearby telephone network.

The potential impact is ***short-term, neutral*** and ***imperceptible*** in respect of telecommunication supply for the construction phase.

Surface Water Infrastructure
During the construction phase, there is potential for an increase in run-off due to the introduction of impermeable surfaces and the compaction of soils. This will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off and sediment loading which could potentially impact local stormwater networks if not controlled adequately. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.

It is not anticipated that there will be any interruptions to service in existing surface water sewers, but should interruptions be anticipated, they will be agreed in advance.

The potential impacts on surface water infrastructure is ***moderate***, ***negative, and short term*** for the construction phase, and mitigation measures will be required.

Foul Drainage Infrastructure
Welfare facilities (canteens, toilets etc.) will be required for the construction crew. Portable toilets will be provided onsite for construction staff.

A temporary connection for foul water drainage to the public foul sewer during construction phase is anticipated. Prior to this, removal of foul waste from temporary portable toilets and welfare facilities will be undertaken by a licenced waste contractor. It not anticipated that the temporary connection would have any offsite impact, as foul water would be treated at Ringsend Waste Water Treatment Plant. The construction phase of the proposed development is anticipated to have a lessor impact that the operational phase therefore there it is anticipated would be sufficient capacity for the foul water drainage from the during construction, subject to temporary connection agreement.

The potential impact will be ***short-term, neutral*** and ***imperceptible i***n respect of foul drainage for the duration of the construction phase.

Water Supply
A temporary connection to the mains water supply will be established for the construction phase. The demand during the construction phase is not expected to be significant enough to affect existing pressures.

The potential impact will be ***short-term, neutral*** and ***imperceptible*** in respect of water supply for the proposed development for the duration of the construction phase.

11.5.2 Operational Phase

Power and Electrical Supply
During operations, the proposed development will be powered through the proposed onsite substation(s). It is anticipated that due the residential nature of the development that there would not be a significant demand for electricity, therefore it is assumed that there is sufficient capacity available in the network to accommodate the development.

It is not anticipated that the proposed connection will impact or reduce the capacity available within the local network to support the neighbouring area. A formal application to confirm the nature of the ESB supply is made once the formal address of the residential development is agreed with SDCC.

As per the *Building Life Cycle Report* prepared by Homan O'Brian Engineering, which has been submitted with the documents for the planning application, the proposed development will be constructed to high building standards and will provide a sustainable, energy efficient area for future occupants.

The potential impact is ***long-term, neutral, imperceptible*** with respect to with power and electrical supply for the proposed development for the operational phase.

Telecommunications
As stated in Section 11.4.2, the proposed development will make a connection to the existing public network at the site, and there is no perceptible impact on the existing telecommunications infrastructure.

It is assumed that there is sufficient capacity available in the network to accommodate the development, so there are ***no potential impacts*** associated with telecommunications for the proposed development for the operational phase.

Surface Water Infrastructure
The operational phase of the development represents an increase in hardstanding area that, if not properly mitigated, has the potential to cause an increase in surface water run-off and flooding offsite and downstream of the development site. In addition silty water or water contaminated with hydrocarbons can arise from hardstand areas and carparks. During operations the potential exists for chemical spills or leaks during loading, unloading, movement of waste and their containers within buildings on the proposed development site.

The design of the proposed development includes design mitigation, as set out in Section 11.7.2 below, to addresses these potential impacts. In the absence of these designed mitigations, the potential impact associated with surface water for the operational phase is ***moderate, negative*** and ***long-term***.

Foul Drainage Infrastructure
During the operational phase the foul water generated from the site will ultimately discharge to the Ringsend WWTP for adequate treatment. Irish Water have confirmed through the PCE that there a connection to the network is feasible, subject to upgrade works, and connection agreement.

There are ***no potential impacts*** associated with foul drainage for the proposed development for the operational phase.
Water Supply

If insufficient pressure is available in the public watermains network to accommodate the demand, existing customers in the area may experience a drop in water pressure below the service level required. However, this will not arise as addressed in Section 11.7.2.

The proposed network connection will be metered, with associated hydrants and valves as per Irish Water requirements. As the connection works will be approved to ensure there is capacity for water supply to the proposed development, it not anticipated that this would have any perceptible offsite impact.

Irish Water have confirmed through the PCE that there is available supply within the network for the proposed development. Irish Water is the National Authority for water management and should there have been an inadequate supply this would have been confirmed to the developer during consultation.

There are ***no potential impacts*** associated with water supply for the proposed development for the operational phase.

11.6 Do Nothing' Impact

If the proposed development did not proceed, there would be no use of material assets at the site. As such, there would be a neutral effect on the environment.

11.7 Mitigation Measures

11.7.1 Construction Phase

Ongoing consultation with Irish Water, Eirgrid, ESB Networks and other relevant service providers will ensure a smooth construction schedule without disruption to local and business community. Best practice measures shall be put in place to ensure that there are no interruptions to these utilities, unless this has been agreed in advance.

Power and Electricity Supply
The power demand for the construction phase will be relatively minor and the connection works are entirely within proposed site boundaries.

The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users.

Once the construction of the unit substations is completed, ESB Networks will complete the commissioning in accordance with the statutory requirements.

Telecommunications
The existing telecommunications will be extended from the perimeter of the site to the proposed development. Strict quality control measures will be undertaken while laying telecommunications cables. The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator.

Surface Water Infrastructure
A temporary drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff by the site during construction. Run-off water containing silt will be contained on site to ensure adequate silt removal. It is not anticipated that there will be any interruptions to service in existing surface water sewers, but should interruptions be anticipated, they will be agreed in advance.

Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt

fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses/ stormwater sewer/ drainage ditch, refuelling of machinery off site) and hydrocarbon interceptors.

Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration (where existing water in the ground enters the surface water infrastructure) and ex-filtration (where water in the surface water infrastructure escapes into the ground).

Foul Drainage Infrastructure
Prior to temporary connection of the foul drainage to the public network, approval will be given to ensure there is enough capacity in the public network for the proposed development's foul water discharge.

The works contractor will be obliged to put a number of measures in place to ensure that there is no impact on the public network during the construction works. Foul drainage for the proposed development will be in accordance with the Building Regulations Technical Guidance Document H for design and construction. Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

Water Supply
A temporary connection will be put in place for the construction phase.

The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to service from the public watermain. It is not anticipated that there will be any interruptions to service from the public watermain, but should interruptions be anticipated, they will be agreed in advance.

Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

11.7.2 Operational Phase

Power and Electricity Supply
In circumstances where consultation with ESB Networks, EirGrid or another relevant service provider has taken place, the proposed work will be in line with their requirements or guidelines. Therefore, no mitigation measures are required in relation to Power and Electricity Supply.

Telecommunications
The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator. In circumstances where statutory telecommunications operator is in compliance with their requirements and guidelines continues.
Therefore, no mitigation measures are required in relation to telecommunications.

Surface Water Infrastructure
As mentioned in Section 11.4.2, the surface water drainage system for the proposed development incorporates the designed SuDS mitigation measures.

These measures include Extensive Green Roofs, Intensive Green Roofs, Permeable Paving, Porous Asphalt, Petrol Interceptor, a Attenuation Tank, Rain Gardens, Tree Pits and Hydrobrakes. Implementation of these measures will prevent an increase in surface water flow offsite.

The allowable runoff rate has been established by the project engineers, Lohan & Donnelly Consulting Engineers, using the methodology set out in the *Engineering Services Report.* To ensure that the existing surface water sewer is not over capacitated, the flow of surface water leaving the last manhole "SW02" on site (as per Greater Dublin Regional Code of Practice for Drainage Works, Rev 6) will be limited to 8.021 l/s via a hydro-brake, a flow control device capable of managing the flow rate of water. Refer to Appendix E & F for Q-Bar and run-off calculations.
Foul Drainage Infrastructure

As discussed in Section 11.4.2 above, IW have provided a CoF for the wastewater requirements for the development (which are detailed in the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers, which accompanies the planning application) can be accommodated, subject to upgrades.

Foul drainage for the proposed development will be in accordance with the relevant standards for design and construction, including the Irish Water Code of Practice for Wastewater Infrastructure, The Building Regulations Technical Guidance Document (TGD) 'Part H' & the Regional Code of Practice for Drainage Works. It will be necessary to carry out further detailed study and investigations to confirm the available capacity and to determine the full extent of any upgrades which may be required to be completed to Irish Water Infrastructure, prior to agreeing to the proposed connection.

No mitigation measures are required in relation to foul drainage infrastructure during the operational phase.

Water Supply
The proposed development will be connected to a 200mm MDPE (medium density polyethylene) type PE-80 water main. The proposed network connection will be metered, with associated hydrants and valves as per Irish Water requirements. As the connection works will be approved to ensure there is capacity for water supply to the proposed development, it not anticipated that this would have any perceptible offsite impact.

As discussed in Section 11.4.2 above, IW have provided a CoF for the water requirements for the development (which are detailed in the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers, which accompanies the planning application) can be accommodated, subject to upgrades. No mitigation measures are required in relation to water supply during the operational phase.

11.8 Predicted Impacts of The Proposed Development

11.8.1 Construction Phase

Power and Electricity Supply
The predicted impacts associated with power and electricity supply for the proposed development will be ***short-term, neutral*** and ***imperceptible*** for the construction phase.

Telecommunications
The predicted impacts associated with telecommunications for the proposed development will be ***short-term, neutral*** and ***imperceptible*** for the construction phase.

Surface Water Infrastructure
The works contractor will ensure appropriate actions are undertaken to ensure that there are no interruptions to service in public surface water sewers and private drains. It is not anticipated that there will be any interruptions to service in public surface water sewers and private drains, but should interruptions be anticipated, they will be agreed in advance.

After the implementation of mitigation measures as set out in section X above, the predicted impact will be ***short-term, neutral*** and ***imperceptible*** for the construction phase.

Foul Drainage Infrastructure
As detailed in Chapter 7 (Hydrology), with the implementation of the construction mitigation measures no negative residual impacts to water quality are anticipated.

Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

The predicted impact will be ***short-term, neutral*** and ***imperceptible*** for the construction phase.

Water Supply

A temporary connection will be put in place for the construction phase. As the connection works are approved to ensure there is capacity within the public watermain, there will be no offsite impact. The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to service from the public watermain. It is not anticipated that there will be any interruptions to service from the existing water main, but should interruptions be anticipated, they will be agreed in advance with Irish Water.

Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

The predicted impact will be ***short-term, neutral*** and ***imperceptible*** for the construction phase.

Predicted Impact – Construction Phase
The implementation of mitigation measures detailed in Section 11.7.1 will ensure that the overall predicted impacts on the material assets described above will be ***short-term, neutral*** and ***imperceptible*** for the construction phase.

11.8.2 Operational Phase

Power and Electrical Supply
It is predicted that there will be a ***long-term, neutral, imperceptible*** effect on power and electrical supply during the operational phase of the proposed development.

Telecommunications
There are no predicted impacts associated with telecommunications for the proposed development for the operational phase.

Surface Water Infrastructure
With the implementation of mitigation as described in Section 11.7.2, the predicted impact on the existing surface water infrastructure will be ***long-term, neutral*** and ***imperceptible*** for the operational phase.

Foul Drainage Infrastructure
As discussed in Section 11.4.2 above, IW have provided a CoF for the wastewater requirements for the development (which are detailed in the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers, which accompanies the planning application) can be accommodated, subject to upgrades.

It is anticipated that no mitigation measures will be required in relation to foul drainage infrastructure as treatment is undertaken off site at Ringsend. There are no predicted impacts associated with foul water drainage for the proposed development for the operational phase.

Water Supply
As discussed in Section 11.4.2 above, IW have provided a CoF for the water requirements for the development (which are detailed in the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers, which accompanies the planning application) can be accommodated, subject to upgrades.

It is anticipated that no mitigation measures will be required in relation to water supply infrastructure as the connection with Irish water is feasible. There are no predicted impacts associated with water supply for the proposed development for the operational phase.

Predicted Impact – Operational Phase
The implementation of mitigation measures detailed in Section 11.7.2 will ensure that the predicted impacts on the material assets will be ***long-term, neutral*** and ***not significant***.

11.9 Monitoring

During construction phase the following monitoring measures will be considered:

- Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off.
- Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling etc.

Maintenance of the surface water drainage system, including hydrocarbon interceptors, and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

11.10 Reinstatement

No reinstatement is required.

11.11 Cumulative Impacts Of The Proposed Development

This section considers the potential cumulative impacts or effects on the environment of the proposed development with other existing, planned and permitted developments in the locality.

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

The cumulative impact (as far as practically possible) of the proposed development with any/all relevant existing or permitted developments as set out in Chapter 3 (Planning and Development Context). The likelihood of cumulative effects are discussed in Sections 12.11.1 and 12.11.2 below for construction and operational phases.

11.11.1 Construction Phase

The review of the planned and permitted projects in the locality of the proposed development has identified 4 substantial permitted developments which may be undertaking construction works simultaneously to the proposed development. The proposed development entails minimal use of material assets during construction therefore there is limited opportunity for the causation of cumulative impacts during the construction phase of the proposed development in combination with other planned or permitted developments (as described in Chapter 3 (Planning and Development Context)).

In summary, based on the consideration above cumulative impact of the proposed development will be ***neutral, imperceptible,*** and ***short term*** for the construction phase.

11.11.2 Operational Phase

Once operational, the proposed development will result in minimal impact on telecommunications, surface water, foul drainage and water infrastructure.

The proposed development will connect to existing telecommunications, surface water, foul drainage and water supply infrastructure adjacent or in close proximity to the proposed development site (refer to the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers).

The existing and permitted projects set out in Chapter 3 (Planning and Development Context), are considered as part of the exiting baseline environment in respect of material assets considered within this chapter.

As stated above Irish Water have confirmed through the PCE (ref: CDS20007999) that there is available supply within the network foul water and potable water for the proposed development. Irish Water is the National Authority for water management, and should there have been an inadequate supply this would have been confirmed to the developer during consultation.

The location of the proposed has access to existing utilities and, through confirmation by utilities suppliers the proposed will not have an impact on capacity for off site development. Therefore, the proposed development will result in ***imperceptible*** impacts on material assets therefore there is limited potential for cumulative impacts with any other developments within the study area. In summary, based on the consideration above, it is predicted that the cumulative impact of the proposed development with other existing and or permitted developments is considered to be ***long-term*** and ***imperceptible*** during the operational phase.

11.12 Interactions

Interactions are addressed in Chapter 16 of this EIA Report.

Adherence to the mitigation measures outlined in Section 11.7.1 and 11.7.2 will ensure that there are no significant impacts on material assets as a result of the construction or operational phases of the proposed development.

11.13 Difficulties Encountered In Compiling

There were no difficulties encountered during the production of this chapter of the EIAR.

11.14 References

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

EPA (2017) Draft EIA Report Guidelines

(Lohan & Donnelly, 2021). Engineering Report

12.0 MATERIAL ASSETS - WASTE

12.1 Introduction

This Chapter of the EIAR comprises an assessment of the likely impact of the Proposed Development on the waste generated from the development as well as identifying proposed mitigation measures to minimise any associated impacts.

This Chapter was prepared by David Doran and Chonaill Bradley of AWN Consulting. Chonaill Bradley is a Senior Environmental Consultant in the Environment Team at AWN. He holds a BSc in Environmental Science. He is an Associate Member of the Institute of Waste Management (CIWM). Chonaill has over seven years' experience in the environmental consultancy sector. David Doran is an Environmental Consultant in the Environment Team at AWN. He holds a MSc in Environmental and Energy Management. David has completed Material Assets – Waste EIAR chapters, as well as many Operational and Construction & Demolition Waste Management Plans for AWN's clients.

A site-specific Construction and Demolition Waste Management Plan (C&D WMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the excavation and construction phases of the Proposed Development and has been included as Appendix 12.1. The C&D WMP was prepared in accordance with the 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

A separate Operational Waste Management Plan (OWMP) has also been prepared by AWN Consulting Ltd. for the operational phase of the Proposed Development and is included as Appendix 12.2 of this Chapter.

The Chapter has been prepared in accordance with EPA Guidelines on the Information to be contained in EIAR (2017, Draft)

These documents will ensure the sustainable management of wastes arising at the Development Site in accordance with legislative requirements and best practice standards.

12.2 Research Methodology

The assessment of the impacts of the Proposed Development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in the C&D WMP and in the OWMP provided in Appendices 12.1 and 12.2.

This Chapter is based on the Proposed Development, as described in Chapter 2 (Project Description and Alternatives Examined) and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation and excavation); and
- Operational phase.

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the Proposed Development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the Proposed Development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 12.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 9 of this EIAR (Land, Soils, Geology and Hydrogeology). Chapter 9 also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the Proposed Development.

12.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for re-use > recycling > recovery > disposal) (Figure 12.1).

Figure 12.1 Waste Hierarchy (Source: European Commission)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity, in 2012. The need to embed climate action in all strands of public policy aligns with the goals of the European Green Deal.

The strategy for the management of waste from the construction phase is in line with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects, published by the Department of Environment, Heritage and Local Government (DoEHLG) in 2006. The guidance documents, Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002) and Environmental Protection Agency (EPA) 'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects' Draft for public consultation (April 2021) were also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021, BS 5906:2005 Waste Management in Buildings – Code of Practice, the South Dublin County Council (SDCC) South Dublin County Council Household & Commercial Waste Bye-Laws 2018, the EPA National Waste Database Reports 1998 – 2018 and the EPA National Waste Statistics Web Resource.

12.2.2 Terminology

Note that the terminology used herein is generally consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
b) the adverse impacts of the generated waste on the environment and human health; or
c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I sets out a non-exhaustive list of disposal operations.

12.3 Receiving Environment

The proposed development comprises the following:

(i) The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3 m – 9.9 m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;

(ii) the construction of a mixed-use Build-to-Rent residential and commercial development comprising 633 no. build-to-rent apartment units (292 no. one-beds, 280 no. two-beds and 61 no. three-beds), 1 no. childcare facility and 10 no. commercial units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:

(a) Block A comprises 209 no. apartments (102 no. 1 bed-units, 106 no. 2 bed-units and 1 no. 3-bed units) measuring 5 - 10 storeys in height. (b) Block B comprises 121 no. apartments (53 no. 1 bed-units, 45 no. 2 bed-units and 23 no. 3 bed-units) measuring 8 - 10 storeys in height. (c) Block C comprises 130 no. apartments (38 no. 1-bed units, 71 no. 2-bed units and 21 no. 3-bed units) measuring 8 - 12 storeys in height. (d) Block D comprises 173 no. apartments (99 no. 1 bed-units, 58 no. 2 bed-units and 16 no. 3 bed-units) measuring 6 - 10 storeys in height. All apartments will be provided with private balconies/terraces;

(iii) provision of indoor communal residential amenity/management facilities including a co-working space, communal meeting room/ work space, foyer, toilets at ground floor of Block A; gym, changing rooms, toilets, resident's lounge, studio, laundry room, communal meeting room/ work space, multi-function space with kitchen at ground floor of Block B; games room with kitchenette, media room, co-working space, resident's lounge, communal meeting room/ work space, reception area, management office with ancillary staff room and toilets, toilets, parcel room at ground floor of Block C;

(iv) the construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block A;

(v) the construction of 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C as follows: Block A has 3 no. units at ground floor comprising 79.46 sq.m., 90.23 sq.m., and 121.39 sq.m., Block B has 1 no. unit at ground floor comprising 127.03 sq.m., Block C has two units at second floor comprising 120.85 sq.m. and 125.45 sq.m., and Block D has 4 no. units at ground floor comprising 84.45 sq.m., 149.77 sq.m., 155.48 sq.m. and 275.59 sq.m.;

(vi) the construction of 3 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 2 no. secondary entrances from the

south for emergency access and services (access from existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

(vii) provision of 424 no. car parking spaces comprising 398 no. standard spaces, 21 no. mobility spaces and 5 no. car club spaces located at ground floor level car park located within Block A and accessed via the proposed entrance at Greenhills Road, a two-storey car park located within Blocks C and D also accessed from the proposed entrance at Greenhills Road and on-street parking at ground floor level adjacent to Blocks A and C. Provision of an additional 15 no. commercial/ unloading/ drop-off on-street parking spaces at ground floor level (providing for an overall total of 439 car parking spaces). Provision of 4 no. dedicated motorcycle spaces at ground floor level parking area within Blocks C and D;

(viii) provision of 1363 no. bicycle parking spaces comprising 1035 no. residents' bicycle spaces, 5 no. accessible bicycle spaces and 7 no. cargo bicycle spaces in 9 no. bicycle storerooms in ground and first floor parking areas within Blocks A, C and D, and 316 no. visitors' bicycle spaces located externally at ground floor level throughout the development;

(ix) provision of outdoor communal amenity space (5,020 sq.m.) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting, and scented gardens located on podiums at first and second floor levels; provision of a communal amenity roof garden in Block C with seating area and planting (176 sq.m.); and inclusion of centrally located public open space (3,380 sq.m.) adjacent to Blocks B and C comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space; and incidental open space/public realm;

(x) development also includes landscaping and infrastructural works, foul and surface water drainage, bin storage, ESB substations, plant rooms, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development.

This application is accompanied by an Environmental Impact Assessment Report (EIAR).

12.4 Characteristics of the Proposed Development

A full description of the Proposed Development can be found in Chapter 2 (Project Description and Alternatives Examined). The characteristics of the Proposed Development that are relevant in terms of waste management are summarised below.

12.4.1.1 Demolition Phase

During the demolition phase, waste will be generated by the demolition of the existing warehouse buildings and hardstanding on site.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific C&D WMP (Appendix 12.1). The C&D WMP provides an estimate of the main waste types likely to be generated during the Demolition phase of the Proposed Development. These are summarised in Table 12.1.

Table 12.1 Estimated off-site Reuse, Recycle and Disposal Rates for Construction Waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	8.8	0	0.0	85	7.5	15	1.3
Concrete, Bricks, Tiles, Ceramics	965.3	30	289.6	65	627.4	5	48.3
Plasterboard	52.7	30	15.8	60	31.6	10	5.3
Asphalts	105.3	0	0.0	25	26.3	75	79.0
Metals	394.9	5	19.7	80	315.9	15	59.2
Slate	17.6	0	0.0	85	14.9	15	2.6
Timber	210.6	10	21.1	60	126.4	30	63.2
Total	**1755.0**		**346.2**		**1150.0**		**258.9**

12.4.1.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition, topsoil, subsoil and clay will require excavation to facilitate site levelling, construction of foundations, along with the installation of underground services. The volume of material to be excavated has been estimated by J. B. Barry and Partners Limited (Project Engineers) at c. 24,008m^3. It is expected that c. 1,200m^3, of the excavated material will be re-used on site with the remaining c. 22,808m^3 will be taken for appropriate offsite reuse, recovery, recycling and/or disposal.

If the material that requires removal from Site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011). For more information in relation to the envisaged management of by-products, refer to the C&D WMP (Appendix 12.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, they have been classified. Environmental soil analysis has been carried out on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). The results of the Rilta Suites showed that all 22 (19 no. soil and 3 no. ground water) of the samples tested fully complied with the inert landfill limits as listed in the EU Council Decision 2003/33/EC. This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. Waste material will need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2019). If the surplus material is classified as inert or non-hazardous it will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for

disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP (Appendix 12.1). The C&D WMP provides an estimate of the main waste types likely to be generated during the Construction phase of the Proposed Development. These are summarised in Table 12.2.

Table 12.2 Estimated off-site Reuse, Recycle and Disposal Rates for Construction Waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	1093.2	10	109.3	80	874.5	10	109.3
Timber	927.5	40	371.0	55	510.1	5	46.4
Plasterboard	331.3	30	99.4	60	198.8	10	33.1
Metals	265.0	5	13.3	90	238.5	5	13.3
Concrete	198.8	30	59.6	65	129.2	5	9.9
Other	496.9	20	99.4	60	298.1	20	99.4
Total	**3312.6**		**752.0**		**2249.3**		**311.4**

12.4.1.3 Operational Phase

As noted in Section 12.1, an OWMP has been prepared for the Proposed Development and is included as Appendix 12.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the houses and duplexes during the operational phase including dry mixed recyclables (DMR), organic waste and mixed non-recyclable waste (MNR), as well as providing a strategy for management of waste glass, batteries, WEEE, printer / toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the Proposed Development for the main waste types, based on the AWN waste generation model (WGM), is presented in Table 12.3 and Table 12.4 below, and is based on the uses and areas as advised by the Project Architects. Further unit breakdowns can be found in Appendix 12.2.

Table 12.3 Estimated Waste Generation During Operational Phase

Waste Type	Waste Volume (m^3/week)			
	Residential Block A	Residential Block B	Residential Block C	Residential Block D
Organic Waste	2.92	2.07	2.35	2.67
DMR	19.97	14.19	16.08	19.55
Glass	0.57	0.40	0.46	0.52

Waste Type	Waste Volume (m^3/week)			
	Residential Block A	Residential Block B	Residential Block C	Residential Block D
MNR	11.61	8.25	9.35	9.30
Total	**35.07**	**24.91**	**28.24**	**32.04**

Table 12.4 Estimated Waste Generation During Operational Phase

Waste Type	Waste Volume (m^3/week)	
	Childcare Facility (Commercial)	Retail Units (Commercial)
Organic Waste	0.02	0.18
DMR	0.64	2.49
Glass	0.00	0.10
MNR	0.35	2.51
Total	**1.01**	**5.28**

The residents and tenants will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. The location of the bins within the units will be at the discretion of the occupants. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). All WSAs can be viewed on the plans submitted with the application.

The OWMP seeks to ensure that the Proposed Development contributes to the targets outlined in the *EMR Waste Management Plan 2015 – 2021* and the SDCC Household & Commercial Waste Bye-Laws 2018.

Mitigation measures proposed to manage impacts arising from wastes generated during the operational phase of the Proposed Development are noted in Section 12.7.

12.5 Potential Impact of the Proposed Development

12.5.1 Proposed Development

This section details the potential waste effects associated with the Proposed Development.

12.5.1.1 Construction Phase

The Proposed Development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to

inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative***.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the Development Site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

There is a quantity of excavated material which will need to be excavated to facilitate the Proposed Development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 6 (Land, Soils and Geology). It is anticipated that c. 22,808m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

12.5.1.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative***.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

Waste contractors will be required to service the Proposed Development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, significant*** and ***negative***.

12.5.2 Potential Cumulative Impact

12.5.2.1 Construction Phase

Multiple permissions remain in place for both residential and commercial developments within the vicinity of the development In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments. For further information on these developments, please see Section 3.3 of Chapter 3 (Planning and Development Context).

Developments that potentially could overlap during the Demolition & Construction phases of note:

ABP Ref. 304383 – 492 no. Build to Rent units with commercial uses and associated site works.

ABP Ref. 309658 – Demolition of existing buildings, construction of 171 no. apartments, creche and associated site works.

ABP Ref. 304686 – 153 no. residential units and associated site works.

DCC 3940/17 – 338 no. residential units and crèche facility

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative effects associated with waste generation and waste management. In the event that the proposed development along with the surrounding developments do not appropriately manage waste during the construction phase, the potential effect will be ***short-term, significant*** and ***negative***.

12.5.2.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments do/will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area are/will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. In the event that the proposed development along with the surrounding developments do not appropriately manage waste during the operational phase, the potential effect will be ***long-term, significant*** and ***negative***.

12.6 Do-Nothing Approach

If the Proposed Development was not to go ahead there would be no excavation or construction or operational waste generated at this site. There will would be a ***neutral*** effect on the environment.

The site is zoned for development and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies to promote sustainable growth and therefore the likely significant effects would be similar to this proposal.

12.7 Remedial or Reduction Measures: Mitigation

12.7.1 Proposed Development

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

12.7.1.1 Construction Phase

The following mitigation measures will be implemented during the construction phase of the Proposed Development:

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (DoEHLG, 2006), and is included as Appendix 12.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the Proposed Development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the C&D WMP (Appendix 12.1) in agreement with SDCC, or submit an addendum to the C&D WMP to SDCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will be required to fully implement the C&D WMP throughout the duration of the proposed construction and demolition phases.

A quantity of topsoil, sub soil and clay which will need to be excavated to facilitate the Proposed Development. Project Engineers have estimated that c. 22,808m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to ‘design out waste’;
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Waste Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition, excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;

- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the Proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the *EMR Waste Management Plan 2015 – 2021*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

12.7.1.2 Operational Phase

As previously stated, a project specific OWMP has been prepared and is included as Appendix 12.2.

- The Facilities Manager, residents and tenants of the development during the operational phase will be responsible for ensuring a high level of recycling, reuse and recovery in their individual units in accordance with the SDCC waste-byelaws.

In addition, the following mitigation measures will be implemented:

- The Facilities Manager, residents and tenants will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Waste electrical and electronic equipment (WEEE);
    - Batteries (non-hazardous and hazardous);
    - Cooking oil;
    - Light bulbs;
    - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
    - Furniture (and from time to time other bulky waste); and
    - Abandoned bicycles.
- The Operator / Buildings Manager will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The Operator / Buildings Manager will ensure that all waste collected from the Site of the proposed Development will be reused, recycled, or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator / Buildings Manager will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.

These mitigation measures will ensure the waste arising from the Proposed Development during the operational phase is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, *the Litter Pollution Act 1997*, the *EMR Waste Management Plan 2015 – 2021* and the SDCC Household and Commercial Waste Bye-Laws 2018. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

12.8 Residual Impacts of the Proposed Development

12.8.1 Proposed Development

The implementation of the mitigation measures outlined in Section 12.6 will ensure that high rates of reuse, recovery and recycling are achieved at the Site of the Proposed Development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

12.8.1.1 Construction Phase

A carefully planned approach to waste management as set out in Section 12.6.1.1 and adherence to the C&D WMP during the construction phase will ensure that the predicted effect on the environment will be ***short-term*, *imperceptible* and *neutral*.**

12.8.1.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 12.6.1.2 and adherence to the OWMP will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be ***long-term, imperceptible* and *neutral*.**

12.8.1.3 Conclusion

Assuming the full and proper implementation of the mitigation measures set out herein and in the C&D WMP (Appendix 12.1) and the OWMP (Appendix 12.2), no likely significant negative effects are predicted to occur as a result of the construction or operational of the Proposed Development.

12.8.2 Cumulative

12.8.2.1 Construction Phase

During the Construction phase waste management will be carefully managed as set out in Section 12.6. Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such it is considered that the cumulative effect relating to waste management will be ***short-term, imperceptible*** and ***neutral.***

12.8.2.2 Operation Phase

During the Operational phase waste management will be carefully managed as set out in Section 12.6. Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such it is considered that the cumulative effect relating to waste management will be ***long-term, imperceptible*** and ***neutral.***

12.8.2.3 Worst Case Impact

In a worst-case scenario, if no mitigation measures found in section 12.6 are followed, poor onsite waste management, non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste offsite and result in negative environmental impacts or pollution as shown in section 12.5.

12.9 Monitoring

12.9.1 Proposed Development

The management of waste during the construction phase will be monitored by the Contactor's appointed Waste Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

The management of waste during the operational phase will be monitored by the residents to ensure effective implementation of the SDCC waste bye-laws internally and by the nominated waste contractor(s).

12.9.1.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The C&D WMP specifies the need for a Waste Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Waste Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the Proposed Development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future Developments.

12.9.1.2 Operational Phase

During the operational phase, waste generation volumes will be monitored by residents. It is unlikely that the number of bins in individual households will require adjustment.

12.10 Reinstatement

In the event that the Proposed Development is discontinued, there is not likely to be any significant impacts on waste management at the site.

12.11 Conclusion

This chapter has discussed the potential and the predicted the impact of the Proposed Development with regards to waste management. These impacts have been considered for both the construction and operational phases of the Proposed Development. The cumulative impact of the Proposed Development and surrounding developments has also been considered.

Provided all mitigation measures as set out in this chapter and the attached C&D WMP and OWMP are implemented, the overall predicted impact of the proposed development is ***long-term, imperceptible*** and ***neutral.***

12.11 References

- Directive 2011/92/EU as amended by Directive 2014/52/EU and European Union (Planning and Development) and (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).
- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation include:
    - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended;
    - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended;
    - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended;
    - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended;
    - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended;
    - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended;
    - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015);
    - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014);
    - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended;
    - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended;
    - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015);
    - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended;
    - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended;
    - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994);
    - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011); and
    - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended.
- BS 5906:2005 Waste Management in Buildings – Code of Practice.
- Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
- Department of Communications, Climate Action and Environment (DCCAE), Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (2020).
- Department of Environment and Local Government (DELG) (1998). Waste Management – Changing Our Ways, A Policy Statement.
- Department of Environment, Communities and Local Government (DECLG) (2012). A Resource Opportunity - Waste Management Policy in Ireland.
- Fingal County Council (FCC), Fingal County Council Development Plan 2017-2023 (2017)
- FCC, Fingal County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws (2020)
- Department of Environment, Heritage and Local Government (DEHLG) (2020). Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities.
- Department of Environment, Heritage and Local Government (DEHLG) (2006). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.
- Eastern-Midlands Region Waste Management Plan 2015-2021 (2015).
- Environmental Protection Agency (EPA). National Waste Database Reports 1998-2018.

- EPA (2015). Waste Classification-List of Waste & Determining if Waste is Hazardous or Non-Hazardous.
- EPA and Galway-Mayo Institute of Technology (GMIT) (2015). EPA Research Report 146-A Review of Design and Construction Waste Management Practices in Selected Case Studies-Lessons Learned.
- FÁS and the Construction Industry Federation (CIF) (2002). Construction and Demolition Waste Management-a handbook for Contractors and Site Managers.
- Forum for the Construction Industry-Recycling of Construction and Demolition Waste.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended.
- Environment Protection Agency Act 1992, (No. 7 of 1992) as amended.

13.0 MATERIAL ASSETS – TRAFFIC

13.1 Introduction

The subject site comprises the following development mix:

- 633 No. apartments,
- 1330 m2 GFA commercial space, and
- 360 m2 GFA crèche (excluding external play area).

The apartment breakdown is as follows:

- 1-Bedroom units 292 No.
- 2-Bedroom units 280 No.
- 3-Bedroom units 61 No.

It is proposed to provide 419 No. car parking spaces, including 21 No. disabled, with an additional 15 No. spaces allocated to the commercial component and an additional 5 No. dedicated GoCar spaces.

This chapter has been prepared by Martin Rogers, BA, BE, M.EngSc, PhD, CEng, TPP MICE, MRTPI, MTPS, Transport Planning Professional, Chartered Civil Engineer and Chartered Town Planner.

Martin has over 40 years' experience across a range of similar type and scale developments including preparation of Traffic Impact Assessments and EIAR's for previous applications such as:

- Claremont Howth (ABP-306102-19 / FCC),
- Concorde, Naas Road (ABP-304383-19 / DCC)
- Cookstown Enniskerry (ABP-307089-20 / WCC)
- Airton Road, Tallaght (ABP-306705-20 / SDCC)

Chapter 13 assesses the traffic and transport impacts of the proposed residential development at the former Chadwicks site, Greenhills Road, Walkinstown, Dublin 12 on the existing road network in the vicinity of the site, as well as identifying proposed mitigation measures to minimise any impacts. There is a separate Traffic & Transport Assessment and Mobility Management Plan that should be read in conjunction with this chapter.

13.2 Research Methodology

The assessment of the potential impact of the Proposed Development on the material assets in the area was carried out according to the methodology specified by the EPA and the specific criteria set out in the Guidelines on Information to be contained in an Environmental Impact Assessment Report 2017 (Draft).

The traffic analysis undertaken on the basis of 1.6% annual growth in network traffic over the period 2019 to 2030 period, decreasing to 0.5% in the 2030 to 2039 period, consistent with the 'medium growth' assumption for the four planning authorities within the Dublin city area as detailed within the 2016 Transport Infrastructure Ireland document 'Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections', PE-PAG-02017-2 May 2019.

The following sources of information were used in the completion of this assessment:

- Smarter Travel A Sustainable Future (2009-2020).
- Greater Dublin Area Transport Strategy, 2016-2023

- Making Residential Travel Plans Work: Guidelines for New Development - UK Department of Transport, 2005
- Travel Plans – A Good Practice Guide foe developers - Surrey County Council, UK, 2018
- South Dublin County Development Plan 2016-2022
- Draft South County Development Plan 2022-2028
- Standard Assessment Methodology (SAM) - TRICS Good Practice Guide, 2016
- Travel Plans for New Residential Developments: Insights from Theory and Practice (De Gruyter, 2015)
- 'Traffic and Transport Assessment Guidelines' (May 2014) National Road Authority;
- 'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003); and
- 'Guidelines for Traffic Impact Assessments' The Institution of Highways and Transportation.

The methodology included a number of key inter related stages;

- Background Review: This background review is broken down as follows:
  (i) An examination of the local regulatory and development management documentation.
  (ii) An analysis of previous 'transport' related, strategic and site-specific studies of development and transport infrastructure proposals across the Greenhills Road area.
- Traffic Counts: Classified junction automatic traffic counts were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed residential development.
- Trip Generation: A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed residential development.
- Trip Distribution: Based upon both the existing and future (for the adopted assessment horizon years) network characteristics, a distribution exercise has been undertaken to assign site generated vehicle trips across the local road network using the following software:
  - TRL ARCADY Junction 9 software – Roundabout Junction
  - TRL PICADY Junction 9 software - Priority Junction

- Issues to be considered in this assessment were agreed with SDCC engineers, as well as the scope of baseline surveys to be carried out were agreed.
- Assessment of Impacts.

In line with the EPA Draft Guidelines (EPA, 2017), seven generalised degrees of impact significance are used to describe impacts: imperceptible, not significant, slight moderate, significant, very significant or profound.

Please refer to tTable 3.3 of the draft EPA EIAR Guidelines.

13.3 Receiving Environment

Road Network
The site is located on the south side of Greenhills Road, adjacent to its junction with Belgard Road, 350 metres south-west of the Walkinstown Roundabout.

The location of the site relative to the 3 No. nearby surveyed junctions is detailed within Figure 13-1.

Given that the proposed development is residential, peak flows will typically occur on weekdays, with peak flows typically occurring between 7am and 9am in the morning and between 4pm and 6pm in the evening.

Accordingly, traffic surveys were carried out in February and November 2019 at the 3 No. junctions.

In the interests of robustness, traffic survey data from a short time before the initial imposition of Covid restrictions have been used as, thus far, morning and evening peak flows have not recovered to these levels due to significant proportion of people working at home and thus not travelling to and from work at these times.

The survey was carried out over a 12-hour period between 0700 and 1900 in order to ascertain the peak hour flows for all traffic movements at the 3 No. junctions.

The survey indicated that the weekday morning peak occurred between 0800 and 1000 with the evening peak occurring between 1600 and 1800 – these were observed to be the timeframes during which the junctions were most heavily loaded. The following analysis is based on these peak periods.

On the basis of the results of both the surveys and assumptions regarding when peak flows from the generated traffic will occur, the morning peak hour has been taken as 0800 to 0900, with the evening peak taken to occur between 1700 and 1800.

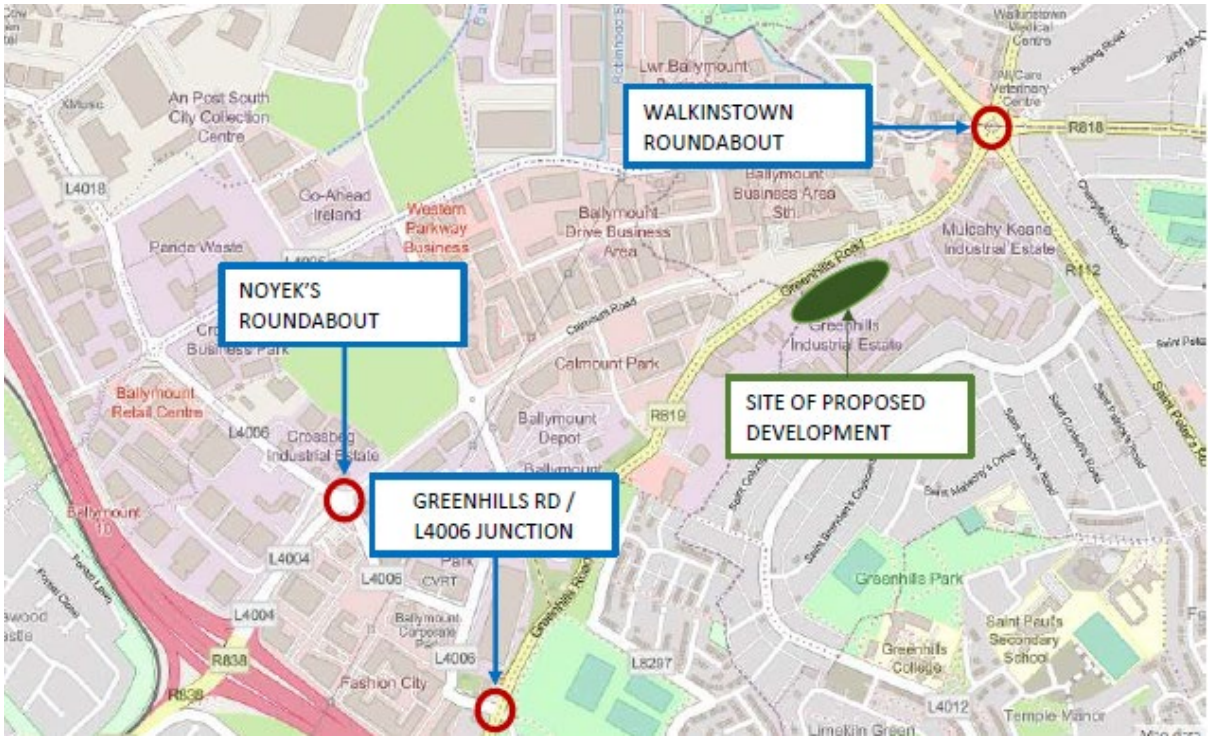
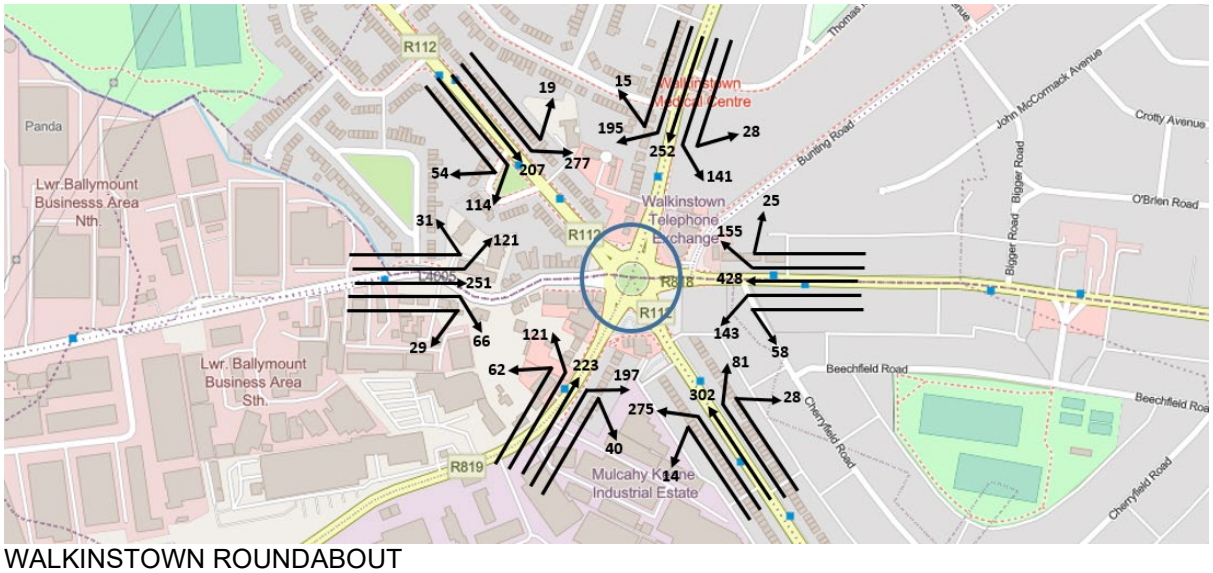
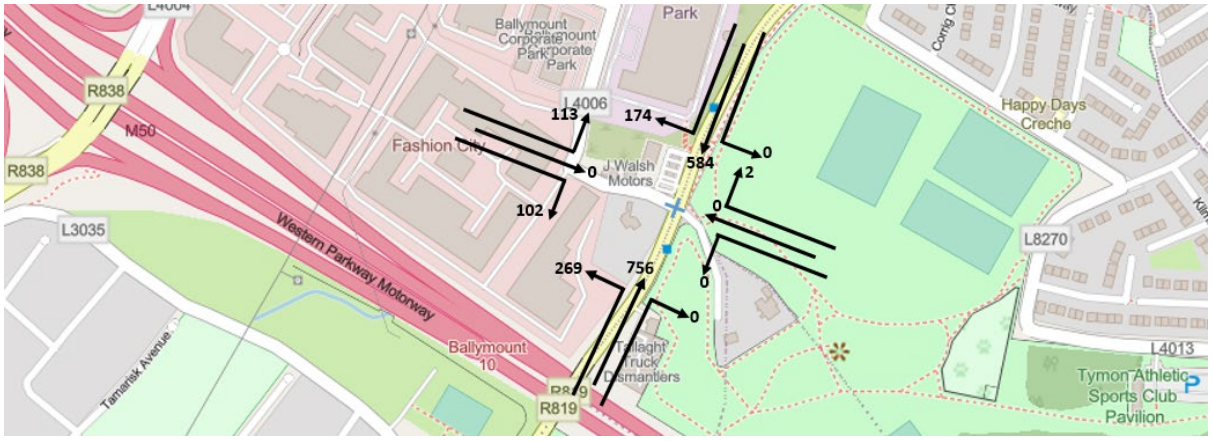


Figure 13-1: Site location map also indicating location of 3 No. traffic surveys

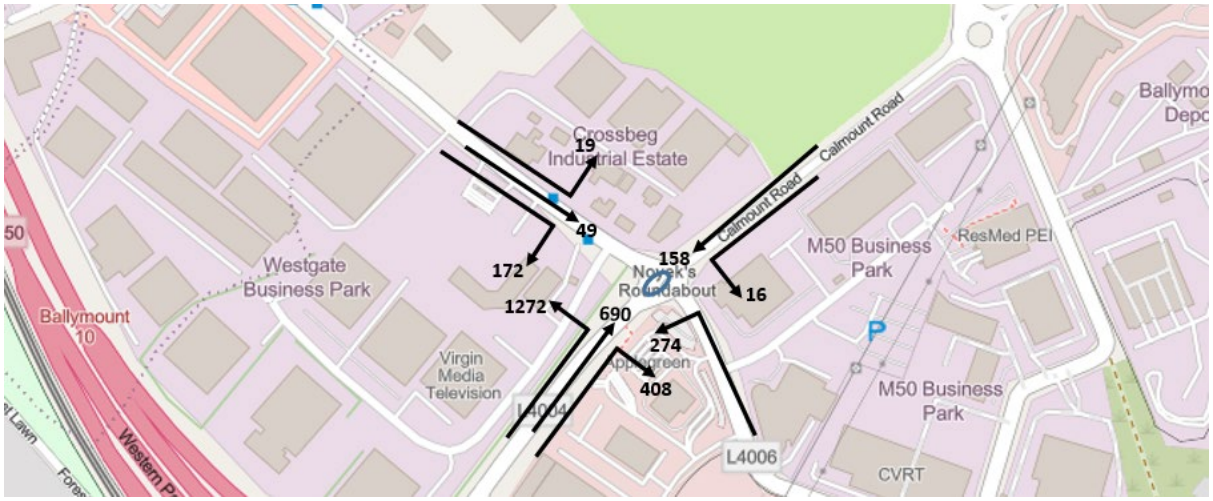
The survey data is detailed for the morning and evening peak hours in Figure 13-2 and Figure 13-3 respectively:



WALKINSTOWN ROUNDABOUT

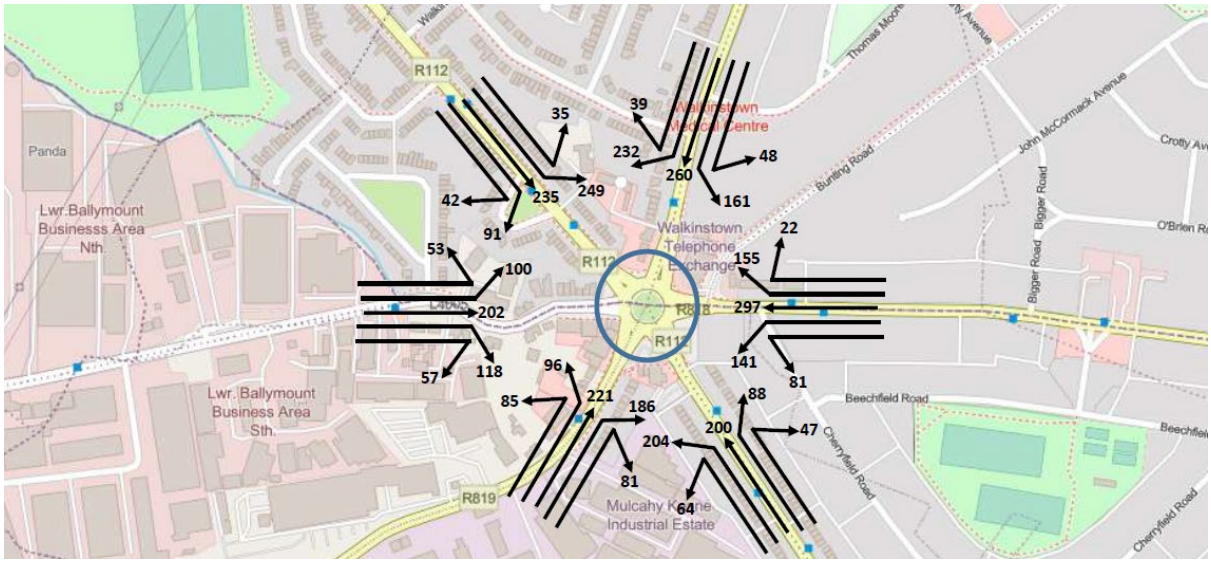


GREENHILLS ROAD / BALLYMOUNT ROAD

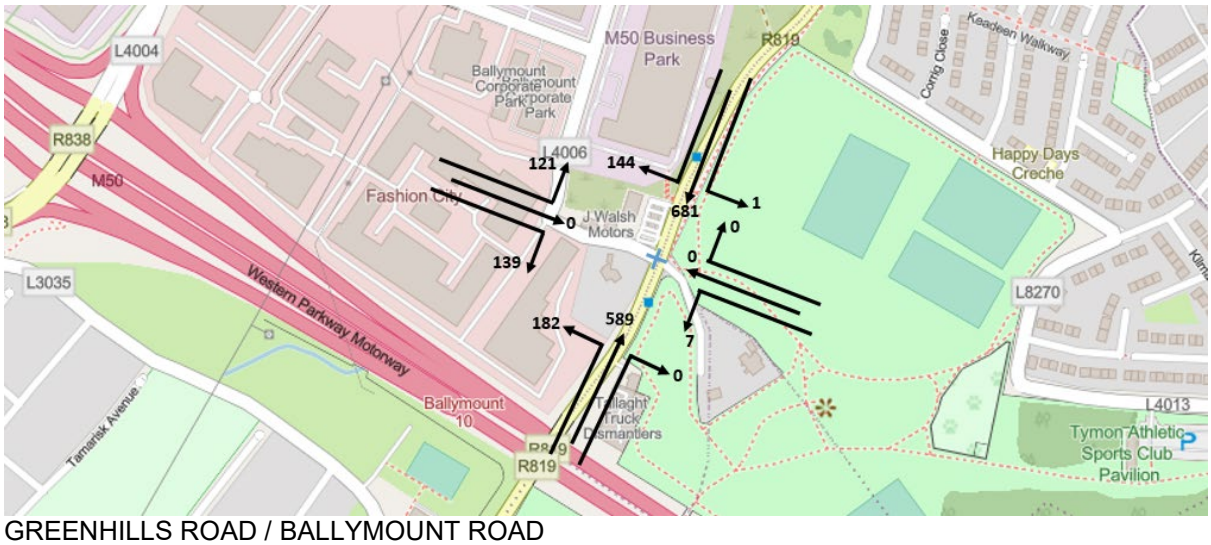


NOYEK'S ROUNDABOUT

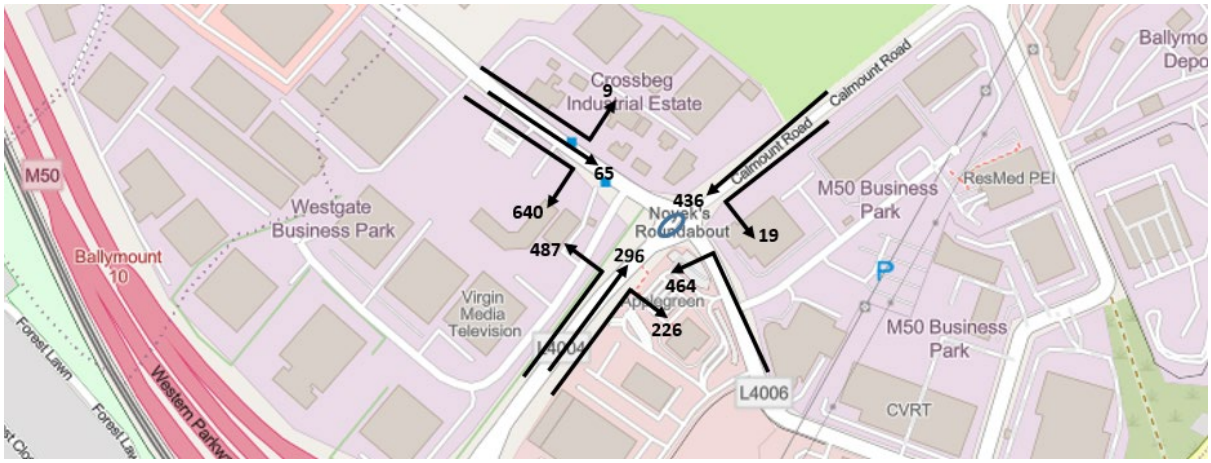
Figure 13-2 – 2019 AM Peak (0800 to 0900)



WALKINSTOWN ROUNDABOUT



GREENHILLS ROAD / BALLYMOUNT ROAD



NOYEK'S ROUNDABOUT

Figure 13-3 – 2019 PM Peak (1700:1800)

Tables 13-1 and 13-2 details the ratios of flow to capacity, queue lengths and delays at two of the three critical junctions for the 2019 morning and evening peaks respectively. (Generated flows from the subject site are less than 1% at Noyek's Roundabout. No detailed analysis of this junction will be undertaken as a result.)

	2019 AM PEAK FLOWS (Existing Flows)				2023 PM PEAK FLOWS (Existing Flows)			
	Flow (PCU/TS)	**Cap.** (PCU/TS)	**RFC** (-)	**Avg. queue** (PCU)	**Flow** (PCU/TS)	**Cap.** (PCU/TS)	**RFC** (-)	**Avg. queue** (PCU)
Walkinstown Road	186	234.05	0.79	4	201	224.65	0.89	7
Cromwellsfort Road	219	240.70	0.91	8	192	229.25	0.84	5
St. Peters Road	182	192.88	0.94	11	157	220.18	0.71	3
Greenhills Road	146	160.00	0.91	7	184	215.18	0.86	5
Ballymount Road	137	228.56	0.60	2	162	278.75	0.58	2
Walkinstown Avenue	193	268.28	0.72	3	178	263.08	0.68	2

Table 13-1: Walkinstown Roundabout

	2019 AM PEAK FLOWS (Existing Flows)				2023 PM PEAK FLOWS (Existing Flows)			
	Flow (PCU/TS)	**Cap.** (PCU/TS)	**RFC** (-)	**Avg. queue** (PCU)	**Flow** (PCU/TS)	**Cap.** (PCU/TS)	**RFC** (-)	**Avg. queue** (PCU)
Greenhills Rd Nth S+R	180	204.15	0.88	9	132	218.69	0.61	3
Ballymount Rd Upr L+R	63	59.19	1.06	11	75	77.28	0.97	9

Table 13-2: Greenhills Road / Balllymount Road Lower

The above analysis indicates that both the Walkinstown Roundabout and the Greenhills Road / Ballymount Road Upper Priority intersection at present operates at or near capacity during both peak hours.

In the context of the existing level of saturation at the junctions analysed, it is worth noting that the Bus Connects system will have a significantly beneficial impact on the performance of all junctions once the scheme is fully implemented. The 'D' spine will run along Calmount Road and past the site to the Walkinstown Roundbout, while the 'F' spine will access from Cromwellsfort Road to St Peters Road via Walkinstown Roundabout.

The confluence of these two spines close to the subject site will have the effect of significantly reducing private car travel in this area as significant modal shift to bus transport will result from the enhanced service provided.

EXISTING CYCLING FACILITIES

Figure 13-4 below details the existing cycle facilities close to the site:

Legend:

- B1 - Bus Lane (no cycle lane)
- C1 - Cycle Track - separated from road
- C2 - Cycle Track - immediately adjacent
- C3 - Cycle Lane (even within Bus Lane)
- G1 - Cycle Trail or Greenway
- S2 - Shared Walking & Cycling
- Study Area
- County Council Boundaries
- Greenline Tram Stops
- Redline Tram Stops
- Stations

Figure 13-4: Cycling facilities in proximity to Chadwicks site

One can see that there are limited cycle lanes in the vicinity of the development, with the main link being along the Greenhills Road within the bus lane.

EXISITNG PUBLIC TRANSPORT

The Greenhills Road area is currently connected via the 27 and 77A bus routes, providing good links both to the city centre and the western suburbs.

The frequency of each bus can be seen in Table 13-3:

ROUTE	ORIGIN	DESTINATION	FREQUENCY AM PEAK
ROUTE 27	JOBSTOWN	CLARE HALL VIA CITY CENTRE	6 PER HOUR
ROUTE 77A	CITYWEST	RINGSEND	2 PER HOUR
ROUTE 9	LIMEKILN AVE	CHARLESTOWN	6 PER HOUR
TOTAL			14 PER HOUR

Table 13-3– Dublin Bus Route Frequencies close to proposed development

In addition, the 123 route, with its terminus west of Walkinstown Road within 1km of the site, runs into the city centre 6 times per hour during the morning peak.

With the present bus system along Greenhills Road yielding 14 No. buses per hour during the morning peak, and assuming a maximum capacity of 80 No. passengers, an overall hourly capacity towards town of 1120 No. passengers is derived.

Assuming the D spine on the Bus Connects route contains the D2, D4 and D5 routes, extending to Tallaght along the Walkinstown Road and Greenhills Road. In Tallaght, D2 would extend past The Square to Jobstown and Citywest, with some similarity to existing Route 27, D4 would extent past The Square to Killinarden Heights and Kiltipper Way, and D5 would split off at Castletymon Road to serve Tymon North and Seskin View on the way to The Square in Tallaght.

In addition, the F spine will be accessible to commuters living at the proposed development, as the F3 route passes through Walkinstown Roundabout immediately east of the site.

These proposed routes will provide capacity commensurate with the existing network, but with significantly reduced journey times, providing uplift to the desirability of the bus as a preferred modal choice for commuters.

In order to estimate the level of demand the proposed development will place on the existing / proposed bus network, we can assume a figure of 2.7 persons per apartment unit of a suitable age to travel to school / college or work. This is a robust figure, given that the development has an average of 1.6 bedrooms per unit, and is based on the 2016 census derived for a standard household of 2.7 persons per household in total. This figure yields a population for the proposed residential component of the development at 1709.

If we assumes 21% travelling by bus (as detailed within Mobility Management Plan document), this translates into 359 No. bus commuters. If one assumes these journeys are spread over 3 hours in the morning, this translates into an hourly demand on the bus network of 120 No. commuters per hour.

This figure is only 11% of the computed maximum capacity of the existing bus network. Thus, based on frequency and capacity, it can be assumed that the bus network in place will cope more than adequately with the demand induced by the residential component of the proposed development.

Figure 13-5 details the routes taken by the 27, 77A, 9 and 123 in close proximity to the site of the proposed development.

Figure 13-5: Existing bus routes 27 and 77A

EXISTING PEDESTRIAN FACILITIES

There are good footpath facilities close to the subject site connecting it to the Walkinstown Roundabout and the general Walkinstown area.

EXISTING MODAL SPLITS

Table 13-4 contains the modal splits for car, bus and Rail travel for the 5 No. Electoral Districts close to the subject site.

Mode	CAR DRIVER (%)	CAR PASS (%)	BUS (%)	LUAS/ TRAIN (%)	CYCLING (%)	WALKING (%)	NOT STATED / VAN / HOME (%)
Terenure-St James	56	2	16	1	7	6	12
Tallaght-Kilmanagh	59	3	6	10	4	6	12
Templeogue-Limekiln	58	3	14	1	7	3	14
Terenure-Greentrees	54	3	15	0	10	4	14
Terenure-Cherryfield	54	3	16	1	8	6	14
Weighted Average	56	3	13	3	7	5	13 (3/6/4)

Table 13-4: Modal splits for electoral districts in vicinity of subject site

Thus, for the existing inhabitants in 5 No. Electoral Districts close to the subject site, 45% commute by private car as detailed within the 2016 Census, with 22% commuting by bus, train or LUAS and 16% cycling or walking.

13.4 Characteristics of the Proposed Development

The development comprises the following:

- 633 No. apartments,
- 1330 m2 GFA commercial space, and
- 360 m2 GFA crèche (excluding external play area).

The apartment breakdown is as follows:

- 1-Bedroom units 292 No.
- 2-Bedroom units 280 No.
- 3-Bedroom units 61 No.

It is proposed to provide 419 No. car parking spaces, including 21 No. disabled for residents. An additional 15 No. spacesare allocated to the commercial component and an additional 5 No. dedicated GoCar spaces.

The permitted development thus involves a car parking provision of 0.66 No. spaces per dwelling unit.

The limited parking provision proposed together with the increased emphasis on a non-car-based mode such as bus transport is consistent with the objective minimizing impact on the environment by promoting a balanced set of viable modes rather than concentrating solely on one dominant mode – the private car.

It is assumed that the proposed development will open in late 2024.

Figure 13-6 below contains a ground floor plan of the revised development indicating the location of the entrance onto Greenhills Road.

Figure 13-6: Ground Floor Plan of proposed development

Traffic will exit the development left southwards or right northwards onto Greenhills Road.

Traffic turning left proceeds southwards towards the Tallaght area, or turns right at the Greenhills Road / L4006 and northwards towards Noyak's Roundabout and then westwards towards the M50 slip road.

Traffic turning right proceeds northwards towards the Walkinstown Roundabout and onwards towards the south city centre.

Figure 13-7 details the available access point from the development onto the Greenhills Road.

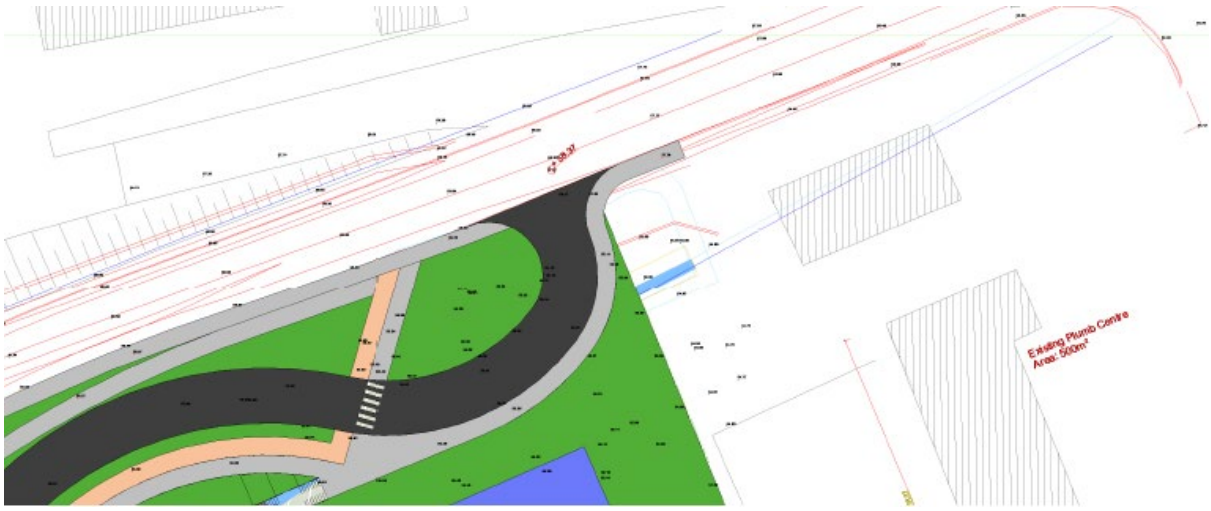


Figure 13-7: Site access onto Greenhills Road

13.5 Predicted Impact of the Proposed Development – Construction Phase

13.5.1 Road Network

The total construction period is predicted to be 36 months, 4 of which will be allocated to site set up/excavation and remaining 32 months to on site construction. This figure is only indicative and is subject to change pending planning approval the commencement of detailed design.

The following construction traffic flow estimates for weekday traffic have been made:

- No. of private vehicles from staff and site visitors – 21 (per day)
- No. of light good vehicles per day from subcontractor staff -14 (per day)
- No. of heavy goods vehicles during excavation stage – 96 (per day)
- No. of heavy goods vehicles during concrete pours – 80 (per day)
- No. of heavy goods vehicles per day during normal standard construction periods (i.e. excluding excavation stage) – 7 (per day)

The above data corresponds to a total of 138 vehicles on a daily basis during the excavation stage and 122 vehicles per day during pouring of concrete. Upon completion of all excavation works and when no concrete pours are scheduled, the number of vehicles per day will reduce to 42 per day.

This equates to 1 vehicle entering/leaving the site daily over a 10-hour working day which results in a traffic flow of 1 vehicles per every 4.5 minutes during excavation stage, 1 vehicles every 5 minutes during concrete pours and 1 vehicle every 14.5 minutes during normal construction periods.

Traffic survey carried out within the Traffic and Transport Assessment (TTA) for this project indicate that the peak traffic hours are between 08:00 – 09:00 and 17:00 – 18:00.

It is predicted that construction hours will be from 07:00 to 19:00. As all the workers will be expected to arrive to site by 07:00, they will not be exposed the peak traffic flows commencing only at 08:00.

This is also true when working will be leaving the site at 19:00, at which point the peak evening traffic flows between 17:00 – 18:00 will have elapsed. To further mitigate any potential traffic congestions, all site workers will be encouraged to use public transport to commute to and from work.

During construction, heavy goods vehicles entering the site will be guided by signs to a waiting area before being directed to their location. Upon exiting the site they will be required to enter a cleaning area, preventing any on-site soil stuck to the vehicles from leaving the site. To ensure all HGV vehicles can safely enter the site a banksman will be assigned at the site entrance, directing the traffic on the existing access road, south of the proposed site.

13.5.2 Pedestrians

Prior to commencement of construction activities within the site, an appropriate hoarding will be erected around the site to protect the general public from ongoing works within the site. Entering/existing will be controlled via a manner turnstile system throughout the contract period.

Segregation measures will be implemented on site to separate pedestrians from heavy equipment and undergoing works. Completely fenced off pedestrian walkways will be provided to close off all site offices.

The existing footpath on the parallel access road south of the proposed development will be maintained throughout the majority of construction phase. Once the development nears to completion and landscaping works start the existing footpath will be removed and replaced with a new wider footpath. This will in turn provide more flexibility for pedestrians and increase the width of the existing access road, providing more manoeuvrability for HGV's.

13.5.3 Cycling

There is currently only one cycle located on Greenhills Road which is parallel to the northern site boundary. The cycle lane will be subjected to minimal impact as the construction site entrance will be located on the southern side of the site, not the on the northern side where the cycle lane is currently located.

13.6 Predicted Impact of the Proposed Development – Operational Phase

13.6.1 Road Network

INTRODUCTION

The traffic impact of the proposed development is derived by assessing the trips generated by the proposal, taking the existing, day of opening and design year flows on the network, gauging the extent to which the superimposed flows from the proposed and adjacent committed developments will affect the efficiency of future network flows.

DIRECT / INDIRECT IMPACT

The analysis of traffic growth volumes on the traffic network plus traffic generated by proposed and adjacent development constitutes a robust assessment of the likely direct impacts of the Proposed Development.

There are no likely indirect impacts arising as there are no substantial adjacent planned developments close to the subject site.

The impact of the Proposed Development on the following 3 No. junctions is assessed:

- The Walkinstown Roundabout (the nearest major junction tot eh site of the proposed development);
- The Greenhills Road / L4006 (Ballymount Road Upper) capturing both the flows along Greenhills Road and the flows going to the M50 access via the Noyek's roundabout; and

- The Noyek's roundabout (the main access route from Greenhills Road onto the M50 northbound and southbound).

The volumes from the Greenhills Road / L4006 and Noyek's Roundabout junctions would be seen as indicative of the flows along Calmount Road towards the M50 once the completed link is in place.

FLOWS GENERATED BY PROPOSED DEVELOPMENT

The planned development quantum consists of 633 No. apartment units plus crèche (360 m^2 GFA) and commercial retail space (1330 m^2 GFA).

TRICS typically gives the following weekday morning and evening peak trip rates for apartments in general urban areas:

		Weekday AM		Weekday PM	
		IN	OUT	IN	OUT
Apartments	Trips/Unit	0.058	0.19	0.161	0.085

Table 13-5: Peak hour trip rates for apartments within development site

The above TRICS trip rates give rise to the following weekday morning and evening peak trip rates for apartments:

		Weekday AM		Weekday PM	
	No. of units	N	OUT	IN	OUT
Apartments	633	37	120	102	54

Table 13-6: Peak hour flows generated by proposed apartments within development site

TRICS typically gives the following weekday morning and weekday evening peak trip rates for commercial / business park developments:

		Weekday AM		Weekday PM	
		IN	OUT	IN	OUT
Commercial	Trips/100m^2 GFA	1.227	0.204	0.297	1.493

Table 13-7: Typical peak hour trip rates for commercial component within development site

The above TRICS trip rates give rise to the following weekday morning and evening peak trip rates for the commercial component:

		Weekday AM		Weekday PM	
	GFA m^2	IN	OUT	IN	OUT
Commercial	1330	16	3	3	20

Table 13-8: Peak hour flows generated by commercial component within development site

TRICS typically gives the following weekday morning and evening peak trip rates for the crèche component:

		Weekday AM		Weekday PM	
		IN	OUT	IN	OUT
Crèche	Trips/100m^2 GFA	4.3	3.3	2.7	3.5

Table 13-9: Peak hour trip rates for crèche component within development site

		Weekday AM		Weekday PM	
	GFA (m^2)	IN	OUT	IN	OUT
Crèche	360	15	12	10	12

Table 13-10: Peak hour flows generated for crèche component within development site

In terms of the crèche component, this report will assume that 60% of the trips detailed within Table 13-10 are generated by residents and do not give rise to additional trips over and above those computed for the apartment component in Table 13-6.

Total trips generated by proposed development
Combining the residential and commercial trips with the amended crèche volumes, Table 13-11 below details the total flows predicted to be generated by the total proposed development:

	Weekday AM		Weekday PM	
	IN	OUT	IN	OUT
Residential	37	120	102	54
Commercial / Business Park	16	3	4	20
Crèche	8	6	5	6
Total generated flows	61	129	111	80

Table 13-11: Total flows generated by the proposed development

Thus, the proposal will result in a 2-way flow of 190 vehicles per hour in the morning peak, increasing to 191 vehicles per hour in the evening peak (3.17 vehicles entering or exiting every minute during the morning peak, increasing to 3.18 vehicles entering or exiting per minute during the evening peak).

DISTRIBUTION OF FLOWS GENERATED BY PROPOSED DEVELOPMENT
The distribution of generated flows from both the subject site and the adjacent lands will be based on the pattern of existing traffic movements in the vicinity, as observed in the 2019 pre-Covid 19 traffic surveys, and are the same assumptions as contained within the 2022 TTA.

Morning peak
From the traffic survey results, it is observed that eastbound and westbound flows along Greenhills Road are split 50:50.

50% of traffic exiting the subject site will do so towards the Walkinstown Roundabout junction, with 50% exiting towards the Greenhills Road / Ballymount Road Upper priority junction.

50% of traffic entering the subject site (non-peak direction) will do so from the Walkinstown Roundabout junction junction, with 50% entering from the Greenhills Road / Ballymount Road Upper priority junction junction.

Of the 50% exiting the subject site towards the Walkinstown Roundabout junction, it can be assumed that 40% will exit left onto Walkinstown Road, with 40% exiting onto Cromwellsfort Road and 20% onto Walkinstown Avenue

Of the 50% of traffic entering the subject site from the Walkinstown Roundabout junction, it can be assumed that 50% will enter from Walkinston Road, while 25% will enter from Cromwellsfort Road and 25% from Walkinstown Avenue.

Of the 50% exiting the subject site towards the Greenhills Road / Ballymount Road Upper junction, it can be assumed that 75% will continue southwards along Greenhills Road and 25% will turn left onto Ballymount Road Upper.

Of the 50% entering the subject site from the Greenhills Road / Ballymount Road Upper junction, it can be assumed that 70% will have travelled northwards along Greenhills Road and 30% will turn arrived from Ballymount Road Upper, tuning left onto Greenhills Road.

All traffic exiting from Greenhills onto the Noyek's Roundabout are assumed to proceed onto the M50.

All traffic entering the site from Noyek's Roundabout are assumed to proceed through the roundabout from the M50 towards Ballymount Road Upper.

Evening peak
From the traffic survey results, it is observed that eastbound and westbound flows along Greenhills Road are split 50:50.

50% of traffic exiting the subject site will do so towards the Walkinstown Roundabout junction, with 50% exiting towards the Greenhills Road / Ballymount Road Upper priority junction.

50% of traffic entering the subject site (non-peak direction) will do so from the Walkinstown Roundabout junction junction, with 50% entering from the Greenhills Road / Ballymount Road Upper priority junction junction.

Of the 50% exiting the subject site towards the Walkinstown Roundabout junction, it can be assumed that 40% will exit left onto Walkinstown Road, with 40% exiting onto Cromwellsfort Road and 20% onto Walkinstoen Avenue

Of the 50% of traffic entering the subject site from the Walkinstown Roundabout junction, it can be assumed that 50% will enter from Walkinston Road, while 25% will enter from Cromwellsfort Road and 25% from Walkinstown Avenue.

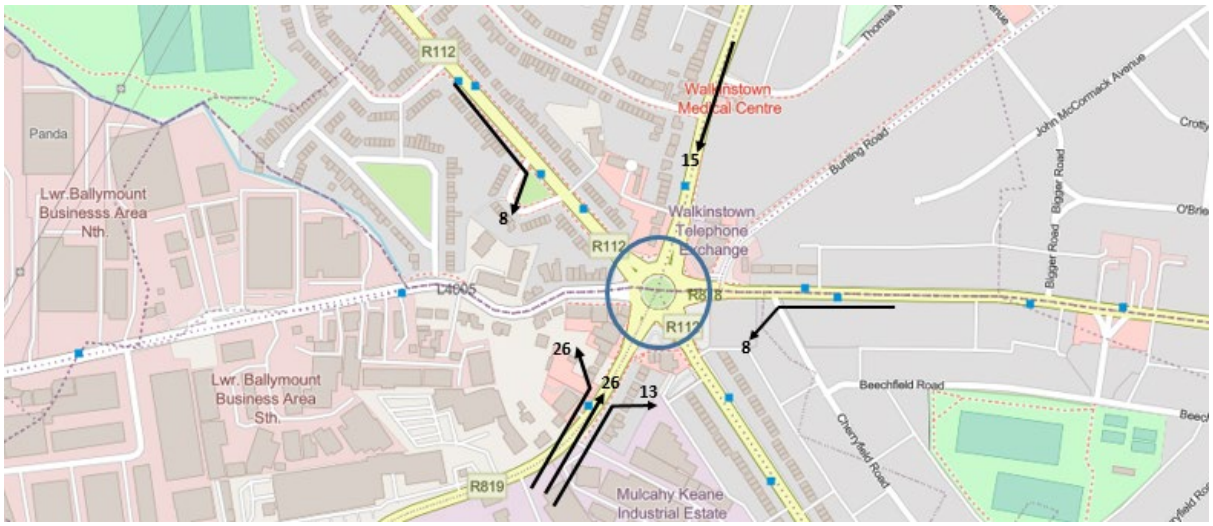
Of the 50% exiting the subject site towards the Greenhills Road / Ballymount Road Upper junction, it can be assumed that 80% will continue southwards along Greenhills Road and 20% will turn left onto Ballymount Road Upper.

Of the 50% entering the subject site fromthe Greenhills Road / Ballymount Road Upper junction, it can be assumed that 60% will have travelled northwards along Greenhills Road and 40% will turn arrived from Ballymount Road Upper, tuning left onto Greenhills Road.

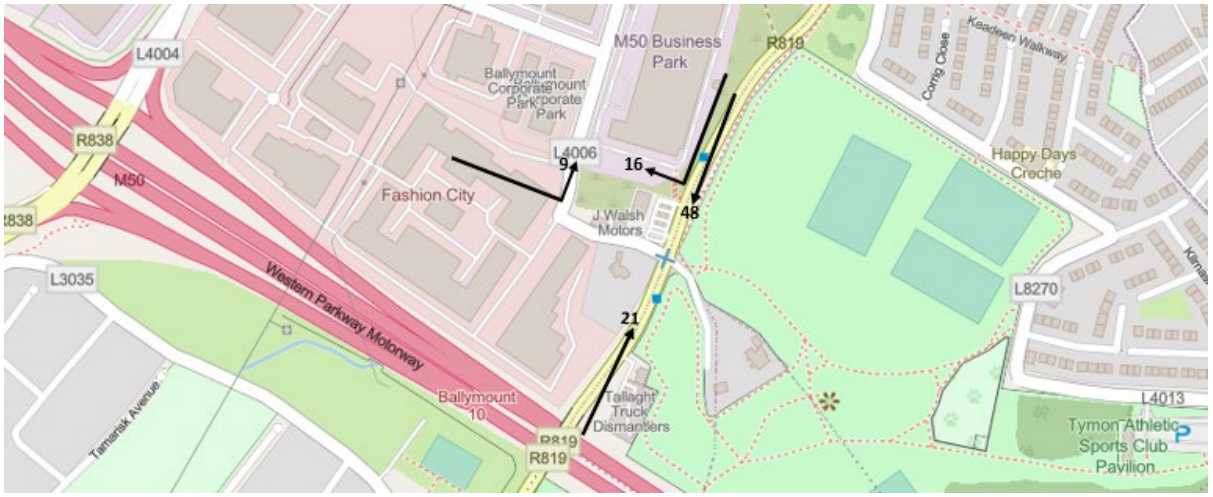
All traffic exiting from Greenhills onto the Noyek's Roundabout are assumed to proceed onto the M50.

All traffic entering the site from Noyek's Roundabout are assumed to proceed through the roundabout from the M50 towards Ballymount Road Upper.

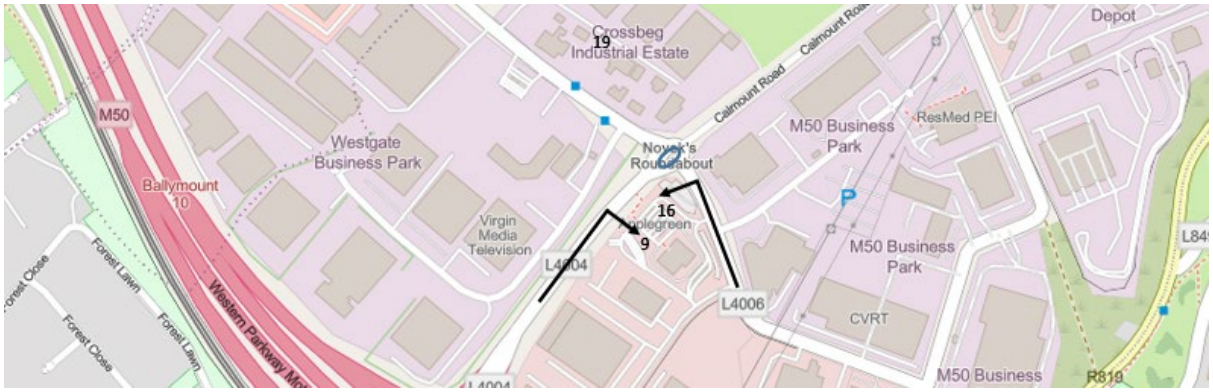
Figures 13-8 and 13-9 detail the assumed distributions for the AM and PM peak hour generated flows respectively.



WALKINSTOWN ROUNDABOUT

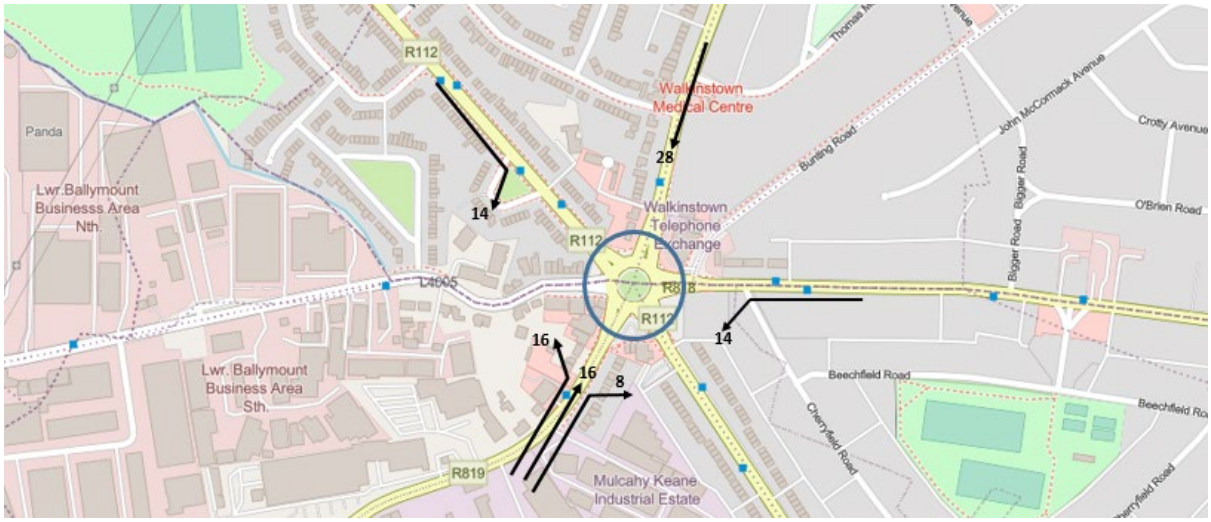


GREENHILLS ROAD / BALLYMOUNT ROAD

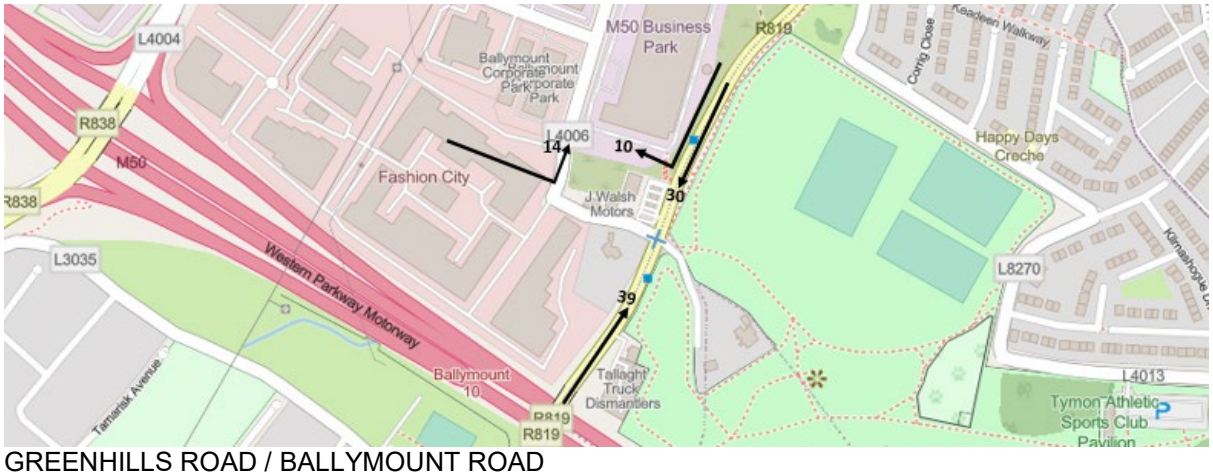


NOYEK'S ROUNDABOUT

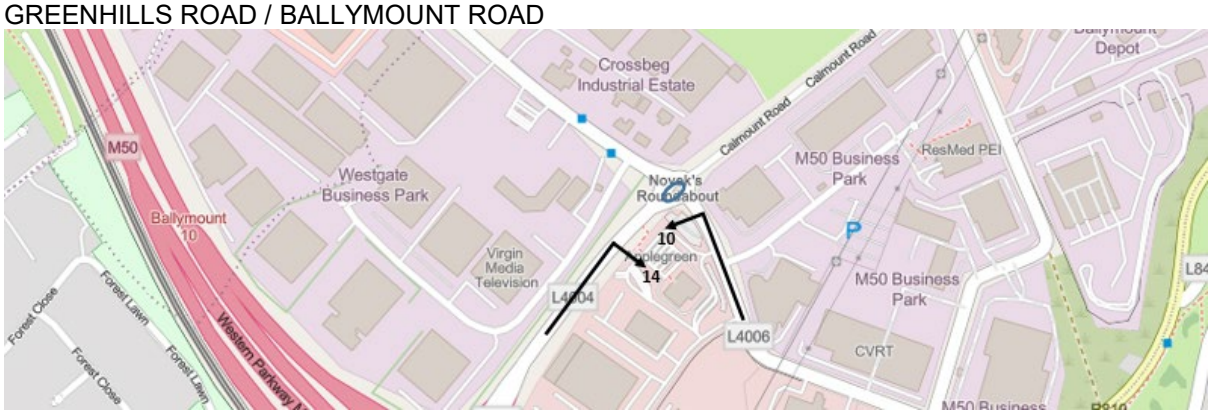
Figure 13-8: Trips generated by proposed development – AM Peak



WALKINSTOWN ROUNDABOUT



GREENHILLS ROAD / BALLYMOUNT ROAD



NOYEK'S ROUNDABOUT

Figure 13-9: Trips generated by proposed development – PM Peak

ASSUMPTIONS REGARDING TRAFFIC GROWTH WITHIN LOCAL ROAD NETWORK

The 2014 Traffic and Transport Assessment Guidelines published by the NRA requires that the relevant junctions be analysed for the existing situation, the year of opening (2021) with the proposed and adjacent developments in place, the design year 1 (year of opening plus 5) with the proposed and adjacent developments in place, and the design year 2 (year of opening plus 15) with the proposed and adjacent developments in place.

The 2019 survey results will be assumed to be present day volumes (2021).

In the interests of robustness, traffic survey data from a short time before the initial imposition of Covid restrictions have been used as, thus far, morning and evening peak flows have not recovered to these levels due to significant proportion of people working at home and thus not travelling to and from work at these times. These 2019 survey results will therefore, in the interests of robustness be assumed to be equivalent to late 2021 flows.

An annual growth rate of 1.6% has been assumed for the period 2021 to 2030, decreasing to 0.5% for 2031 to 2039, based on the low growth estimate for the Dublin Metropolitan Region, containing SDCC, published by TII in 2019 (PE-PAG-02017-2).

The 2024 Do-Nothing ('without development') scenario is derived by factoring the survey results in Diagrams 1 and 2 up by 4.9% ($(1.0162)^3$ - 1 = 0.049). The 2024 Do-Something ('with development') scenario is derived by adding the development flows detailed within Diagrams 3 and 4 to these factored network flows.

The 2029 Do-Nothing ('without development') scenario is derived by factoring the survey results in Diagrams 1 and 2 up by 13.7% ($(1.0162)^8$ - 1 = 0.137). The 2028 Do-Something ('with development') scenario is derived by adding the development flows detailed within Diagrams 3 and 4 to these factored network flows.

The 2039 Do-Nothing ('without development') scenario is derived by factoring the survey results in Diagrams 1 and 2 up by 21.3% ($(1.0162^9 \times (1.005)^9) - 1 = 0.209$). The 2039 Do-Something ('with development') scenario is derived by adding the development flows detailed within Diagrams 3 and 4 to these factored network flows.

Table 13-12 below details the network and development (proposed plus adjacent) incident on the 3 No. roundabout locations on the projected day of opening in 2024, within 2028, 5 years after opening and within 2039, 15 years after opening:

WALKINSTOWN ROUNDABOUT	Network Flows		Development flows		Total flows		Development flows as % of total flows	
	AM	PM	AM	PM	AM	PM	AM	PM
Day of opening (2024)	4148	4079	95	95	4243	4174	2.2	2.3
Design Year 1 (2029)	4495	4421	95	95	4590	4516	2.1	2.1
Design Year 2 (2039)	4794	4714	95	95	4889	4809	1.9	2.0
GREENHILLS ROAD / BALYMOUNT ROAD UPPER	Network Flows		Development flows		Total flows		Development flows as % of total flows	
	AM	PM	AM	PM	AM	PM	AM	PM
Day of opening (2024)	2100	1956	95	95	2195	2051	4.3	4.6
Design Year 1 (2029)	2276	2120	95	95	2371	2215	4.0	4.3
Design Year 2 (2039)	2427	2260	95	95	2522	2355	3.8	4.0
NOYEK'S ROUNDABOUT	Network Flows		Development flows		Total flows		Development flows as % of total flows	
	AM	PM	AM	PM	AM	PM	AM	PM
Day of opening (2024)	3210	2773	25	24	3235	2799	0.8	0.9
Design Year 1 (2029)	3478	3005	25	24	3503	3031	0.7	0.9
Design Year 2 (2039)	3709	3205	25	24	3734	3231	0.7	0.8

Table 13-12: Network and development flows at 3 No. roundabouts on day of opening (2024), Design Year 1 (2029) and Design Year 2 (2039)

The 2014 Traffic and Transport Assessment Guidelines requires the impact of the additional traffic volumes on the critical nearby junctions to be assessed in detail if:

- Development flows exceed 10% of existing turning movements at the two relevant junctions;
- Development flows exceed 5% of turning movements if the location has the potential to become congested.

It is noted that the generated flows from the subject site are below the 5% threshold at all three surveyed junctions, with values reducing to less than 1% at Noyek's Roundabout. No further detailed analysis of this junction will be undertaken.

The Walkinstown Roundabout will experience a maximum increase of 2.3%, less than half the lowest threshold under the Guidelines, with the Greenhills Road / Ballymount Road Upper junction experiencing a maximum increase of 4.6%.

In traffic impact terms, therefore, the impact of the proposed development will be very low.

Notwithstanding that all of the 3 No. junctions relating to the AM and PM peaks are below the 5% threshold, the 2 No. junctions closest to the proposed development (Walkinstown Roundabout and Greenhills Road / Ballymount Road Upper) will be analysed in detail to provide a robust assessment of the proposed development.

TRAFFIC IMPACT OF PROPOSAL ON WALKINSTOWN ROUNDABOUT

The traffic analysis detailed the performance of the proposed development on the Walkinstown Roundabout for the following 3 No. scenarios:

- 2024 flows with proposed development in place (AM and PM peak) - 2024 WDEV
- 2029 flows with proposed development in place (AM and PM peak) - 2029 WDEV
- 2039 flows with proposed development in place (AM and PM peak) - 2039 WDEV

The ARCADY programme was used to analyse all scenarios.

Analysis of AM and PM peak hour flows for 3 No. scenarios

Table 13-13 immediately below summarises the critical flows, capacities, RFC's and queue lengths for the morning and evening peaks for each of the 3 No. scenarios for the Walkinstown Roundabout junction:

Scenario No.1	2024 AM PEAK FLOWS (Do-Something)				2024 PM PEAK FLOWS (Do- Something)			
Walkinstown Road	188	221.03	0.85	5	202	197.95	1.02	22
Cromwellsfort Road	230	235.99	0.97	15	204	208.96	0.98	12
St. Peters Road	230	215.21	1.07	34	163	202.58	0.80	4
Greenhills Road	170	154.13	1.10	46	200	216.88	0.94	9
Ballymount Road	144	221.42	0.65	2	170	255.96	0.66	2
Walkinstown Avenue	203	261.48	0.78	4	190	241.12	0.79	4
Scenario No.2	**2029 AM PEAK FLOWS (Do-Something)**				**2029 PM PEAK FLOWS (Do-Something)**			
Walkinstown Road	203	209.67	0.97	12	219	182.42	1.20	50+
Cromwellsfort Road	250	224.32	1.11	57	221	207.33	1.07	30
St. Peters Road	249	185.37	1.34	50+	176	197.23	0.89	7
Greenhills Road	183	147.43	1.24	50+	208	205.52	1.06	32
Ballymount Road	155	227.12	0.68	3	183	245.10	0.75	3
Walkinstown Avenue	222	258.75	0.86	6	206	226.67	0.91	8
Scenario No.3	**2039 AM PEAK FLOWS (Do-Something)**				**2038 PM PEAK FLOWS (Do-Something)**			
Walkinstown Road	216	197.76	1.10	43	233	173.50	1.34	50+
Cromwellsfort Road	266	218.37	1.22	50+	236	208.43	1.13	50+
St. Peters Road	265	181.88	1.46	50+	189	203.62	0.93	8
Greenhills Road	250	191.34	1.31	50+	233	198.86	1.17	62
Ballymount Road	166	232.21	0.71	3	196	238.72	0.82	5
Walkinstown Avenue	235	254.48	0.92	9	219	218.35	1.00	20

Table 13-13: Critical flows, capacities, ratios of flow to capacity and queue lengths for each 15-minute interval during the morning and evening peak hours for each scenario

The above analysis indicates that, in 2024, with the development fully operational, the Walkinstown Roundabout intersection the maximum degree of saturation increases to 110% in the morning peak, with small additional incident flows from the development.

By 2029, with the proposed development in place, the maximum degree of saturation increases to 134%.

By 2039, with the proposed development in place, the maximum degree of saturation increases to 146%.

Therefore, the potential impact of the development at this location will be moderately negative by 2024 with the development in place, rising to severely negative within future design years 2029 and 2039, with and without the development in place, based on the assumptions taken within the traffic assessment report submitted.

With no significant adjacent planned developments taken into consideration, indirect impacts will not arise therefore the cumulative impacts are identical to the direct impacts detailed immediately above.

TRAFFIC IMPACT OF PROPOSAL ON GREENHILLS ROAD / BALLYMOUNT ROAD UPPER PRIORITY JUNCTION

The traffic analysis detailed the performance of the Greenhills Road / Ballymount Road Upper junction for the following 3 No. scenarios:

- 2024 flows with proposed development in place (AM and PM peak) - 2024 WDEV
- 2029 flows with proposed development in place (AM and PM peak) - 2029 WDEV
- 2039 flows with proposed development in place (AM and PM peak) - 2039 WDEV

The PICADY programme was used to analyse all scenarios.

Analysis of AM and PM peaks for the 3 No. scenarios

Table 13-14 immediately below summarises the critical flows, capacities, RFC's and queue lengths for the morning and evening peaks for each of the 7 No. scenarios for the Greenhills Road / Ballymount Road Upper Priority junction:

Scenario No.1	2024 AM PEAK FLOWS (Do-Something)				2024 PM PEAK FLOWS (Do- Something)			
Greenhills Rd Nth S+R	218	210.50	1.04	32	164	227.38	0.72	6
Ballymount Rd Upr L+R	62	50.39	1.23	32	82	70.12	1.17	32
Scenario No.2	**2029 AM PEAK FLOWS (Do-Something)**				**2029 PM PEAK FLOWS (Do-Something)**			
Greenhills Rd Nth S+R	236	204.69	1.15	50+	233	272.74	0.86	11
Ballymount Rd Upr L+R	66	32.32	2.04	50+	88	62.65	1.40	50+
Scenario No.3	**2039 AM PEAK FLOWS (Do-Something)**				**2038 PM PEAK FLOWS (Do-Something)**			
Greenhills Rd Nth S+R	231	183.00	1.26	50+	277	281.92	0.98	24
Ballymount Rd Upr L+R	71	10.85	6.5	50+	80	44.50	1.80	50+

Table 13-14: Critical flows, capacities, ratios of flow to capacity and queue lengths for each 15-minute interval during the morning and evening peak hours for each scenario

The above analysis indicates that, with the development in place in 2024, the Greenhills Road / Ballymount Road Upper Priority intersection will operate over capacity, with maximum degree of saturation at 123%.

By 2029, with the proposed development in place, the maximum degree of saturation increases to 204%.

By 2039, the intersection will be significantly over capacity during both peaks.

Therefore, the potential impact of the development at this location will be moderately negative by 2024 with the development in place, rising to severely negative within future design years 2029 and 2039, with and without the development in place, based on the assumptions taken within the traffic assessment report submitted.

With no significant adjacent planned developments taken into consideration, cumulative impacts are identical to the direct impacts detailed immediately above.

13.6.2 Pedestrian Impacts

DIRECT / INDIRECT

There are no likely indirect impacts arising from pedestrian movement as there are no substantial adjacent planned developments close to the subject site being considered.

The Mobility Management Plan for the proposed development assumes a modal split for pedestrians of 6%.

Assuming 2.7 persons per dwelling unit, a population of 1709 No. persons, this will result in 103 No. persons walking to work / college during the morning peak.

Assuming this takes place between 7am and 10am, this translates into an average hourly flow of 34 No. pedestrians per hour, or one pedestrian exiting the development on foot every 1.8 minutes.

Therefore, the potential impact of the development at this location due to pedestrian movement will be imperceptible within every year of analysis with the development in place.

With no significant adjacent planned developments taken into consideration, and no indirect impacts therefore resulting, cumulative impacts are identical to the direct impacts detailed immediately above.

13.6.3 Cycling Impacts

DIRECT / INDIRECT

There are no likely indirect impacts arising from cycling movement as there are no substantial adjacent planned developments close to the subject site being considered.

Figure 13-10 details the facilities planned within the GDA Cycle Network Plan.

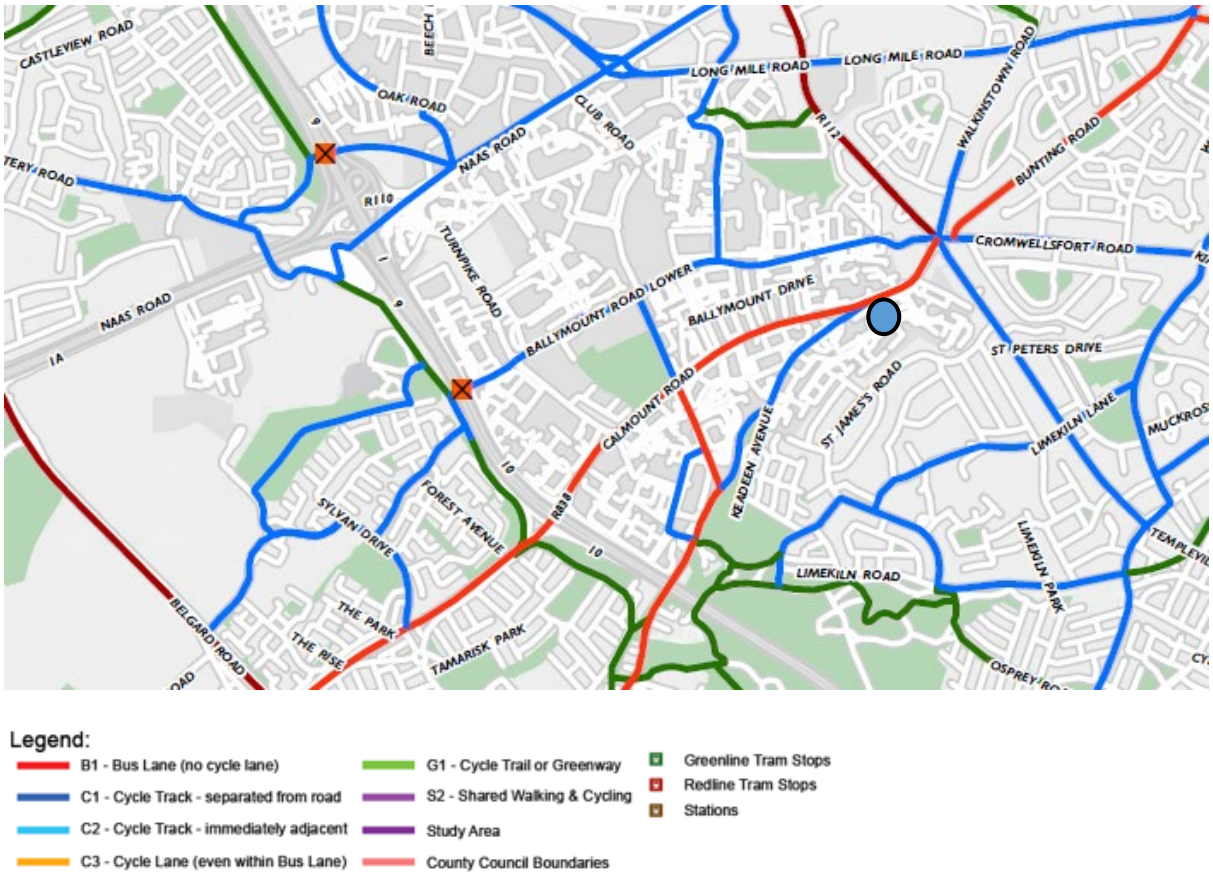


Figure 13-10: Cycle lane improvements detailed within the GDA Cycle Plan

Residents of the proposed development can gain access to the city via the primary route linking Greenhills to the city centre.

The Mobility Management Plan for the proposed development assumes a modal split for cyclists of 15%.

Assuming 2.7 persons per dwelling unit (the average habitation factor for Ireland derived within the analysis of the 2016 Census), a population of 1709 No. persons, this will result in 257 No. persons cycling to work / college during the morning peak.

Assuming this takes place between 7am and 10am, this translates into an average hourly flow of 86 No. cyclists per hour, or 1.4 No. cyclists exiting the development every minute.

Therefore, the potential impact of the development at this location due to cycling movement will be slight within every year of analysis with the development in place.

With no significant adjacent planned developments taken into consideration, and no indirect impacts therefore resulting,cumulative impacts are identical to the direct impacts detailed immediately above.

13.6.4 Public Transport

DIRECT / INDIRECT

There are no likely indirect impacts arising from public transport movement as there are no substantial adjacent planned developments close to the subject site being considered.

Figure 13.11 details the Bus Connects proposals, indicating that the D3 route on the high frequency D spine replacing the existing routes.

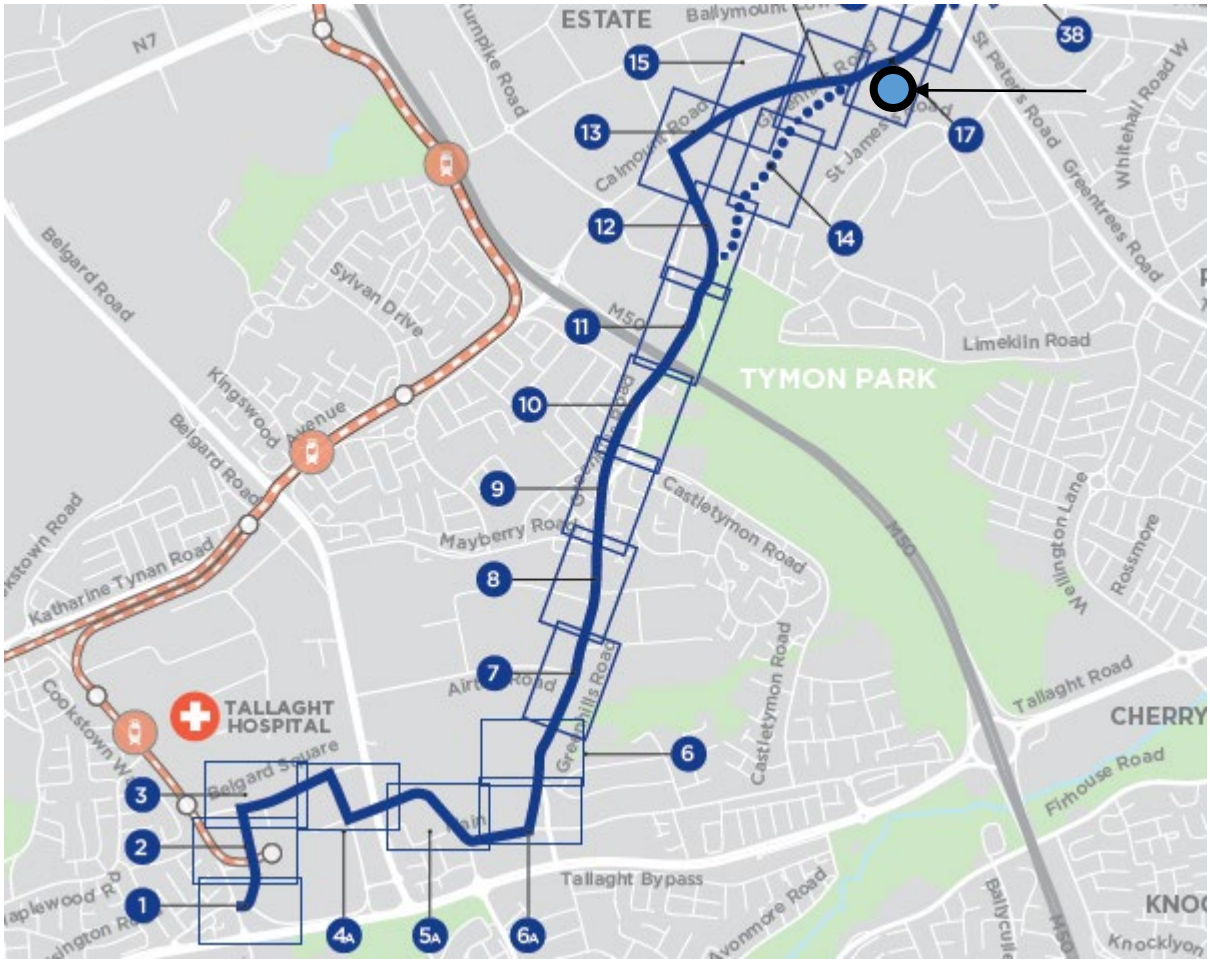


Figure 13-11: Proposed Greenhills to City Centre spine running along Greenhills Road

The Greenhills to City Centre spine would have service every 5 minutes. In the southwest, close to the site of the proposed development, the spine terminates at Crumlin Hospital, at which point it splits into D2 and D3. The D2 spur, scheduled every 15 minutes, proceeds along Greenhills Road, past the site of the proposed development and onwards to Tallaght, similar to current 27 Route. The D3 spur (every 15 minutes) proceeds west, servicing Nangor Road, Clondalkin Village, Bawnogue, and the Grange Castle Business Park.

The Mobility Management Plan for the proposed development assumes a modal split for public transport users of 21%.

Assuming 2.7 persons per dwelling unit, a population of 1709 No. persons, this will result in 359 No. persons travelling to work / college during the morning peak by public transport.

Assuming this takes place between 7am and 10am, this translates into an average hourly flow of 120 No. public transport users per hour, or 2.0 No. public transport users exiting the development every minute.

Therefore, the potential impact of the development at this location due to public transport movement will be slight to moderate within every year of analysis with the development in place.

With no significant adjacent planned developments taken into consideration, and no indirect impacts therefore resulting, cumulative impacts are identical to the direct impacts detailed immediately above.

13.7 Do Nothing

The same format will be utilised as in section 13.6.1, with the 2 No critical junctions assessed for the 'without development' scenarios in 2024, 2029 and 2039.

WALKINSTOWN ROUNDABOUT

Table 13-15 immediately below summarises the critical flows, capacities, RFC's and queue lengths for the morning and evening peaks for each of the 3 No. 'without development' scenarios for the Walkinstown Roundabout junction:

	Flow (PCU/TS)	Cap. (PCU/TS)	RFC (-)	Avg. queue (PCU)	Flow (PCU/TS)	Cap (PCU/TS)	RFC (-)	Avg. queue (PCU)
Scenario No.1	**2024 AM PEAK FLOWS (Do-Nothing)**				**2023 PM PEAK FLOWS (Do-Nothing)**			
Walkinstown Road	183	221.84	0.82	4	195	200.76	0.97	13
Cromwellsfort Road	228	239.25	0.95	12	200	212.06	0.94	9
St. Peters Road	230	221.28	1.04	27	163	211.51	0.77	3
Greenhills Road	154	152.80	1.01	16	193	216.12	0.89	6
Ballymount Road	144	224.67	0.64	2	170	262.71	0.65	2
Walkinstown Avenue	201	263.26	0.76	3	187	244.98	0.76	3
Scenario No. 2	**2029 AM PEAK FLOWS (Do-Nothing)**				**2029 PM PEAK FLOWS (Do-Nothing)**			
Walkinstown Road	199	210.56	0.95	10	212	184.96	1.15	50+
Cromwellsfort Road	248	226.47	1.10	50+	218	208.10	1.05	22
St. Peters Road	249	187.58	1.33	50+	176	200.94	0.88	6
Greenhills Road	167	143.59	1.16	50+	208	204.02	1.02	18
Ballymount Road	155	228.31	0.68	2	183	249.38	0.73	3
Walkinstown Avenue	220	258.40	0.85	5	202	229.99	0.88	6
Scenario No.3	**2039 AM PEAK FLOWS (Do-Nothing)**				**2039 PM PEAK FLOWS (Do-Nothing)**			
Walkinstown Road	212	197.50	1.07	36	226	174.43	1.30	50+
Cromwellsfort Road	264	219.48	1.20	50+	233	209.08	1.11	50+
St. Peters Road	265	184.56	1.44	50+	189	207.43	0.91	7
Greenhills Road	233	189.92	1.23	50+	223	196.97	1.13	39
Ballymount Road	166	232.95	0.71	13	196	242.55	0.81	4
Walkinstown Avenue	233	254.57	0.92	33	215	220.57	0.97	15

Table 13-15: Critical flows, capacities, ratios of flow to capacity and queue lengths for each 15-minute interval during the morning and evening peak hours for each scenario

The above analysis indicates that, in 2024, with network flow increases only allowed for and no development in place, the intersection will operate at or near capacity on some approaches, with maximum degree of saturation at 104% in the morning peak.

By 2029, with network flow increases only allowed for, the intersection will be over capacity during both peaks, with maximum degree of saturation at 133%.

By 2039, with network flow increases only allowed for, the intersection will be over capacity during both peaks, with maximum degree of saturation at 144%.

The 'do-nothing impacts during all three scenarios are very similar to the 'with development' results, demonstrating that the impact of development flows is very low level.

Assuming network flow increases of 21 % from now until the design year for the Proposed Development in 2039 (day-of-opening plus 15), maximum queuing is significant, even without all proposed / planned development in place.

It should again be stated, however, that an increase of 21% in network flows over the 2021 to 2039 period is highly unlikely given the aim of existing transport policies within the Greater Dublin area to minimise use of the private car for the journey to work.

GREENHILLS ROAD / BALLYMOUNT ROAD UPPER

Table 13-16 immediately below summarises the critical flows, capacities, RFC's and queue lengths for the morning and evening peaks for each of the 3 No. 'without development' scenarios for the Greenhills Road / Ballymount Road Upper junction:

	Flow (PCU/TS)	Cap. (PCU/TS)	RFC (-)	Avg. queue (PCU)	Flow (PCU/TS)	Cap. (PCU/TS)	RFC (-)	Avg. queue (PCU)
Scenario No.1	**2024 AM PEAK FLOWS (Do-Nothing)**				**2023 PM PEAK FLOWS (Do-Nothing)**			
Greenhills Rd6 Nth S+R	198	207.81	0.95	16	146	222.69	0.66	4
Ballymount Rd Upr L+R	63	58.5	1.08	17	79	73.89	1.07	17
Scenario No.2	**2029 AM PEAK FLOWS (Do-Nothing)**				**2029 PM PEAK FLOWS (Do-Nothing)**			
Greenhills Rd Nth S+R	201	190.96	1.08	45	176	230.10	0.78	6
Ballymount Rd Upr L+R	64	42.97	1.50	50+	85	66.27	1.28	50+
Scenario No.3	**2039 AM PEAK FLOWS (Do-Nothing)**				**2039 PM PEAK FLOWS (Do-Nothing)**			
Greenhills Rd Nth S+R	234	199.69	1.17	50+	255	253.45	1.01	26
Ballymount Rd Upr L+R	68	27.16	2.50	50+	77	47.90	1.61	50+

Table 13-16: Critical flows, capacities, ratios of flow to capacity and queue lengths for each 15-minute interval during the morning and evening peak hours for each scenario

The above analysis indicates that, by 2024, the Greenhills Road / Ballymount Road Upper Priority intersection, with network flow increases only allowed for and no development in place, the intersection will operate at or just over capacity, with maximum degree of saturation at 108%.

By 2029, with network flow increases only allowed for, the intersection will be over capacity during both peaks, with maximum degree of saturation at 150%.

By 2039, with network flow increases only allowed for, the intersection will be significantly over capacity during both peaks, with the situation worsened with the proposed development in place.

Assuming network flow increases of 21 % from now until the design year for the Proposed Development in 2039 (day-of-opening plus 15), maximum queuing is significant, even without all proposed / planned development in place.

It should again be stated, however, that an increase of 21% in network flows over the 2021 to 2039 period is highly unlikely given the aim of existing transport policies within the Greater Dublin area to minimise use of the private car for the journey to work.

The 'do-nothing impacts during all three scenarios are very similar to the 'with development' results, demonstrating that the impact of development flows is very low level.

Cycling / Public Transport

There is no planned upgrades to the cycle and footpath network, therefore if there is to be no development then the potential impact will be imperceptible with neutral long term effects.

In regard to public transport the planned improvements the Bus Connects project will still happen. Therefore, the potential impact if there was no development is positive with increased carriage capacity and a positive long-term effect.

13.8 Mitigation and Remedial Measures – Construction Phase

To mitigate the environmental impact as a result of the constructions works during the duration of the construction phase, the following mitigation measures will be implemented:

- To reduce the strain on the morning traffic, specifically during the peak traffic flows between 08:00 – 09:00, no HGV's vehicles will be permitted to leave/enter the site during these times. All on site HGV's which have entered the site prior to the peak traffic flows will be escorted to a waiting area be loaded (if applicable) and be ready to leave at 09:00.
- All and any requirements with regards to the construction traffic management made by the local authority will be adhered to.
- Appropriate road signage will be used to ensure the safety of all road users and construction personnel.
- Sufficient on-site car parking spaces will be provided to ensure no impact on the local road network.
- All site offices and compounds will be located within the site boundary.
- All workers and visitors will be informed regarding parking/access arrangements for the site. By making the workers and visitors aware of the access/parking arrangements, an appropriate means of transport can be chosen and no strain on the adjacent local roads imposed as a result of site affiliated visitors/personnel parking.

13.9 Mitigation and Remedial Measures – Operational Phase

The following mitigation measures are proposed for the operational phase of the Proposed Development with reference to the road network:

The proposed development will have a moderate impact with a moderately negative and long-term effect on the Walkinstown Roundabout and Greenhills Road / Ballymount Road Upper junctions, the following mitigation measures have been incorporated into the design to limit the effect.

The above traffic assessment details that both junctions are at present busy and congested during the morning and evening peak hours of travel, and will continue to experience increased congestion going into the future if the required conservative growth estimates are applied to existing surveyed network flow, with estimated total generated traffic from both proposed and planned adjacent development not adding in any significant way to existing and future predicted congestion levels at both critical junctions within this comprehensive traffic analysis.

Given that the critical junctions under analysis are congested, it is appropriate that there is mitigation to minimise car usage by residents and visitors to the Proposed Development. This comprises the limited on-site car parking spaces.

It is proposed within this development to provide car parking space for 66% of the 633 No. apartment units proposed.

The trip generation estimates for this project outlined within this report are conservative and robust as they are based on sites with greater car parking provision than proposed for the Proposed Development.

It is highly likely, therefore, that the actual traffic impact of the proposal will be less than predicted, as the limited car parking provision will require residents to actively seek out alternative modes of travel particularly for their journey to work / college within the morning and evening peak. The significant availability of cycle parking at the development will facilitate this accessing of alternative modes, as will the information on public transport, cycling and walking routes disseminated to residents by the mobility management plan coordinator appointed for the development (see duties of mobility management plan coordinator in accompanying Mobility Management Plan).

Table 13-17 contains the modal splits for car, bus and LUAS travel for the 5 No. Electoral Districts close to the subject site.

Mode	CAR DRIVER (%)	CAR PASSENGER (%)	BUS (%)	LUAS/TRAIN (%)	CYCLING (%)	WALKING (%)	NOT STATED / VAN / HOME (%)
Terenure-St James	56	2	16	1	7	6	12
Tallaght-Kilmanagh	59	3	6	10	4	6	12
Templeogue-Limekiln	58	3	14	1	7	3	14
Terenure-Greentrees	54	3	15	0	10	4	14
Terenure-Cherryfield	54	3	16	1	8	6	14
Weighted Average	56	3	13	3	7	5	13 (3/6/4)

Table 13-17- Modal splits for electoral districts in vicinity of Proposed Development (2016 census – SAPMAP data source)

The above table demonstrates that, for existing residents close to the Proposed Development, 56%, just over half, commute by private car as detailed within the 2016 Census, with 16% commuting by bus or train and 12% cycling or walking.

It is expected that residents at the Proposed Development would undertake a similar pattern of mode usage, thus resulting in reduced traffic impact on the local road network relative to that envisaged within the conservatively-framed traffic assessment, given that greater than 40% of commuters would travel by non-private-car-based modes.

13.10 Residual Impacts

ROAD NETWORK

Provided that the proposed mitigation measures are implemented, the impact of the Proposed Development during the construction stage will be an imperceptible impact of neutral and temporary effect during the construction phase.

There is an increase of road usage by private vehicles in the operational phase, however given the reduced car parking provisions set out in this development, the consequent model shift will result in the mitigation effect traffic flow on the network set out in the above section on traffic impacts.

It can be assumed that the predicted increase in use of public transport and soft modes by residents at the proposed development will result in a moderate impact with negative and long term effects on both critical junctions.

PEDESTRIANS/CYCLISTS

Provided that the proposed mitigation measures are implemented, the impact of the Proposed Development during the construction stage will be of a temporary nature and imperceptible. There will be an increase in pedestrians and cyclists in the surrounding area in the operational stage. This will have a marginally effect on the existing pedestrian and cycle networks. Therefore, the impacts of the development will be neutral, imperceptible and long term.

PUBLIC TRANSPORT

Provided that the proposed mitigation measures are implemented, the impact of the Proposed Development during the construction stage will be of a temporary nature and imperceptible. There will be an increase in public transport usage by site staff, but these will be in the opposite direction to commuting traffic.

Within the operational phase, there will be an increase in public transport usage by residents of the proposed development. Without mitigation, the effect is moderate with a negative long-term effect. The effect of the model shift set out above as a result of reduced car parking facilities, will increase public transport and soft mode usage. Given the increased capacity of the bus system proposed within Bus Connects, that is planned to be in place when the proposed development is fully operational, the public transport system will have capacity to accommodate this model shift and the long-term impact will be moderate with negative.

13.11 Interactions

None

CONSTRUCTION PHASE

Increased traffic flows during construction, notwithstanding the mitigation measures outlined, do have temporary impact in respect of air, noise, biodiversity and human health and these impacts are dealt with in the appropriate chapters of this EIAR.

OPERATIONAL PHASE

Increased traffic flows resulting from the development, notwithstanding the mitigation measures outlined, do have an impact in respect of air, noise, biodiversity and human health and these impacts are dealt with in the appropriate chapters of this EIAR.

13.12 References

- National Roads Authority, Traffic and Transport Assessment Guidelines (2014)
- Transport Infrastructure Ireland, Traffic Appraisal Guidelines (PE-PAG-02017-2), May 2019.
- South Dublin Development Plan (2016 - 2022)
- National Transport Authority, Dublin Area Bus Network Redesign Public Consultation Report, June 2018
- National Transport Authority, Greater Dublin Area Cycle Network Plan, December 2013
- Dublin Bus Website; www.dublinbus.ie
- Irish Rail Website; www.irishrail.ie
- Guidelines on the Information to be contained in Environmental Impact Assessment Report (Draft Aug 2017) – www.epa.ie
- Central Statistics Office – www.cso.ie
- TRL Junction 9 Software

14.0 ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

14.1 Introduction

Cultural Heritage has been defined by UNESCO as "the legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations" (Tangible Cultural Heritage, UNESCO http://www.unesco.org/new/en/cairo/culture/tangible-cultural-heritage). Cultural Heritage is assumed to include all humanly created features on the landscape, including portable artefacts, which might reflect the prehistoric, historic, architectural, engineering and/or social history of the area. Where appropriate, it also includes for non-physical aspects of heritage, such as history, linguistics, folklore, etc.

The Heritage Act (1995) contains a list of various aspects of heritage, including archaeological monuments and objects, architectural heritage, fauna, flora, geology, heritage gardens and parks, heritage objects, inland waterways, landscapes, monuments, seascapes, wildlife habitats, and wrecks.

This chapter discusses the receiving environment from a Cultural Heritage perspective. It provides information with respect to previously identified baseline data and assesses the impact of the proposals on identified sites and areas of Cultural Heritage interest and/or potential.

This chapter has been prepared by Martin Byrne, Byrne Mullins & Associates, who has in excess of 30 years' experience in preparing Archaeological and Cultural Heritage Assessments. Martin Byrne holds a BA (UCC) in Archaeology and History and an MA (UCC) in Archaeology, together with a Diploma in EIA Management (UCD) and was a member of the National Monuments Service Expert Advisory Committee (2009-2010) tasked with reviewing the proposed National Monuments (Consolidated) Act with respect to the area of Monument Protection and to bring forward proposals for associated statutory regulations; he is founding Board Member and former Chairperson of the Institute of Archaeologists of Ireland (IAI) and represented the IAI on the Royal Irish Academy Standing Committee for Archaeology (2014-2018). He is currently a company member of The Discovery Programme – Centre for Irish Archaeological Research, representing the IAI.

14.1.1 Definition of Study Area

The subject development lands (red-line boundary) and an area of 500m surrounding such lands were determined to be the Study Area for Cultural Heritage. The extent of the Cultural Heritage Study Area was chosen to reflect an appropriate context for the development, beyond which it was considered that a development of this nature would have no direct/indirect impacts.

14.2 Research Methodology

The overall Cultural Heritage components of the study comprise the results of a survey and evaluation of sites of archaeological and architectural heritage architectural potential within, and in the immediate environs of, the proposed development area, together with historical research of the subject area and environs. The work consists of the results of a paper survey and site inspection

14.2.1 Paper Survey

As part of a documentary/cartographic search, the following principal sources were examined from which a list of sites and areas of Cultural Heritage interest/potential was compiled:

- Record of Monuments and Places – Co. Dublin (RMP)
- Sites and Monuments Record of the Archaeological Survey of Ireland (SMR) – www.archaeology.ie
- Topographical Files of the National Museum of Ireland
- Annual Archaeological Excavations Bulletin – www.excavations.ie
- Aerial Photographic & Cartographic Archive of the Ordnance Survey of Ireland – www.osi.ie
- National Inventory of Architectural Heritage (NIAH) – www.buildingsofireland.ie
- Placenames Commission – www.logainm.ie
- Documentary and cartographic source material (see Appendix 14.1)
- South Dublin County Development Plan 2016 – 2022
- Draft South Dublin County Development Plan 2022 - 2028
- Heritage Council Heritage Maps – www.heritagemaps.ie
- National Folklore Collection (The School's Collection) – www.duchas.ie

14.2.1.1 Site Inspection

Following completion of the preceding paper survey, a preliminary detailed survey was undertaken in November 2021.

11.2.1.2 Difficulties Encountered

No significant difficulties were encountered with respect to the preparation of the Paper Survey or subsequent Site Inspection Survey.

14.3 Receiving Environment

14.3.1 Local Historical Background

The subject development lands form part of the townland of Greenhills, in the civil parish of Crumlin and barony of Uppercross (6-inch Historic Map: Dublin Sheet 22). The Irish form of the name is *Na Glaschnoic* and is validated by the Placenames Commission (www.logainm.ie).

The name Crumlin occurs frequently in the local nomenclature of Ireland, and in an Irish poem entitled "The Battle of Gabrha" it is mentioned as being the residence in his advanced years of the Fenian hero Ossian. This poem has been published in the Transactions of the Ossianic Society and the editor gives the meaning of the word Crumlin as the "the lake of Crom" (or Crum), who was a pagan deity who received the offerings of the husbandmen for the fruits of the earth. However, it is unclear whether this poem refers to the subject parish area.

Ní Mharcaigh (1997, 246) notes that in the seventh century, the general area had largely been the home of the *Uí Dünchada*, whose family name at the time of the Anglo-Norma invasions was *MacGiolla Mo-Cholmóg* and that an ecclesiastical foundation was established at Kilnamanagh at this time.

The earliest reference to Crumlin is in 1169, at the time of the Anglo-Norman invasions, when William de Harptre possessed the advowson of Crumlin, which he conferred on his clerk, Robert. There appears to have been a church in existence at Crumlin by this time, as one of the privileges granted was permission to appropriate sixteen acres most convenient to the church. In 1193, this church was given by King John (then Prince of Morton) to form a prebend in the collegiate church of St. Patrick and in 1215 was transferred to the economy of St. Patrick's Cathedral.

Before the close of King John's reign the lands at Crumlin had been constituted as a royal manor. Ball (1905, 136) notes that the system of tenure of this manor was different from other manors, as the tenants themselves took the place of a middleman and held the demesne lands in addition to their own farms.

Early in the thirteenth century, at a time that the populace of Crumlin were largely Anglo-Norman settlers, steps were taken by the Crown to erect a castle at Crumlin for the protection of the inhabitants, who had

been subjected to attacks by Irish raiders from the Wicklow Hills. Towards the end of the thirteenth century, Edward I decided to leave the manor of Crumlin to Henry de Compton, a lessee of the profits of the manor courts of Saggart and Newcastle Lyons, and who had rendered valuable service to the Crown in the Irish Chancery. However, due to considerable opposition to this act, the King considered it more prudent to leave the manor in the possession of 'his poor men of Crumlin'. The principal families of Crumlin at this time were 'Le Crumlin', Le Reves', Russell and 'Le Monte and the area was known as Crum or Trum.

The O'Tooles, following a raid on Tallaght in 1331, ambushed a number of prominent residents of Crumlin who were not sheltering in the castle at the time. As a consequence of this, and other similar raids, the King granted to populace 122 acres of land on the condition that within ten years, at their own expense, they enclosed the town against attack. However, no evidence of this enclosure remains and it is possible that it was never constructed.

During the fourteenth and fifteenth centuries the Abbey of St. Thomas, the Priory of the Holy Trinity and the Guild of St Anne in St. Audeon's Church all appear as owners of property in Crumlin, and amongst the local families there occur the names of Stephens, Whitbred, Gillane, Stafford, Hay, Arthur and Says. During the latter part of the fifteenth century an important local person is mentioned as Robert Walsh, who is styled as 'parish clerk', and an important landowner in the area was Joan Drywer.

The fees paid to several Government officials in the sixteenth century were drawn from the taxes of the manor of Crumlin, and at the end of the century it appears that the greater portion of the lands continued to be held under the Crown by small farmers. In addition to the Religious Houses mentioned above, the Convent of St. Mary de Hogges, the Cathedral of St. Patrick and the Abbot of St. Marys also held lands in Crumlin prior to the dissolution of 1547 under Henry VIII. Their holdings were afterwards known under various names, including Cromwell's Land, Mustocke's Land, Giffards Grove and Kevin's farm. At the time of his attainder, Gerald, ninth Earl of Kildare, was in possession of some lands at Crumlin which were forfeited to the Crown and we subsequently find Chief Baron Bathe and his descendants and the families of Sutton and Talbot holding these as well as the former monastic lands, under the Crown. At this time there were several stone houses in or near the village of Crumlin. These were plundered and burned in December 1594 by the Irish under the command of Gerald Fitzgerald, the assailants escaping 'without wounded or bloodshed', but having taken lead from the roof of the church to melt down for bullets. The village was subsequently rebuilt before it was again destroyed in 1559 by another raid, this time under the command of Fiach MacHugh O'Byrne of Glenmalure.

At the end of the sixteenth century the Purcell family, who were resident near the village until the nineteenth century, are first mentioned as resident at Crumlin; and in 1609 Edmund Purcell was leased land then belonging to the church. However, at this time the most important resident was Sir Patrick Fox, sometime Clerk of the Council, who, in the early seventeenth century, acquired much property in Crumlin and occupied what was later the manor house.

A branch of the Ussher family had also settled at Crumlin during the reign of James I – Robert Ussher, who was then engaged in the wine trade was living there. His son, Robert the younger, was granted in 1646 licence to hold two fairs annually at Crumlin, and a few years later his children, Airlander and Mary, were recorded as living there. During the Cromwellian Commonwealth period, the manor house and lands, which had been forfeited by the Fox family, and other lands were granted to Capt. John Blackwell, although other notable families appear not to have been disturbed. The censuses of 1641 and 1670 record that the lands at Greenhills, though not named, totalled 135 plantation acres owned by John Brice; at this time the parish of Crumlin formed part of the barony of Newcastle and Uppercross (www.downsurvey.tcd.ie). The lands at Crumlin are indicated in maps of 1656-8 and 1670 (Figures 14.1 and 14.2 below), the latter of which indicates a land division to Kilnamanagh.

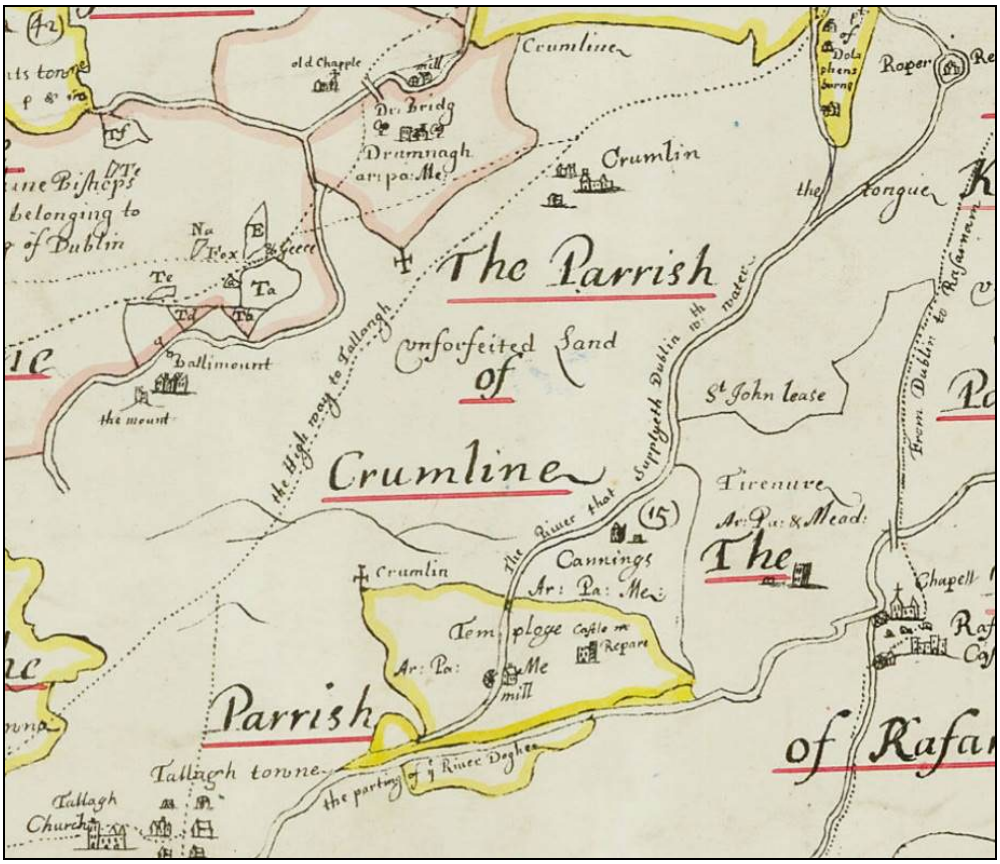


Figure 14.1 Extact from Civil Survey Map of 1656-8

Figure 14.2 Extact from 1670 Map

The greater portion of lands, in the latter half of the seventeenth century, came into the possession of Major Joseph Deane, who was also an owner of Terenure at this time. He was also the MP for Inistioge,

Co. Kilkenny at this time and, presumably led the manor house and former lands of the Fox family. Immediately after the Battle of the Boyne (1690), King William and his army camped at Crumlin for two days before proceeding to Castlemartin (Kilcullen, Co. Kildare) and thence to the south of the country. In 1699 Major Deane was succeeded at Crumlin by his godson, the Right Hon. Joseph Deane, Chief Baron of the Exchequer, who built a red brick house in the village (Crumlin House) as his country residence. After his death in 1715, the house was offered for sale but was not initially sold; consequently it was occupied for a time by the Baron's representative, Richard Allen.

Roque's map of 1760 indicates lands at Green Hills (Figure 14.3) and it is again mentions by Rutty in 1772. Ball (1906, 144) notes that in the middle of the eighteenth century a French visitor mentions that the neighbourhood of Crumlin was well inhabited by farmers and labourers and that the area of Green Hills had 'formerly been a great resort of highwaymen who took the lives as well as the property of their victims'. Horse racing took place in the Common of Crumlin at around this time before being outlawed in the 1790s. In a contemporary guide to Dublin, reference is made to the 'great traffic to Blessington and Baltinglass' which passed through the village and it is stated that the village was no longer as fashionable as it had been.

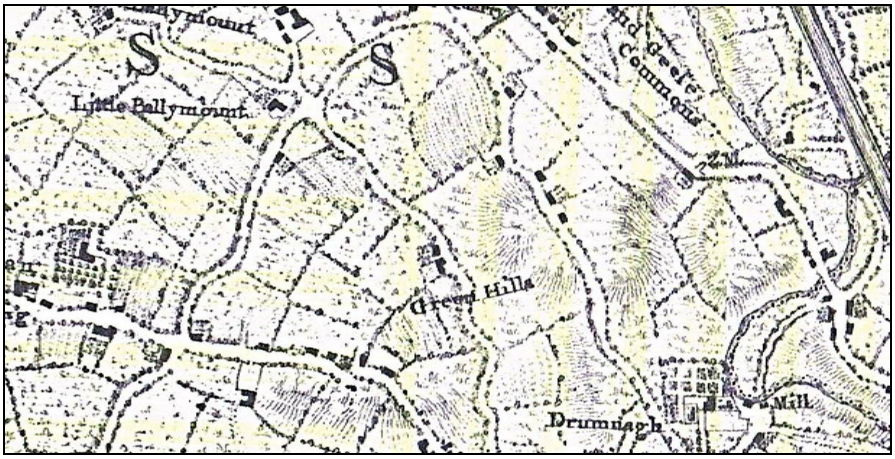


Figure 14.3 Extact from Rocque – 1760

Lewis (1837, 44) notes that the parish of Crumlin contained 958 inhabitants at that time, "of which number, 544 are in the village, which consists of 115 houses". The Ordnance Survey Map of this time (Figure 14.4) indicates that the western site boundary serves as a townland boundary between Greenhills and Kilnamanagh, with the northern boundary formed by the road to Tallaght; the existing eastern and southern boundaries had not been formed by this time, with the site forming part of an overall landholding that extended further to the south and east. A number of structures are indicated in the north-eastern quadrant, with a garden plot, bounded by trees, to the west and a pump feature to the east; this complex appears to be accessed directly from the road. A gravel pit is indicated in the western area of the site round hillock is located immediately outside the eastern boundary; some internal land divisions are also indicated.

D'Alton (1838, 704) states that a "great part of the road from Drymnagh to Green Hills is over a portion of palpable 'esker' or elevated mound"; he further states that the 'village of Green Hills' is an "assemblage of neat cottages, surrounded by hilly pastures, that are let for about £5 per acre. These swells have pits of sand, or rather marle, abounding with limestone gravel, but are finely coated with verdure, and present many pretty situations for inland villas and summer residences".

Ua Broin (1942, 110) notes that Fox's Hill was the name of a remarkable esker of 300 feet elevation in the townland of Greenhills. The road to Tallaght climbed along its northern shoulder; much of the hill was subsequently removed, after which it comprised a low-lying area on the southern side of the road; in addition, in the early-mid-nineteenth century the road to Tallaght was subject to a toll payment, being part of the Dublin – Carlow Turnpike Road, which was abolished in 1855.

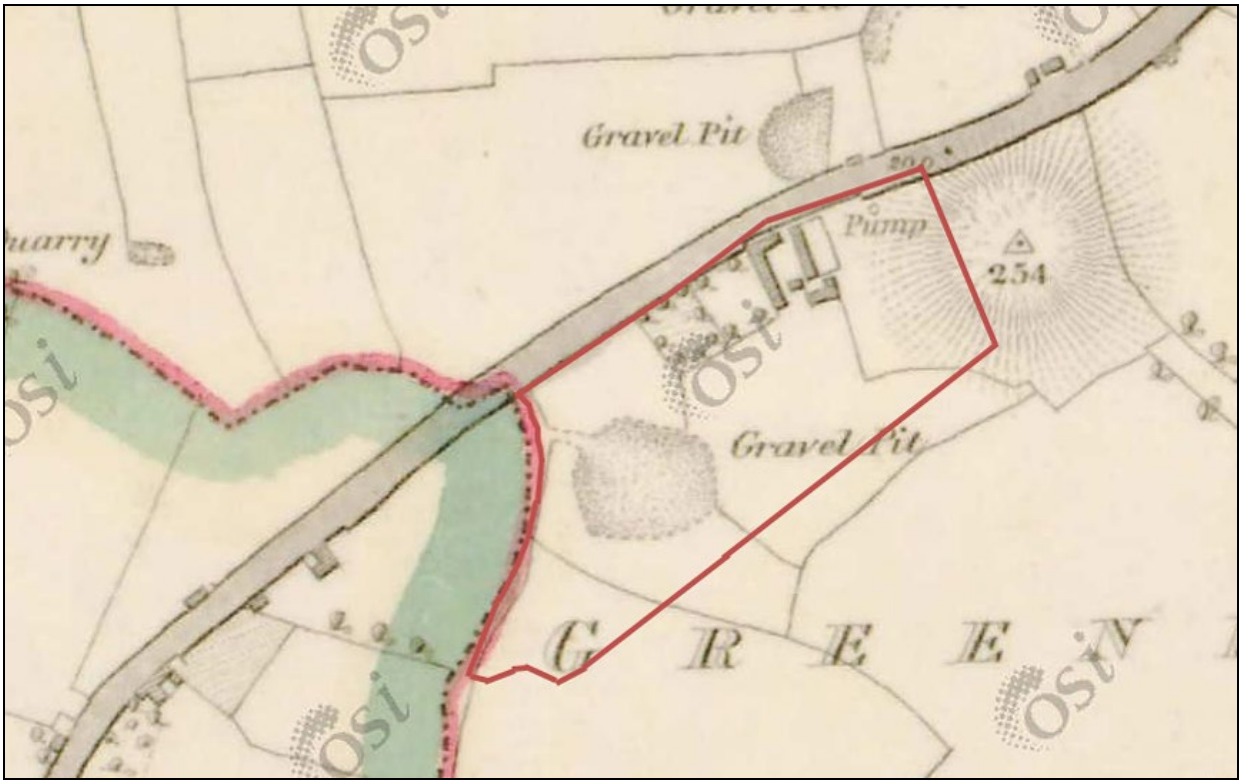


Figure 14.4 Extact from Ordnance Survey 6-inch Map of 1837

Griffiths Primary Valuation for Ireland was published in 1853 for County Dublin and notes that the extent of the subject lands formed part of two larger properties; one was owned by Sit Robert Shaw, which comprised lands of approximately 68 acres while the other was owned by Michael Keogh, extending over approximately 56 acres and containing houses and office (outbuildings; both properties were leased by Thomas Fox.

Healy (2004, 39) notes that the Greenhills Road was previously routed along a series of sand hills which were quarried away in the later nineteenth century, and by the end of the century the only section of original ground was a ridge along which the road then passed across. This is indicated in the Ordnance Survey Map of 1907 below (Figure 14.5), which illustrates that almost the entire extent of the subject site had been quarried.

Similarly, the Ordnance Survey 6-inch map of 1936 (Figure 14.6) indicates the site as comprising part of a larger quarry pit, with a trackway routed through the south-eastern area.

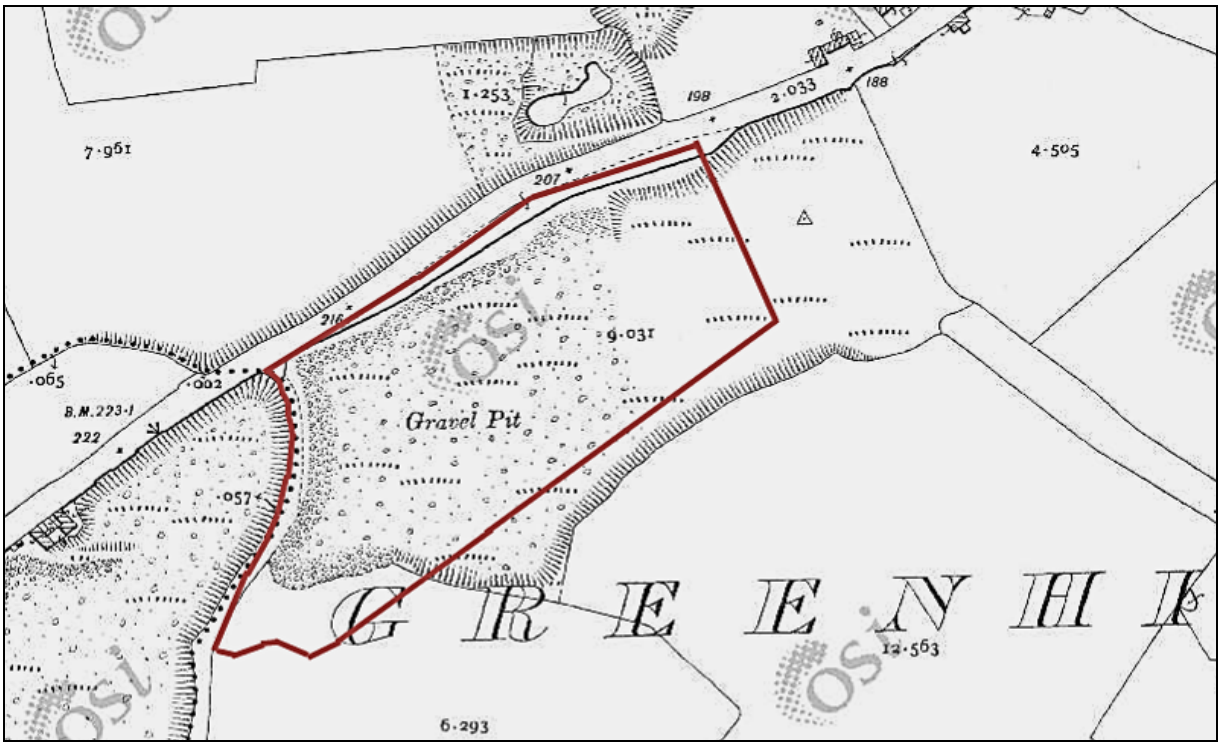


Figure 14.5 Extact from Ordnanace Survey 25-inch Map of 1907

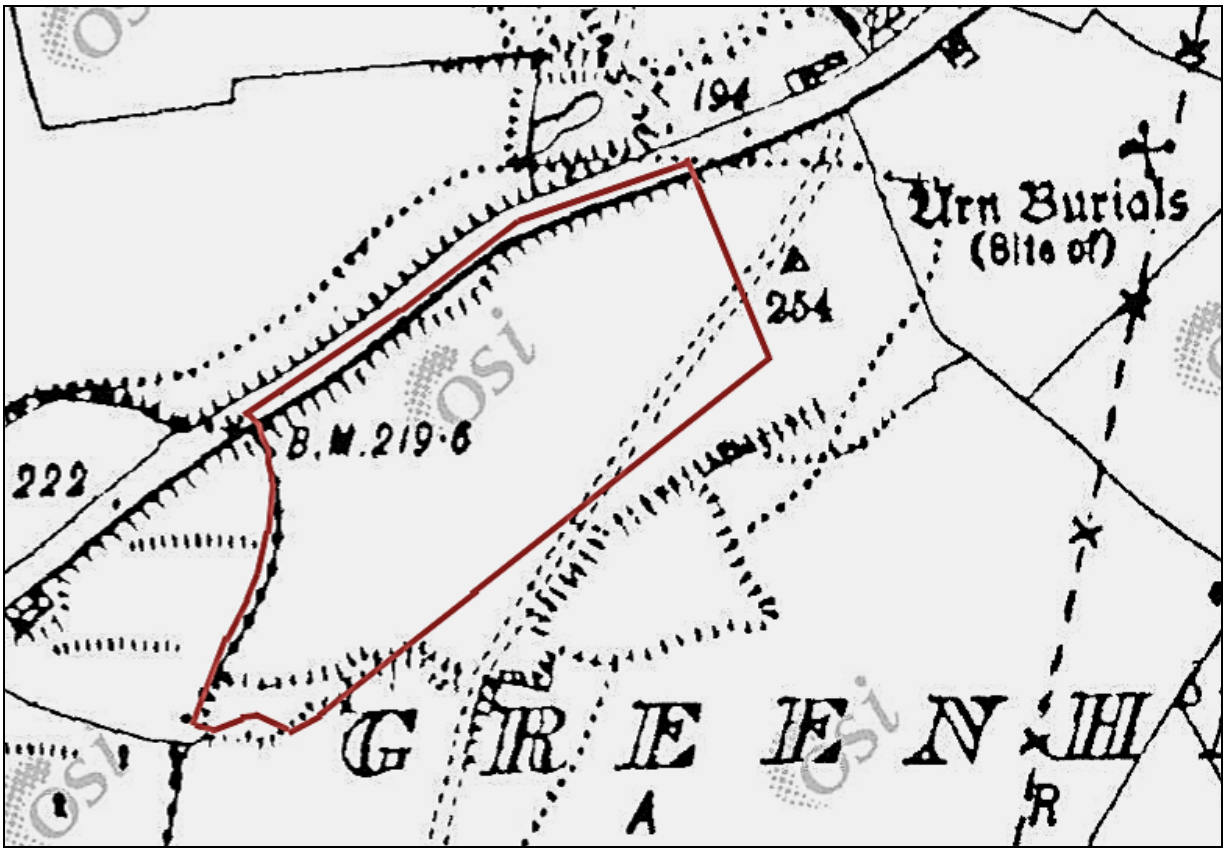


Figure 14.6 Extact from Ordnanace Survey 6-inch Map of 1936

Parts of the parish of Crumlin were incorporated into tDublin County Borough in 1941. Residential estates were constructed in the general area from the late 1930's into the 1940s and in the early 1950s, at which time new road infrastructure, including the nearby Walkinstown Roundabout, was constructed. In subsequent years, a number of industrial and commercial facilities were constructed in the area; Greenhills Industrial Estate was initially developed in the early 1960s, with further expansion withn the existing site in the 1970s and thereafter (Figire 14.7).

The site was the subject of a Valuation Tribunal in 1994 in which it was described as containing offices, flat-roofed offices, obsolete storage buildings, a former vehicles garage, paint manufacturing buildings and various storage sheds.

Figure 14.7 Areial View of Site and Immediate Environs – from south

14.3.2 Archaeological Heritage

14.3.2.1 Introduction

Archaeology is the study of past societies through their material remains and the landscapes they lived in. 'Archaeological Heritage consists of such material remains (whether in the form of sites and monuments or artefacts in the sense of moveable objects) and environmental evidence' (DAHGI, 1999, 9).

Archaeological heritage comprises all material remains of past societies, with the potential to enhance our understanding of such societies. It includes the remains of features such as settlements, burials, ships and boats and portable objects of all kinds, from the everyday to the very special. It also includes evidence of the environment in which those societies lived. The terms "site" or "monument" are used generally to refer to fixed structures or areas of activity, as opposed to particular moveable objects. Historic wrecks are also part of the archaeological heritage (DHLG&H, 2021, 3).

14.3.2.2 Statutory Protections

The statutory and administrative framework of development control in zone of archaeological potential or in proximity to recorded monuments has two main elements:

(a) Archaeological preservation and licensing under the National Monuments Acts and
(b) Development plans and planning applications under the Planning Acts

A. National Monuments Acts 1930-2004
Section 12 (1) of the National Monuments (Amendment) Act, 1994 provides that the Minister for the Environment, Heritage and Local Government shall establish and maintain a record of monuments and places where the Minister believes there are monuments, such record to be comprised of a list of monuments and relevant places and a map or maps showing each monument and relevant place in respect to each county of the State. This is referred to as the 'Record of Monuments and Places' (RMP), and monuments entered into it are referred to as 'Recorded Monuments'.

Section 12(3) of the National Monuments (Amendment) Act 1994 provides for the protection of monuments and places in the record, stating that
"When the owner or occupier (not being the Minister) of a monument or place which has been recorded under subsection (1) of this section or any person proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Minister and shall not, except in the case of urgent necessity and with the consent of the Minister, commence work for a period of two months after having given the notice".

B. South Dublin County Development Plan 2026 - 2022
The following relevant Archaeological Heritage Policies and Objectives are contained in Section 9.1.1 of the Plan:

HCL Policy 2	It is the policy of the Council to manage development in a manner that protects and conserves the Archaeological Heritage of the County and avoids adverse impacts on sites, monuments, features or objects of significant historical or archaeological interest.
HCL Objective 1	To favour the preservation in-situ of all sites, monuments and features of significant historical or archaeological interest in accordance with the recommendations of the Framework and Principles for the Protection of Archaeological Heritage, DAHGI (1999), or any superseding national policy document.
HCL Objective 2	To ensure that development is designed to avoid impacting on archaeological heritage that is of significant interest including previously unknown sites, features and objects.
HCL Objective 3	To protect and enhance sites listed in the Record of Monuments and Places and ensure that development in the vicinity of a Recorded Monument or Area of Archaeological Potential does not detract from the setting of the site, monument, feature or object and is sited and designed appropriately.

14.3.2.2 Archaeological Inventory

There are no previously identified monuments of archaeological interest or features of archaeological potential interest located within the extent of the subject site; no features of interest were noted by documentary, cartographic or aerial photographic research or by the detailed site inspection survey.

There are two previously recorded monuments located within the wider Cultural Heritage Study Area, as illustrated in Figure 14.8. These are described as follows:

SITE CH-1 is the former site of a prehistoric Flat Cemetery (SMR Ref: DU022-002; Greenhills Td), first uncovered in 1892 during the quarrying of a sand and gravel ridge (NMI Reg: 1892:48; Figure 14.6 above). The remains comprised a burial with a bowl food vessel and an uncontexted vase food vessel. In 1898 there were further discoveries of two cists with two pit burials and two other possible pit burials (Plunkett 1898-190, 388). One contained an urn, the other a food vessel/urn (Waddell 1970, 116; 1990, 83). The remains were located approximately 195m from the eastern extent of the subject site, which is positioned approximately 115m outside the associated Zone of Archaeological Potential (Figure 14.8). The area of the former cemetery is now developed and forms part of the Mulcahy Keane Industrial Estate.

SITE CH-2 is a Holy Well (SMR Ref: DU011-001; Walkinstown Td) formerly situated in a Green off

Walkinstown Crescent, approximately 350m to the north of the northern extent of the subject site. It was known as 'Toberacreena' and was regarded as a holy well. The water was thought to cure eye troubles. In former times a bush, with rags attached, had overhung the well (Ua Broin 1942, 109-110). There are no visible remains above ground.

Figure 14.8 Locations of Archaeological Monuments within Defined Studay Area

13.3.2.3 Previously Discovered Artefacts

Aside with the remains and artefacts uncovered with respect to Site Ch-1 above, there are no reported 'stray finds' listed in the Topographical Registers of the National Museum of Ireland, as having been discovered from the site or wider Cultural Heritage Study Area.

11.3.2.4 Results of Previous Relevant Archaeological Investigations

A search undertaken of the annual Archaeological Excavations Bulletin (www.excavations.ie) indicates that no previous archaeological investigations have been undertaken within the subject site; one investigation is recorded for the wider Cultural Heritage Area, as follows:

Greenhills, Co. Dublin (Excavations.ie Ref: 2022:243)
Thaddeus Breen, Marion Sutton & Grace Fegan, Shanarc Archaeology Ltd – Licence No: 20E0622
Archaeological monitoring took place of Stage 1 detailed ground investigations relating to the National Transport Authority's Bus Connects Infrastructure Dublin project; the areas included Route 09: Greenhills to City Centre. Nothing of archaeological interest was uncovered.

14.3.3 Architectural Heritage

14.3.3.1 Introduction

Architectural heritage has several definitions and meanings for people. A useful rule of thumb (which is actually the legal situation) is set out in the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 which provides the following definition:

a) Structures and buildings together with their settings and attendant grounds, fixtures and fittings,
b) Groups of such structures and buildings, and
c) Sites, which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest

14.3.2 Record of Protected Structures (South County Development Plan 2016 – 2022)

Section 51 of the Planning and Development Act, 2000 (as amended) requires the Development Plan to include a record of structures. These structures form part of the architectural heritage of the County and are to be protected.

South Dublin County Council has drawn up this list, referred to as the Record of Protected Structures (RPS), in which each structure is given a reference number and is a constituent part of the County Development Plan.

There are no structures listed in the Record of Protected Structures (RPS) of the Development Plan as being located within the extent of the subject site or wider Cultural Heritage Study Area.

14.3.3 National Inventory of Architectural Heritage (NIAH)

The National Inventory of Architectural Heritage (NIAH) is a state initiative under the administration of the Department of Culture, Heritage and the Gaeltacht. It was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. Its purpose is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. It is intended that the NIAH will provide the basis for the recommendations of the Minister for Housing, Local Government and Heritage to the planning authorities. The NIAH includes structures and garden features but does not confer any statutory protections on such buildings or garden features.

There are no structures of Architectural Heritage interest listed by the NIAH as being located within the extent of the subject site or wider Cultural Heritage Study Area**.**

14.4 Characteristics of the Proposed Development

The development proposes the following:

> *(i) The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3 m – 9.9 m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;*
>
> *(ii) the construction of a mixed-use Build-to-Rent residential and commercial development comprising 633 no. build-to-rent apartment units (292 no. one-beds, 280 no. two-beds and 61 no. three-beds), 1 no. childcare facility and 10 no. commercial units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:*
>
> *(a) Block A comprises 209 no. apartments (102 no. 1 bed-units, 106 no. 2 bed-units and 1 no. 3-bed units) measuring 5 - 10 storeys in height. (b) Block B comprises 121 no.*

apartments (53 no. 1 bed-units, 45 no. 2 bed-units and 23 no. 3 bed-units) measuring 8 - 10 storeys in height. (c) Block C comprises 130 no. apartments (38 no. 1-bed units, 71 no. 2-bed units and 21 no. 3-bed units) measuring 8 - 12 storeys in height. (d) Block D comprises 173 no. apartments (99 no. 1 bed-units, 58 no. 2 bed-units and 16 no. 3 bed-units) measuring 6 - 10 storeys in height. All apartments will be provided with private balconies/terraces;

(iii) provision of indoor communal residential amenity/management facilities including a co-working space, communal meeting room/ work space, foyer, toilets at ground floor of Block A; gym, changing rooms, toilets, resident's lounge, studio, laundry room, communal meeting room/ work space, multi-function space with kitchen at ground floor of Block B; games room with kitchenette, media room, co-working space, resident's lounge, communal meeting room/ work space, reception area, management office with ancillary staff room and toilets, toilets, parcel room at ground floor of Block C;

(iv) the construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block A;

(v) the construction of 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C as follows: Block A has 3 no. units at ground floor comprising 79.46 sq.m., 90.23 sq.m., and 121.39 sq.m., Block B has 1 no. unit at ground floor comprising 127.03 sq.m., Block C has two units at second floor comprising 120.85 sq.m. and 125.45 sq.m., and Block D has 4 no. units at ground floor comprising 84.45 sq.m., 149.77 sq.m., 155.48 sq.m. and 275.59 sq.m.;

(vi) the construction of 3 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 2 no. secondary entrances from the south for emergency access and services (access from existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

(vii) provision of 424 no. car parking spaces comprising 398 no. standard spaces, 21 no. mobility spaces and 5 no. car club spaces located at ground floor level car park located within Block A and accessed via the proposed entrance at Greenhills Road, a two-storey car park located within Blocks C and D also accessed from the proposed entrance at Greenhills Road and on-street parking at ground floor level adjacent to Blocks A and C. Provision of an additional 15 no. commercial/ unloading/ drop-off on-street parking spaces at ground floor level (providing for an overall total of 439 car parking spaces). Provision of 4 no. dedicated motorcycle spaces at ground floor level parking area within Blocks C and D;

(viii) provision of 1363 no. bicycle parking spaces comprising 1035 no. residents' bicycle spaces, 5 no. accessible bicycle spaces and 7 no. cargo bicycle spaces in 9 no. bicycle storerooms in ground and first floor parking areas within Blocks A, C and D, and 316 no. visitors' bicycle spaces located externally at ground floor level throughout the development;

(ix) provision of outdoor communal amenity space (5,020 sq.m.) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting, and scented gardens located on podiums at first and second floor levels; provision of a communal amenity roof garden in Block C with seating area and planting (176 sq.m.); and inclusion of centrally located public open space (3,380 sq.m.) adjacent to Blocks B and C comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space; and incidental open space/public realm;

(x) development also includes landscaping and infrastructural works, foul and surface

water drainage, bin storage, ESB substations, plant rooms, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development.

This application is accompanied by an Environmental Impact Assessment Report (EIAR).

A ground floor layout of the development, as proposed, is illustrated in Figure 14.9.

Figure 14.9 Proposed Ground Floor Layout

14.5 Potential Impact of the Proposed Development

14.5.1 Construction Phase

14.5.1.1 Local History

The general historical background to the subject development area was introduced above in Section 14.3.1. In summary, there are no significant historical events associated with the proposed development lands which have the ability to be impacted upon by the proposed development. Much of the western boundary is formed by a townland boundary, currently defined by a concrete wall, which will be retained

as part of the development proposals. Consequently, it is considered that any potential impacts that might occur with respect to Historical Heritage during the proposed construction phase of the development are of unlikely probability, of neutral quality and of imperceptible significance.

14.5.1.2 Archaeological Heritage

There are no previously identified monuments or features of archaeological interest located within the subject development lands; two recorded monuments have been identified within the wider Cultural Heritage Study Area. A former prehistoric flat cemetery (SITE CH-1) was discovered in the nineteenth century to the east of the eastern extent of the subject lands; this site has new been removed and developed; the eastern site boundary is located approximately 115m outside the associated Zone of Archaeological Potential – Figure 14.8 above. A former holy well (SITE CH-3) is located approximately 350m to the norther of the northern site boundary.

As noted above in Section 13.3.1, the site has been the subject of sand and gravel quarrying since the early nineteenth century, resulting in significant disturbance and ground reductions within the extent of the site, as illustrated in Figures 14.5 and 14.6 above; it is not deemed likely that any previously unrecorded subsurface archaeological features might be positioned within the subject site.

Consequently given the above, it is considered that the development, as proposed, will not cause any direct impacts to any previously recorded archaeological monuments and that there are no potential for the discovery of any subsurface remains of archaeological interest within the site at construction phase, resulting in an impact (effect) of unlikely probability, of neutral quality and of imperceptible significance.

14.5.1.3 Architectural Heritage

As noted above in Sections 14.3.3.1 and 14.3.3.2, there are no structures of architectural interest located within the subject site or wider Cultural Heritage Study Area. Consequently, it is not envisaged that the development, as proposed, will cause any direct impacts to structures of architectural heritage interest during the construction phase of the project, resulting in an impact (effect) of unlikely probability, of neutral quality and of imperceptible significance

14.5.2 Operational Phase

There are no extant monuments or structures of historical, archaeological or architectural heritage interest located within the defined Cultural Heritage Study Area. Consequently, the overall proposed development will not impact on the views or setting of any monuments or structures of Cultural Heritage interest, resulting in an impact (effect) of unlikely probability, of neutral quality and of imperceptible significance

14.6 Do-Nothing Approach

If the development does not proceed the site will remain in its current condition.

14.7 Remedial or Reduction Measures: Mitigation

14.7.1 Construction Phase

As noted above in Sections 14.5.1.1, 14.5.1.2 and 14.5.1.3, the impacts (effects) of the proposed development, at construction stage, with respect to any archaeological monuments or structures of historical, archaeological or architectural heritage interest is considered to be of unlikely probability, of neutral quality and of imperceptible significance; in addition given the developmental history of the site, it is not deemed likely that any previously unrecorded subsurface archaeological features might be positioned within the subject site. Consequently, no mitigation measures are deemed necessary.

14.7.2 Operational Phase

As noted above in Section 14.5.2, there are no extant monuments or structures of historical, archaeological or architectural heritage interest located within the defined Cultural Heritage Study Area. It is considered that the overall proposed development will not impact on the views or setting of any monuments or structures of Cultural Heritage interest, resulting in an effect of unlikely probability, of neutral quality and of imperceptible significance; consequently, no mitigation measures are deemed necessary.

14.8 Predicted Impact of the Proposal

There are no predicted impacts in terms of the overall Cultural Heritage of the site and immediate environs.

14.9 Cumulative Impact

The proposed development has been considered in terms of other permitted and existing developments within the defined study area. It is not envisaged that any negative cumulative effects will occur with respect to Cultural Heritage Assets as a results of the project proceeding as proposed.

14.10 Monitoring

No monitoring measures are required.

14.11 Reinstatement

No reinstatement measures are required.

APPENDIX 14
Consulted Documentary Sources

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CHAPTER 15.0 LANDSCAPE AND VISUAL IMPACT

15.1 Introduction

15.1.1 Scope

This chapter assesses the townscape / landscape and visual impacts associated with the proposed mixed use development including 633 no. build-to-rent apartment units, 10 no. commercial/retal units, residential amenity/management facilities, creation of new public open spaces including plazas, public realm and enhanced streetscape (hereafter referred to as the proposed development) on 2.79 hectares / 6.89 acres of land (the Application Site) at the Chadwick's Site on Greenhills Road in Walkinstown, Dublin 12 (the "**Application Site**"). A detailed description of the proposed development can be found in Chapter 2 of the EIAR with a description of developments permitted in the surrounding area set out in the Cumulative projects Section 1.9 of Chapter 1 and in Section 3.3 of Chapter 3.

15.1.2 Statement of Authority

The Townscape and Visual Impact Assessment ("**TVIA**") has been prepared by Park Hood Chartered Landscape Architects on behalf of Steelplefield Limited. Park Hood is a Member of the Irish Landscape Institute and Landscape Institute UK with extensive experience in preparation of Landscape / Townscape and Visual Impact Assessments for large scale projects throughout Ireland and the UK.

The primary author is Andrew Bunbury BA DipLA CMLI. Director at Park Hood, who is a fully qualified Landscape Architect and Chartered Member of the Landscape Institute with over 25 years' consultancy experience in the profession across Ireland and the UK. He works between the Dublin, London and Belfast offices of Park Hood where there are 23 members of staff including a further ten Chartered Landscape Architects.

All work is undertaken in compliance with the *Landscape Institute's Code of Standards of Conduct and Practice for Landscape Professionals* and checked in accordance with Park Hood's ISO 14001:2015 and ISO 9001:2015.

15.1.3 Supporting Documents and Appendices

This Chapter is supported with Appendices as follows:-

- Appendix 15A: Generic TVIA Terminology
- Appendix 15B: Visualisations and Photomontages (3D Design Bureau)

The proposed development and mitigation section should also be read in conjunction with Drawing Nos. 7013 L2000, 2001, 2002 and 2003 and the accompanying Landscape Design Statement that set out the proposed landscape works associated with this proposal.

15.2 Research Methodology

15.2.1 Guidance

The overall approach and methodology undertaken within this TVIA are based on the *Guidelines for Landscape and Visual Impact Assessment (3rd Edition)* by *The Landscape Institute and the Institute of Environmental Assessment (2013)* (GLVIA) and the *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018),* published by the *Department of Housing, Planning and Local Government*.

There are a number of published guidance and reference documents including Development Plans, which include planning designations relevant to the Study Area as listed below:-

- *The National Planning Framework (NPF) - IRELAND 2040;* Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute
- *South Dublin County Council Development Plan 2016-2022;*
- Draft Dublin City Development Plan 2022-2018
- *Urban design manual - a best practice guide by the Department of Environment, Heritage and Local Government (2009);*
- *National Landscape Strategy 2015–2025;*
- *Sustainable Residential Development in Urban Areas and the accompanying Urban Design Manual: A Best Practice Guide (2009);*
- *Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute; and*
- *Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals (2019)*

Other sources of information include:

- *Landscape Character Assessment of South Dublin County Draft Report May 2015 by Minogue and Associates on behalf of South Dublin County Council;*
- *National Inventory of Architectural Heritage http://www.buildingsofireland.ie;*
- *www.myplan.ie;*
- *National Parks and Wildlife Service (NPWS) and Environmental Protection Agency - https://gis.epa.ie/EPAMaps*
- *https://www.heritagecouncil.ie*
- *https://walkinstownresidents.weebly.com*
- *Dublin City Biodiversity Action Plan 2015-2020; and*
- *All Ireland Pollinator Plan 2021-2025*

The baseline assessment included study of Ordinance Survey Ireland historical and recent mapping to assess how this part of Dublin has developed since the 19th century as well as assess approximate calculations of relevant distances or areas.

15.2.2 Summary of TVIA Objectives and Key Tasks

The objective of the TVIA is to evaluate the likely significance of townscape / landscape character and visual amenity effects to the Application Site and study area to assist the determining authority in considering the acceptability of this proposal. It is based on the interpretation of the physical and aesthetic characteristics following criteria and terminology partially drawn from *Principles and Overview of Processes (Chapter 3)* within the GLVIA. The Generic TVIA Terminology is contained within Appendix 15A. The TVIA focuses on key effects and issues as follows:

- The effect of the proposed development upon the townscape / landscape resource;
- The effect of the proposed development on the perception of the townscape; and
- The effects arising from the proposed development on visual amenity.

The TVIA methodology can be summarised as undertaking the following key tasks:-

- Site Visits between February and September 2021;
- Assessing the baseline Landscape / Townscape Setting and Conditions;
- Evaluation of key components of the proposed development based on site layouts, plans and elevations prepared by C+W O'Brien Architects and other members of the design team;
- Assessment of Townscape and Landscape Effects;

- Assessment of Visual Effects;
- Description of Mitigation and Enhancement Measures; and
- Summary of Significance of Townscape and Visual Amenity Effects.

15.2.3 Definition of Townscape / Landscape and Visual Effects

For the purpose of this assessment, this chapter adopts the definition of landscape presented in the European Landscape Convention and as such, the term 'landscape' refers equally to areas of rural countryside and urban – built up –areas (typically historically referred to as 'townscape'). The definition of landscape is:-

"An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors."

The assessment process helps identify the effects of the proposed development on views and on the associated townscape and landscapes. The effects can be quite different and are assessed separately; although the process is similar and effects ultimately arise as a result of combined impacts upon the townscape/landscape and visual amenity of a proposed development. Developments can have significant visual effects but no impact on townscape / landscape character and some can be vice versa.

Landscape Effects are the effects on landscape / townscape as a resource and defined as follows:

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner." (GLVIA3 paragraphs 5.1 and 5.2)

Visual Effects are the effects on Views and Visual Amenity and summarised as follows:-

"…establish the area in which the development may be visible, the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity at those points." (GLVIA3 paragraph 3.13)

15.2.4 Photomontages and Visualisations

To support the visual assessment, photomontages, wirelines and graphics have been prepared from 12 no. representative viewpoints by 3D Design Bureau to allow assessment of its potential scale and nature in these views and these are contained in Appendix 15B.

Relevant projects were considered in the locality in terms of cumulative impacts and the baseline photography was undertaken in winter months to allow for maximum objectivity in terms of views (i.e., no leaves on vegetation). The viewpoint selection process and photomontage methodology is based on *Landscape Institute Technical Guidance Note 06/19: 'Visual Representation of Development Proposals (2019).*

15.2.5 Study Area

The study area includes the Application Site itself and the wider townscape where the proposed development may have an influence either directly or indirectly. There is no specific guidance on extents of study areas applicable to this type of development in Ireland. Given the Walkinstown area comprises existing built townscape, the use of digital Zone of Theoretical Visibility Maps (based on topography) to assess potential viewpoints was considered superfluous as urban views are usually constrained by built

environment. Viewpoints were identified on site visits in February 2021 and formed part of a Landscape and Visual Summary Statement (Park Hood June 2021) that was issued to South Dublin County Council as part of the consultation process.

15.2.6 Consultation

- A S247 meeting with South Dublin County Council (SDCC) was held on the 9th March 2021 including with the Parks & Landscape Services at which issues including connectivity, site layout, level differences, SUDs and open space development were discussed. The Parks & Landscape Services issued a report on 22nd June 2021 outlining issues related to trees, design, open spaces, play provision, green infrastructure, biodiversity, invasive species and SUDs;
- A Section 5 meeting with An Bord Plenála on 4th October 2021. The issues raised included quality and function of proposed open space, permeability, connectivity and how the proposal would integrate with the surrounding land-uses and roads;
- The "Landscape and Visual Summary Statement" (June 2021) which included 11 no. representative viewpoints in the Walkinstown / Greenhills area. Note that no further viewpoints were requested by SDCC or their consultees during the consultation process;

15.2.7 TVIA Criteria

The objective of the TVIA is to evaluate the likely significance of townscape / landscape character and visual amenity effects to the application site and study area to assist the determining authority in considering the acceptability of this proposal. It is based on the interpretation of the physical and aesthetic characteristics following criteria and terminology described in the following tables. These are partially drawn from *Principles and Overview of Processes (Chapter 3)* within GLVIA. Mitigation measures proposed to prevent/avoid, reduce and, where possible, offset or remedy any significant adverse townscape / landscape impacts or visual effects are described.

15.2.8 Baseline Townscape Character Assessment

The baseline studies extend to include to the wider context into which the proposed development will be introduced. The baseline description of existing conditions forms an objective evaluation of the townscape / landscape character and visual amenity of the study area. This forms the base against which the townscape / landscape and visual effects deriving from the proposed development can be identified, assessed and measured. It involves a desk-top analysis and review of material including:-

- National and Regional Landscape Character or local Landscape Character Assessments;
- Review of historical planning applications on the Application Site;
- Existing National, Regional or Local Designations and relevant Planning Policy;
- Current and historical Ordinance Survey Ireland (OSI) Maps evidence;
- Aerial Photographs via Bing, Google and OSI; and
- Relevant environment / ecology, cultural heritage, historical and archaeology evidence.

  As part of the baseline assessment, the combination of desk-top analysis and site survey allows a judgment to be made on the key elements that contribute to the townscape / landscape character and its wider condition (positive, neutral or negative) and wider value and sensitivity. Landscape value, quality and sensitivity are affected by factors including:

  (i) whether the resource is common or rare;
  (ii) whether it is considered to be of local, regional, national or global importance;
  (iii) whether there are any statutory or regulatory limitations / requirements relating to the resource;
  (iv) the quality of the resource;
  (v) the maturity of the resource, and
  (vi) the ability of the resource to accommodate changes.

Table 15.1: Determination of Townscape Value and Sensitivity

Terminology	Definition	Summary
Highest Value Townscape	Nationally or regionally important townscape with high quality, highly valued rare or unusual features. Diverse, stimulating and thriving street level uses with high level of human comfort, interactive pedestrian environment and strong hierarchy of public amenity and civic spaces. National area / feature designation and assemblage of important listed historical and rich cultural features including Conservation Areas and Listed Buildings / Scheduled Monuments or valued modern buildings. Well maintained unified townscape with attractive visual detail and no detractors. Negligible pedestrian and traffic conflict.	Very vulnerable to change. High Sensitivity
Very Attractive Townscape	Locally distinctive development form with rich cultural associations using good quality locally characteristic materials. Harmonious relationship between buildings and hierarchy of publicly accessible spaces. Several Listed Buildings or local area / feature designations may apply including features of regional interest. Highly permeable, well maintained and no significant townscape detractors. A townscape that promotes social interaction and pedestrian movement dominates traffic circulation with few conflicts.	Some ability to absorb change in some situations without having significant effects. High to Medium Sensitivity
Good Townscape	Features with historical / cultural local value, possibly designated. Locally distinctive townscape, vernacular or planned layout often with ornamentation in good condition and well maintained. Possibly degraded by unsympathetic modern development but retaining essential characteristics with potential for enhancement. Townscape supports social interaction and pedestrian movement co-exists with traffic movement with few conflicts.	Some ability to absorb change in some situations without having significant effects. Medium Sensitivity
Ordinary Townscape	Development is primarily functional, incoherent development form or minimum design criteria being used in contemporary situations. Little indication of local distinctiveness, design expression or ornamentation. Remnant distinctive townscape features may persist but no longer in context. Few opportunities for social interaction, limited to specific 'community' locations. Traffic circulation usually controls pedestrian movement.	Able to accommodate change without significant effects. Low Sensitivity
Poor Townscape	Poorly designed development form using inappropriate materials and / or materials of limited lifespan. Unsympathetic scale, lacking structure, variety, coherence or clear communication links. Poor boundary definition and arbitrary 'un-owned' space, often vandalised, rarely used by community. Townscape in poor condition or decline, unwelcoming or even threatening, with a lack of opportunity for social interaction. Pedestrian movement may be inhibited / severely constrained by major transport barrier.	Damaged landscapes very capable of accommodating change. Very Low Sensitivity

15.2.9 Criteria for Townscape Character Impacts

This EIAR Chapter considers how the proposed development would impact on existing townscape / landscape elements and resources which are normally associated with the direct effects on the application site itself. The indirect impacts of the proposed development on the wider townscape / landscape are assessed with reference to individual types or character areas.

This is affected by factors including:

(i) the physical extent and nature of the key elements that make up the proposal;
(ii) the townscape / landscape context of these effects; and
(iii) the time-scale of impact, such as whether it is temporary (short, medium or long term), permanent with reversible potentials, or irreversibly permanent.

Table 15.2: Magnitude Criteria for Landscape Character Effects

Terminology	Definition
Profound	Total loss or major alteration to key elements / features / characteristics of the baseline (i.e., pre-development) townscape or view and /or introduction of elements considered to be totally dominant when set within the attributes of the receiving townscape.
Major	A prominent change that may be large in scale and / or extent and include the loss of key townscape characteristics or the addition of new features or elements that would potentially change the overall townscape quality and character at a wider scale.
Moderate	Partial loss or alteration to one or more key elements / features / characteristics of the baseline (i.e., pre-development) townscape or view and / or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving townscape.
Slight	Minor loss or alteration to one or more) key elements / features / characteristics of the baseline (i.e., pre-development townscape or view and /or introduction of elements that may not be uncharacteristic when set within the attributes of the receiving townscape
Negligible	Very minor loss or alteration to one or more key elements / features / characteristics of the baseline (i.e., pre-development) townscape or view and /or introduction of elements that are not uncharacteristic with the surrounding townscape - approximating the 'no change' situation.
In those instances where there would be no change to the landscape, the magnitude is recorded as 'zero' and the level of effect as 'no change'.	

15.2.10 Visual Amenity Assessment

Visual Effects are concerned wholly with the effect of the development on views, along with the general visual amenity and are defined by the Landscape Institute in GLVIA3, Paragraph 6.1 which states:-

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern here is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements."

The baseline studies establish the area from which the proposal may potentially be visible and the different groups of people ("visual receptors") who may experience views or changes to view context.

Viewpoints are usually identified in locations that are publicly accessible, such as roads, parks, public realm / domain areas, footpaths or publicly accessible open spaces. Selection is also based on a determination of the extent of visibility towards the Application Site or from locations where there may be significant numbers of visual receptors who will see the proposed development e.g., main roads. Viewpoints are chosen to be representative, specific or illustrative and cover as much of the study area as reasonable or necessary and address all areas where there may be changes in terms of views or visual amenity.

Viewer sensitivity is based on the nature of the visual receptor (resident, tourist, commuter etc.) and the visual quality or value attached to a particular view**.**

Table 15.3: Viewer Sensitivity and Types

Terminology	Definition	Summary
High	Notable views of heritage assets, quality, valued or historic townscapes. Views that may be in designated areas, feature in guidebooks, scenic tours, associated with culture, literature and art or an important contributor to experience	People whose interest is likely to be focused on an appreciation of townscape, culture, built form or particular views. e.g., tourists, cultural events. Residents / Communities living within close proximity of the proposal
Medium	Ordinary views where the reason for visual receptor to be in the area and does not involve or depend upon an appreciation of the views of the townscape or its character.	Commuters, travellers on road and rail. City centre / Public Building users including shopping / retail / commercial uses, recreational activity. Outdoor activity with focus on recreation. Residents / Communities living within close proximity of the proposal.
Low	Areas that may be viewed by the majority as incidental townscape where the focus of the viewer is on their work or activity and the setting is not important to the visual amenity or quality of working life.	Landowners for proposal. Workers with employment related to construction and management / maintenance activity in this part of the city and likely to have a low interest or appreciation of the view.

The visual effects deriving from the proposed development are based on the combined judgement of the anticipated change in nature, visual amenity and duration of the particular view (magnitude) and the nature of the visual receptor (sensitivity). The magnitude and nature of visual effects are based on a number of factors including:-

- Scale of change;
- Distance from proposed development site;
- Contrast in terms of mass, colour, form and texture deriving from new feature(s);
- Extent of intervening vegetation (and seasonality if deciduous) or buildings and topography;
- Speed of passing visual receptor (and how long view is experienced);
- Angle and elevation of view e.g., oblique, direct, perpendicular;

- Nature of backdrop or skyline; and
- Duration of change or effect.

Where mitigation measures are proposed or relevant, these are described as part of any judgement.

Table 15.4: Magnitude Criteria for Visual Effects

Terminology	Definition
Major	A major change or obstruction of a view that may be directly visible, appearing as a prominent and contrasting feature and/or appearing in the foreground / middle ground.
Moderate	A moderate change or partial view of a new element within the view that may be readily noticeable, directly or obliquely visible including glimpsed, partly screened or intermittent views, appearing as a noticeable feature in the middle ground.
Slight	A small level of change, affecting a small part of the view that may be obliquely viewed or partly screened and/or appearing in the background townscape landscape. May include moving views at speed. The proposal forms a minor component in the wider view which might be missed by the casual viewer / observer.
Negligible	The proposal is barely discernible or may be at such a distance that it is very difficult to perceive equating to a no-change situation.

15.2.11 Significance of Townscape and Visual Effects

The assessment process aims to be objective and quantify effects as far as possible. However, townscape and visual assessment has aspects of it that can be considered subjective. Magnitude of change to a view can be factually defined but any subsequent objective assessment should be based on professional training, experience, observation, evidence and informed opinion.

Table 15.5: Summary Scale of Significance

• Sensitive views or visual receptors; • Effects on recognised scenic, rare or distinctive townscapes; • Effects on mature or diverse landscape elements, features, characteristics, aesthetic or perceptual qualities; and • Large scale changes	More Significant
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• Effects on poorer condition or degraded townscapes / landscapes; • Effects on low sensitivity visual receptors; and • Small scale changes	Less Significant

Significance of visual effects is not absolute and can only be defined in relation to each development and its specific location. Usually an effect is considered 'significant' if the level of effect is 'moderate/substantial' or 'substantial'. The significance of townscape and visual effects is determined by cross-referencing sensitivity of townscape / landscape or view with the magnitude of change.

Table 15.6: Assessment of Significance Matrix

Townscape and Visual Sensitivity	**Magnitude of Impact**			
	Negligible	**Low**	**Medium**	**High**
Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
Low	Negligible or minor	Negligible or minor	Minor	Minor or moderate
Medium	Negligible or minor	Minor	Moderate	Moderate or major
High	Minor	Minor or moderate	Moderate or major	Major

15.2.12 Nature of Townscape and Visual Effects

Townscape / landscape and visual assessment has aspects of it that can be considered subjective. Magnitude of change to a view can be factually defined but any subsequent objective assessment is based on professional training, experience, observation, evidence and informed opinion.

Table 15.7 Nature of Townscape / Landscape Effects

Terminology	**Definition**
Positive	A change that improves the quality of the townscape character and fits very well with the existing townscape character.
Neutral	A change which does not affect the scale, landform or pattern of the townscape and maintains existing townscape quality.
Adverse	A change which reduces the quality of the townscape and cannot be fully mitigated.

15.3 Receiving Environment

15.3.1 Landscape Character/ Context in the Existing Environment

15.3.1.1 Site Location

The Application Site comprises 2.79 hectares / 6.89 acres of land off Greenhills Road in Walkinstown, Dublin 12. The city centre is located 6km to the north-east. See Figure 15.1 Site Location Plan.

The site comprises an irregular landholding bound to the north by Greenhills Road (to which it has a 278m boundary) that is located to the west of the Walkinstown Roundabout. The site is bound by a service road within the industrial and commercial estates set off St James Road to the south with the boundary being 90m long to the east and 363m long to the south. A jagged boundary extending to 143m defines the site to the west.

Photo 15.1: Existing Site Aerial Photograph

15.3.1.2 Baseline Landscape Character

Landform, Topography and Drainage

The majority of the site has been subject to historic quarrying with grading and modifications undertaken to facilitate industrial scale buildings and yard areas with levels rising gradually from the east (+54.1m) to the west (+59.1) though large areas are graded flat. More significant gradients are to the north of the site where there is steep bank rising towards the Greenhills Road set on an embankment associated with a glacial esker where levels rise to +63.5m. The slope steepness varies but there are sections with 1:1 slopes set towards the road verge and a 50m long retaining wall has been constructed in this area.

Of note is 19th century OSI historical maps depicting both the esker and a circular mound rising to 254

feet (+77.4m) to the west of the site but the mound is no longer evident. The Greenhills Esker is formed by large deposits of sands and gravels deposited under the ice sheet and its margins as the ice retreated northwest across Dublin at the end of the last Ice Age. It was subject of historic quarrying activity in the 19th and early 20th century.

There are no notable or named watercourses on the site and drainage is managed via conventional gullies or natural drainage towards boundaries. No streams or waterbodies are depicted on current or historical maps.

Land-use and Vegetation

The site is dominated by large scale industrial sheds, warehouses and commercial units of varying condition that extend to a total of approximately 1.1 hectares (i.e., 40% of the site). The architecture is primarily functional or utilitarian with facades of red brick, render, corrugated metal or cladding with standalone and terraced buildings and interconnecting asbestos/metal deck roofed warehouses.

Photo 15.2: Existing Site Setting

Intervening lands are primarily set out in access roads, yards, loading areas and parking / storage facilities surfaced in a mix of hardcore types, primarily tarmac with concrete. The site has been subject to limited use recently as evidenced by the extent of colonising or unmanaged scrub growth and damaged paving.

There are no residential properties or used buildings on the Application Site. OSI historical maps indicate a couple of buildings were located towards the Greenhills Road in the 19th century that were probably related to quarrying activity but no evidence remains on site.

The site can be accessed by a two gateways on the east service road (to the existing Chadwick's Plumbing Centre and TC Matthews Carpets premises) and three splayed gateways on the south service

road where the gates have been locked for some time. The site is bound by a combination of 2.5m high concrete block walls, steel palisade fences, high mesh security fences and barbed wire.

There is no access provision from the site onto Greenhills Road or to the west. The northern boundary to the (single-carriageway 6m wide) Greenhills Road is defined by a concrete wall with a security fence. There is no footpath provision on the south side of Greenhills Road (aside the side boundary) but a footpath and cycle-lane is located on its northern side.

The service lane to the south of the site is approximately 5.5m wide and surfaced in concrete. A narrow footpath of c.1.2m is located along part of the north side of the road. On the property boundaries to the southside of the lane is a line of approximately 55 no. mature Macrocarpa conifer trees.

Photo 15.3: Existing Service Lane and Site Entrance to south of Application Site

Vegetation is limited to boundary areas or liner strips aside warehouses though much of this is scrub that has become established across the middle and west part of the site following the cessation of use. This includes Buddleia and Elders but also scrub trees and more ornamental shrubs such as viburnum and cotoneaster planted as part of historic landscape schemes that have been allowed to grow in an unmanaged manner since the site closed. Many of the former landscape areas have become swamped by brier as a consequence.

The bank to Greenhills Road extending to approximately 3,800m² has become swamped in thickets of scrub vegetation and with some trees, mainly ash and hawthorn, emerging. Many areas are subsumed in heavy ivy growth and brier which is also an evident component on and within the boundary mesh fence.

There are incidental trees and groups across the site including 5 no. mature Birch (*Betula pendula),* 3 no. maple (*Acer platanoides*) and ornamental conifers at the eastern service road boundary. Further trees and large shrubs are located internally within the site but none would be categorised as being significant in stature or amenity value or visible beyond the site. Ivy growth is a feature on internal boundaries and

walls. The ecology survey identified no significant habitats, designated sites or individual or group of species on the Application Site.

Townscape History and Settlement

The area is part of a broader set of commercial estates and land-uses associated with the Greenhills Industrial Estate and Beechlawn Industrial Complex that are a notable component of the Dublin 12 townscape.

Greenhills Road to the north of the site links Walkinstown and Tallaght and runs, in part on the geological feature of a natural glacial esker that has been subject to centuries of quarrying activity on account of being a valued source of sand and gravel for building works. OSI historical mapping from the 19th century annotates several "gravel pits" and "quarries" in this area suggesting the area, while rural, has been characterised by commercial and industrial activity since that time. By the time of the Cassini maps in the mid-20th century, many of the quarries are annotated "disused" and while the area is still predominantly rural, the city is clearly encroaching with extensive housing development extending to the nearby Crumlin, Drimnagh and Kimmage areas.

The area remained mostly farmland until city expansion in the 1950s and 1960s comprising new housing estates which were built in the area as starter homes and social rented schemes as a response to the poor housing conditions in the inner city. The area on and around the Application Site became absorbed into the city with commercial estates attracted here by the nearby workforce. By the 1970's, the area was fully enveloped into the Dublin cityscape and any association with the rural landscape was gone having been replaced by a myriad of small housing estates, commercial / industrial zones and institutional lands.

Photo 15.4: Greenhills Road on section adjacent to Application Site

Adjacent Townscape Character

Greenhills (*Na Glaschnoic*) is a Dublin suburb named after the hills that make up the now partially hidden esker. It merges into Walkinstown (*Baile Bhailcín*) to the east which is a further suburb comprising extensive low-rise private and social housing estates and the dominant characteristic of the area is that of mid-20th century housing developments. The area also includes a library, residents' association, sports ground, community centre, schools, pubs, church and retail facilities. The population of Walkinstown was recorded as 6,819 in the 2016 Census.

Greenhills Road was part of an ancient highway called the Eiscir Riada and its alignment near the Application Site is the same as that depicted on the 1st Edition OSI Ordnance Survey Maps dating from the 1830s. It commences at the Walkinstown Roundabout, 235m to the north-east of the Application Site and runs 4km to the south-west crossing the M50 to the N81 in Tallaght. There are no existing accesses or linkages between the Greenhills Road and the Application Site.

Across the lands to the south, west and north, this part of Dublin is dominated by commercial estates and light industrial units extending across approximately 575 hectares including the Ballymount Industrial Estate, John F Kennedy Industrial Estate, Sunbury Industrial Estate. M50 Business Park, Greenhills Industrial Estate and Western Industrial Estate / Park. Off the service lane to the immediate south of the Application Site are further large scale warehouses and premises including iron works, motor repairs and manufacturing industries.

Photo 15.5: Walkinstown Roundabout looking west towards Greenhills Road and the Application Site

The M50 and its Junction 10 Ballymount are located 1.3km to the west but is accessed from the site via the Walkinstown Roundabout and Calmount Avenue. Walkinstown Roundabout (or Walkinstown Cross) is a junction which serves as the conduit for seven roads and is known as one of the busiest junctions in the city.

There are few notable buildings or historic landmarks in the Greenhills and Walkinstown area. The Church of the Holy Spirit (1960-70) is located at St Pauls, 680m due south of the Application Site. The National Inventory of Architectural Heritage ("**NIAH**") notes it is a "*…fine example of mid twentieth-century church design…"* and that the "*…eye-catching roof profile acts as a landmark in this predominantly low-rise area*". The Church of the Assumption of the Blessed Mary (1955) is located at Walkinstown Green, 720m to the north-east. NIAH notes that its "*…height and form make it a notable feature in the streetscape, and it forms a pleasing backdrop to the adjoining park to the south-west*". In reality, Walkinstown's most notable feature is its large roundabout that dates from the 1950s and extends to nearly 1 hectare of land.

Public Amenities and Facilities

The site is privately owned and has no public accesses or rights or way. A review of information provided by Fáilte Ireland shows that there are no promoted tourism amenities, sites, routes or attractions in close proximity to the Application Site. There are no noted public amenities or public paths / rights of way in close proximity to the site. There are a number of public parks within 1km of the site including:-

- Beechfield Park located over 435m to the east in Walkinstown including sports pitches and a playground;
- Greenhills Park is located over 400m to the south near the Greenhills Community College and includes large areas of open grassland and some sports facilities;
- Walkinstown Park is located over 470m to the north off Walkinstown Avenue. The park has three football pitches, two GAA pitches and a tennis court; and
- Tymon Park is situated over 720m to the south-west in the old townland of Greenhills and is located to the south of the Limekiln estate. It extends to over 300 acres / 120 hectares including 29 sports pitches and a children's adventure playground but is divided in two by the M50 motorway,

Photo 15.6: Views to the east from Tymon Park include the roofscapes of the Greenhills and Walkinstown areas with the Application Site, over 700m distant, part of the panoramic view

15.3.1.3 Published Landscape / Townscape Character Assessments

***Landscape Character Assessment of South Dublin County 2015* (LCA)**

This assessment identified and categorised five primary landscape character areas in South Dublin. This provided a broad overview of the landscape character, description, condition and sensitivity for each area and is a useful research document in terms of baseline assessment of the study area. Within this, *Figure 19 Landscape Character Types* annotates the Application Site as being in the "Urban" area and states the following driver of this particular landscape character type:-

"Includes built land around historic settlements within the larger urban areas. Primarily composed of established nucleated villages and towns that have developed historically many of which saw significant improvements in the 19th century in terms of streetscapes. These are surrounded by residential development of various origins but primarily 20th century, with significant recent development in the past two decades."

In terms of Relict Land Use Types, the LCA notes the following for the Application Site area:-

"Some areas in the region have little or no relict land use types at all visible and are defined by large scale high density developments such as housing and industrial estates, where neither the historical or archaeological evidence is sufficiently dominant to suggest a relict land use type. In these cases, they have been designated 'none'. This area corresponds broadly with the highly developed area to the east of the M50 routeway."

The LCA shows the Application Site located in the "Urban South Dublin" landscape character area though notes that as this is a built-up sector, it "…*would require a separate townscape assessment, to be undertaken at a smaller scale and provide a more detailed evidence base for townscape management issues in the future*". There is no detailed published landscape character of this area at this time but is summarises the key characteristics as follows:-

- *Built – up urban area with extensive housing estates and industrial /commercial parks. Variety of house styles and layouts dating from the late 19th century to late 20th century;*
- *Settlements of Rathfarnham, Templeogue and Clondalkin with important historical legacy and remnants;*
- *Major traffic corridors with M50 traversing north- south through the area, and LUAS line travelling north from Tallaght, parallel to the M50,to city centre;*
- *Corridors of natural and semi natural vegetation, notably along the River Dodder (a linear park) and the Camac River;*
- *Grass open spaces in gardens, industrial parks, golf courses, school playing fields, and miscellaneous spaces in housing areas;*
- *Street trees planting; and*
- *Recreational facilities – public parks and golf courses - provide amenities and ecological resources*

The "*LCA retains little of historical significance and the setting of its primary settlements have been radically altered by built developments, notably through the 20th Century"*.

South Dublin County Council Development Plan 2016-2022

The Development Plan notes in Section 1.7.1 that the settlements of Greenhills and Walkinstown are part of "*… established areas are located to the east of the M50 and south of the River Dodder. They are suburban areas with established identities and communities with distinct heritage and character. These areas have a range of urban services such as transport, retail, medical and community facilities. Recent Census data identifies an aging population and stagnant or falling populations, which presents a serious risk for the viability of services and facilities into the future.*"

15.3.2 Planning Guidance and Landscape / Townscape Designations

15.3.2.1 South Dublin County Council Development Plan (2016-2022) (SDCCDP)

Designations and Objectives

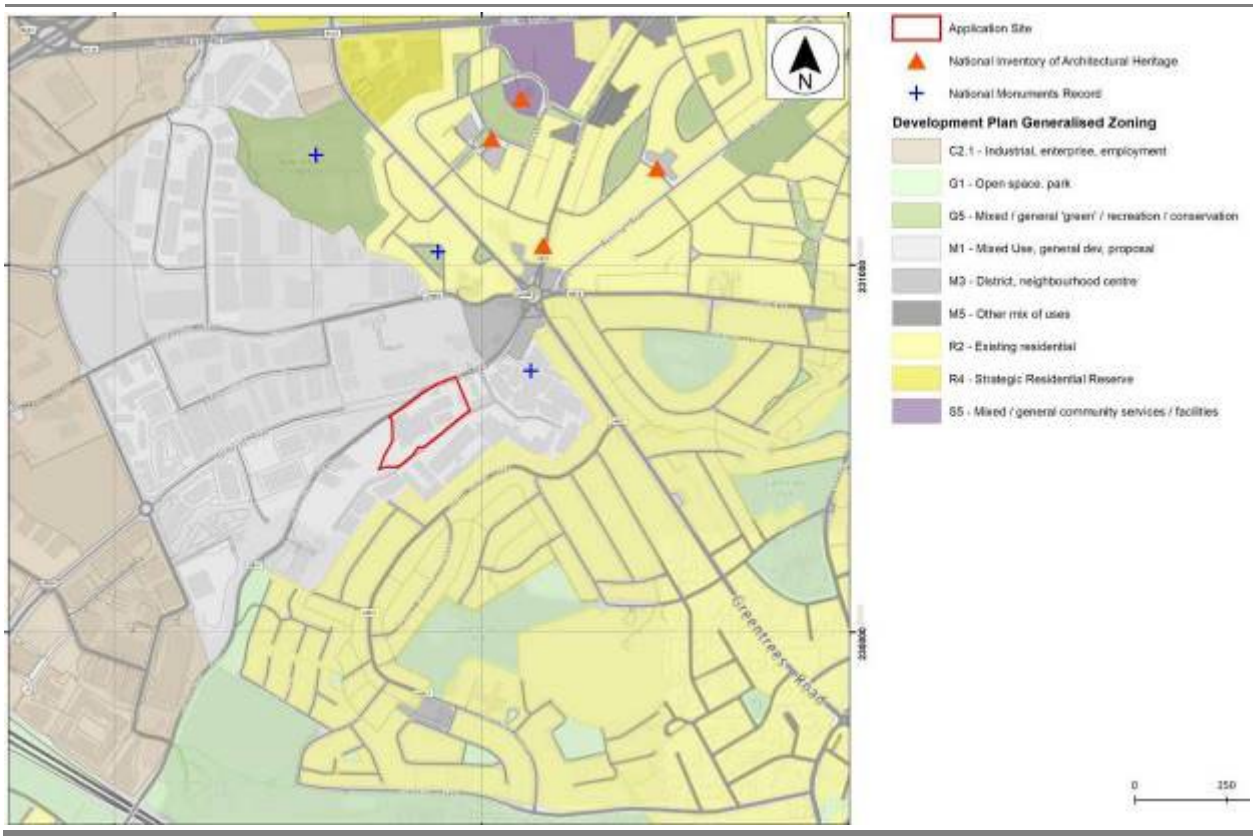
The Index Map annotates the Application Site as being in the Objective REGEN zone with the stated objective "*To facilitate enterprise and/or residential-led regeneration*."

In terms of Housing Land Capacity, Section 1.6.4 notes *"Most significantly, a new Regeneration zoning objective 'REGEN' has been introduced to support and facilitate the regeneration of underutilised industrial lands that are proximate to town centres and/or public transport nodes for more intensive enterprise and residential led development*."

Section 6.4 notes an objective to "*Upgrade of Greenhills Road from Airton Road to Walkinstown Roundabout with new links to Ballymount Avenue, Limekiln Road and Calmount Road*" which includes the section passing the Application Site.

Section 9.7 notes that the Greenhills Esker in Kilnamanagh, Tymon North is a geological site for protection.

Figure 15.1: Planning Designations



Relevant Policies

In term of residential development and landscape inputs, Section 2.3.2 and 2.33 related to Open Space provision and note the following:-

- *Policy H12: The provision of public open space that is appropriately designed, properly located and well maintained is a key element of high quality residential environments. Public open space should have active and passive recreational value and should enhance the identity and amenity of an area.*
- *Policy H13: The provision of adequate and well-designed private open space is crucial in meeting the amenity needs of residents. In schemes that include apartments and duplexes the more limited private open space provision for these units can be successfully augmented by high quality semi-private open spaces that are landscaped to a high quality and offer a range of active and passive uses for residents.*

Residential Building Heights

Policy 9 relates to the Residential Building Heights and states it is "*…the policy of the Council to support varied building heights across residential and mixed use areas in South Dublin County*" with the following objectives:-.

- *Objective 1: To encourage varied building heights in new residential developments to support compact urban form, sense of place, urban legibility and visual diversity;*
- *Objective 2: To ensure that higher buildings in established areas respect the surrounding context;*
- *Objective 3: To ensure that new residential developments immediately adjoining existing one and two storey housing incorporate a gradual change in building heights with no significant marked increase in building height in close proximity to existing housing (see also Section 11.2.7 Building Height);*
- *Objective 4: To direct tall buildings that exceed five storeys in height to strategic and landmark locations in Town Centres, Mixed Use zones and Strategic Development Zones and subject to an approved Local Area Plan or Planning Scheme;*
- *Objective 5: To restrict general building heights on 'RES-N' zoned lands south of the N7 to no more than 12 metres where not covered by a current statutory Local Area Plan*

15.3.2.2 Draft South Dublin County Council Development Plan (2022-2028)

Map No. 5 that has been prepared as part of the draft Development Plan continues to designate the site as Objective REGEN with this substantiated as "To facilitate enterprise and / or residential-led regeneration subject to a development framework or plan for the area incorporating phasing and infrastructure delivery. The map also indicates that Greenhills Road under "Road Proposals – 6 years".

The map also identifies various conservation objectives including "Prospects" and "Protect and Preserve Significant Views" and "Tree Preservation Orders" but none of these are in proximity to the Application Site or close enough to be affected by any activity on the site.

15.3.2.3 Local Area Plan

The Development Plan notes an objective to produce a "*Ballymount Local Area Plan for lands zoned REGEN, EE, and LC, stretching southwest from Walkinstown Roundabout along the Greenhills Road (including those areas adjacent to Greenhills Estate) to the M50, north from there to the Red Cow, east from there along the Naas Road to the city boundary, and along the boundary back to Walkinstown Roundabout*" that would include the Application Site lands but this is not available as yet.

15.3.2.4 National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) identifies no monuments or historic sites on the Application Site.

15.3.2.5 Environmental Protection Agency

Maps available from the Environmental Protection Agency (EPA) indicate no protected landscapes, environment or ecology areas on or close to the Application Site.

15.3.3 Townscape Sensitivity

Sensitivity is based on the townscape's physical shape, scale, pattern, its visual environment/enclosure, any sense of heritage or architecture, sensitive or designated areas and the presence of rare or unique features, elements or components. Townscape sensitivity is ultimately an assessment of the ability of a surrounding landscape or townscape to accommodate and absorb change within the application site without affecting its character.

In visual amenity terms, the site is rated as having Low sensitivity on account of a limited visual envelope due to the historic and existing land-uses both on and in the Application Site. It is underutilized site with redundant buildings that has a post-industrial character. There is no nearby designated landscapes, conservation areas or listed buildings that would be affected by activity on the Application Site. The most sensitive landscape feature is the Greenhills Esker to the immediate north of the site but, as noted above, this has been subject to historic quarrying activity and the area is now characterised by road infrastructure and industrial parks which have substantially affected its nature and subsumed any presence it has in the landscape.

Longer views are afforded from elevated or exposed areas in parklands to the west but these are of a distant or partial nature and, in overall terms, the Application Site is well concealed from public vantage points. From the majority of areas in the Greenhills and Walkinstown areas, it would be considered that the site has a good ability to absorb changes without significant detriment to landscape / townscape character or visual amenity of this area.

Photo 15.7: Internal view of Application Site demonstrating existing setting and condition

15.3.4 Townscape / Landscape Quality and Value

The Application Site comprises an extensive area of commercial warehouses and functional buildings some of which are degraded, run-down and vacant with extensive areas of utilitarian parking provision. Bound by unsightly security fences and walls subject to graffiti and weed growth respectively, the site would be categorised as *poor* townscape in terms of quality and value and very capable of accommodating change in townscape / landscape and visual terms. It has been in a similar condition for some time and contributes adversely to the setting of Greenhills and Walkinstown.

The site carries no environment, amenity, heritage, visual amenity or landscape designations and possesses nothing that would be categorised as sensitive in terms of townscape character, features or vegetation.

In general, the areas to the periphery of the Application Site are of a similar character and *poor* quality / value being made up or further commercial and industrialised landscapes comprising further functional and utilitarian buildings with little in terms of aesthetic or amenity provision.

Beyond the industrial park areas, the townscape of Walkinstown and Greenhills comprises a mix of good to *ordinary* townscape of *medium* sensitivity comprising extensive areas of low-rise mid-20th century housing estates and incidental parks. There are no heritage or conservation areas in this area.

The LCA notes that the key "*Landscape Value*" contributors in south Dublin are the public parks, the Dodder River Valley, 19th century industrial heritage and views out to Dublin (Wicklow) Mountains and agricultural hinterland. These are all sufficiently distant from the Application Site to be subject to any significant landscape or visual effects.

Photo 15.8: Aerial View of Application Site demonstrating existing land-use and townscape setting

15.3.5 Baseline Visual Evaluation

Site surveys were undertaken between February and August 2021 to establish locations where there are potential views of the proposed development or where key visual receptor groups might visit, work or stay and any general movement through the area. Built-up townscape, infrastructure and vegetation are features of the Greenhills townscape and this ensures that views consistently change in context, scale and extent with many views of the Application Site, even from close proximity locations closed off. Note that there was no or very limited leaf cover at this time of year that the baseline photography was undertaken for the photomontages so views are at their most open and therefore appropriate for objective assessment.

Viewpoints were selected within publicly accessible areas based on the following criteria:-

- Site investigation to establish those locations where there was likely to be significant views (e.g., exposed and elevated locations);
- Site investigation to establish those locations where there was likely to be a significant number of visual receptors (e.g., commuter routes or public parks;
- Consultation and review with Cultural Heritage Consultants to identify key viewpoints in relation to listed buildings, conservation areas, landmark buildings and important local prospects, views and panoramas; and
- Ensuring that all townscape character areas potentially affected are covered to give representative likely visual effect.

Figure 15.2: Viewpoint Locations Map

Extract from Viewpoint Locations Map provided by 3DDB (2022)

A review was also undertaken of the 18 no. designated "*Prospects to be reserved and protected*" (as per Section 9.2.1 in the SDCCDP) but this established none are in close proximity to the site or will be impacted by activity or land use on the Application Site.

Selected representative viewpoints for the visual assessment are taken from the following locations:-

- Viewpoint 1: Walkinstown Crescent;
- Viewpoint 2: R819 Greenhills Road;
- Viewpoint 3: Greenhills Road near Walkinstown Roundabout;
- Viewpoint 4: Walkinstown Roundabout;
- Viewpoint 5: Beechfield Park, Walkinstown;
- Viewpoint 6: St Joseph's Road;
- Viewpoint 7: Greenhills Park;
- Viewpoint 8: St James's Road;
- Viewpoint 9: Tymon Park;
- Viewpoint 10: R819 Greenhills Road;
- Viewpoint 11: Walkinstown Avenue Park; and
- Viewpoint 12: Greenhills Industrial Estate Service Lane

15.4 Characteristics of the Proposed Development

15.4.1 Proposed Development Summary

The key components of this of this proposal involves demolition of the existing buildings and construction of a mixed-use development including the following:-

(i) The demolition of the former Chadwicks Builders Merchant development comprising 1 no. two storey office building and 9 no. storage/warehouse buildings ranging in height from 3 m – 9.9 m as follows: Building A (8,764 sq.m.), Building B (1,293 sq.m.), Building C (two-storey office building) (527 sq.m.), Building D (47 sq.m.), Building E (29 sq.m.), Building F (207 sq.m.), Building G (101 sq.m.), Building H (80 sq.m.), Building I (28 sq.m.), and Building J (44 sq.m.), in total comprising 11,120 sq.m.;

(ii) the construction of a mixed-use Build-to-Rent residential and commercial development comprising 633 no. build-to-rent apartment units (292 no. one-beds, 280 no. two-beds and 61 no. three-beds), 1 no. childcare facility and 10 no. commercial units in 4 no. blocks (A-D) ranging in height from 5 to 12 storeys as follows:

(a) Block A comprises 209 no. apartments (102 no. 1 bed-units, 106 no. 2 bed-units and 1 no. 3-bed units) measuring 5 - 10 storeys in height. (b) Block B comprises 121 no. apartments (53 no. 1 bed-units, 45 no. 2 bed-units and 23 no. 3 bed-units) measuring 8 - 10 storeys in height. (c) Block C comprises 130 no. apartments (38 no. 1-bed units, 71 no. 2-bed units and 21 no. 3-bed units) measuring 8 - 12 storeys in height. (d) Block D comprises 173 no. apartments (99 no. 1 bed-units, 58 no. 2 bed-units and 16 no. 3 bed-units) measuring 6 - 10 storeys in height. All apartments will be provided with private balconies/terraces;

(iii) provision of indoor communal residential amenity/management facilities including a co-working space, communal meeting room/ work space, foyer, toilets at ground floor of Block A; gym, changing rooms, toilets, resident's lounge, studio, laundry room, communal meeting room/ work space, multi-function space with kitchen at ground floor of Block B; games room with kitchenette, media room, co-working space, resident's lounge, communal meeting room/ work space, reception area, management office with ancillary staff room and toilets, toilets, parcel room at ground floor of Block C;

(iv) the construction of 1 no. childcare facility with dedicated outdoor play area located at ground floor of Block A;

(v) the construction of 8 no. commercial units at ground floor level of Blocks A, B and D, and 2 no. commercial units at second floor level (fronting Greenhills Road) of Block C as follows: Block A has 3 no. units at ground floor comprising 79.46 sq.m., 90.23 sq.m., and 121.39 sq.m., Block B has 1 no. unit at ground floor comprising 127.03 sq.m., Block C has two units at second floor comprising 120.85 sq.m. and 125.45 sq.m., and Block D has 4 no. units at ground floor comprising 84.45 sq.m., 149.77 sq.m., 155.48 sq.m. and 275.59 sq.m.;

(vi) the construction of 3 no. vehicular entrances; a primary entrance via vehicular ramp from the north (access from Greenhills Road) and 2 no. secondary entrances from the south for emergency access and services (access from existing road to the south of the site) with additional pedestrian accesses proposed along Greenhills Road;

(vii) provision of 424 no. car parking spaces comprising 398 no. standard spaces, 21 no. mobility spaces and 5 no. car club spaces located at ground floor level car park located within Block A and accessed via the proposed entrance at Greenhills Road, a two-storey car park located within Blocks C and D also accessed from the proposed entrance at Greenhills Road and on-street parking at ground floor level adjacent to Blocks A and C. Provision of an additional 15 no. commercial/ unloading/ drop-off on-street parking spaces at ground floor level (providing for an overall total of 439 car parking spaces). Provision of 4 no. dedicated motorcycle spaces at ground floor level parking area within Blocks C and D;

(viii) provision of 1363 no. bicycle parking spaces comprising 1035 no. residents' bicycle spaces, 5 no. accessible bicycle spaces and 7 no. cargo bicycle spaces in 9 no. bicycle storerooms in ground and first floor parking areas within Blocks A, C and D, and 316 no. visitors' bicycle spaces located externally at ground floor level throughout the development;

(ix) provision of outdoor communal amenity space (5,020 sq.m.) comprising landscaped courtyards that include play areas, seating areas, grass areas, planting, and scented gardens located on podiums at first and second floor levels; provision of a communal amenity roof garden in Block C with seating area and planting (176 sq.m.); and inclusion of centrally located public open space (3,380 sq.m.) adjacent to Blocks B and C comprising grassed areas, planting, seating areas, play areas, water feature, flexible use space; and incidental open space/public realm;

(x) development also includes landscaping and infrastructural works, foul and surface water drainage, bin storage, ESB substations, plant rooms, boundary treatments, internal roads, cycle paths and footpaths and all associated site works to facilitate the development.

This application is accompanied by an Environmental Impact Assessment Report (EIAR).

The proposed works includes creation of new public open spaces including plazas, public realm and enhanced streetscape totalling 6,500m² (with over 350 no. semi-mature or extra-heavy trees). buffer and screen planting extending to 1,250m² and green roofs on buildings totalling 7,100m².

A water management strategy is designed into the project to capture storm water runoff from the site, using an integrated network of sustainable drainage systems (SUDS) including rain garden planting, wetland planting and Sedum green roofs.

A full description of the Proposed Development is contained within **Chapter 2** Project Description of this EIAR and the Design and Access Statement (C+W O'Brien Architects) submitted with this Application and is not repeated here.

15.5 Potential Impact of the Proposed Development

The aim of the TVIA is to objectively and professionally assess how the Proposed Development will affect the landscape, townscape and visual amenity of this part of Dublin. The terminology and glossary used in this chapter to describe landscape and visual effects is based on a review of the Principles and Overview of Processes (Chapter 3) of the GLVIA. The TVIA Criteria and Terminology is outlined in **Section 15.2 above**.

The magnitude and significance of any effect is determined by the scale and context of the Proposed Development and any resulting contrast between this and the existing townscape setting, visual quality and amenity. A further consideration is not just its proximity to adjacent townscape or areas but also the number of people who use or pass through this area who may feel that the visual and townscape quality of the area has been affected by this proposal.

Any assessment must be measured against that of the situation that pertains at present and the existing site possesses little in terms of a positive contribution to city character or quality. Impacts are not necessarily adverse and may be neutral (i.e., changes which make the existing situation neither better nor worse), or beneficial, following the development though effects may be categorised as substantial or significant.

15.5.1 Construction Phase

The construction operations will cause affects to local townscape and visual amenity though the following:-

- Removal / demolition of existing warehouses, buildings and internal infrastructure;
- Removal of scrub vegetation and internal colonising shrubs and trees;
- Site access and haulage routes using the existing road infrastructure off Greenhills Road;
- Fixed construction plant, including cranes and scaffolding and gantries;
- Mobile construction plant, such as excavators and lorries;
- Storage and compound areas;
- Erection of welfare facilities and retention of existing protective hoardings;
- Security and safety lighting; and
- The presence of evolving buildings.

Such is their condition, the removal of the existing buildings and vegetation would have no significant effects on local townscape character and demolition would have *neutral* effects (i.e., no better or worse) on the character of the site.

The site will be bound by hoardings to clearly delineate working areas. Where feasible existing walls and fences will be retained in situ for the construction period to also form this function. Publicity material may be displayed on the hoardings along Greenhills Road to inform the public and passer-by's about the proposal and programme for delivery. These will also obscure views from low-level street / road areas.

The construction works will represent an intensive change to the site character and result in direct effects to adjacent areas which will constitute a *slight adverse* effect comparative to the existing situation. These

will be temporary and are not considered significant in context of the wider townscape given current site use and degraded quality.

As the construction of higher floors commences, there will be more visual exposure and this will continue to have *slight adverse* effects on local townscape areas including areas on the adjacent section of Greenhills Road and immediately adjacent areas within the Greenhills Estate Being a heavily urbanised area and commercial / industrial location and in an area of significant transport corridors with several sites in degraded condition, effects deriving from construction traffic would not constitute a significant change from the existing situation. Construction traffic and materials can access from Greenhills Road which is busy road and any increased usage will not be significant in landscape and visual terms.

To areas across the wider city including Walkinstown, the construction phase will have *negligible* effects until the taller elements are being constructed and come into view. As these higher stories are constructed, the construction works will inevitably become more evident from incidental gaps or elevated areas in the Greenhills / Walkinstown area but given the context of built environment and distance, the effects would be of a *low magnitude* and not of a significant nature. Any significant effects are therefore limited to the Application Site itself and the immediately adjacent lands.

15.5.2 Operational Phase

On the basis the current site contributes very limited positive townscape or landscape influence, the TVIA's main consideration is the scale, height and mass of the proposed development in terms of the operational / completed phase. Note that tall buildings are commonly defined as those which are significantly taller than the generally prevailing height of buildings in the surrounding area.[1]

The townscape and visual effects deriving from this proposal are deemed to be permanent changes (i.e., effects lasting over twenty five years and irreversible). On completion, it will be a significant addition to the Greenhills townscape forming a prominent set of buildings and public realm that will transform the sense of place and character of this area. In broad terms, a proposal of this nature and scale will become part of the integrity, legibility and identity of Greenhills with a distinctive or landmark status representing a major change as to how the townscape is perceived in this part of the city. The following reviews the likely impacts on key townscape areas as identified in the baseline assessment section above.

15.5.2.1 Application Site

In terms of the actual Application Site, there are no distinctive / notable built or natural features including vegetation, facades or architecture that will be lost; the key part of the assessment therefore relate to the scale and nature of the proposed development.

While the removal of the existing buildings would have no significant effects on local townscape character, the subsequent development will result in significant changes to the site character due to introduction of a series of taller buildings that will have *profound* effects on the baseline setting on completion. The effects on the Application Site are categorised as *high* magnitude but this is not something that should be seen as adverse in townscape / landscape character terms. The improved facades, architecture and frontages will reinvigorate and revitalise this part of Greenhills giving it a more productive use contributing to the immediate townscape character and sense of place.

The road pattern to the periphery will be unaffected though the proposal offers the opportunity to broaden the constrained service road to the south and improve the associated public realm and landscape works by widening that would have positive effects on its visual appearance, usability, amenity and function.

[1] Tall Buildings Assessment - Royal Borough of Greenwich 2011

Figure 15.3 Existing and Proposed Aerial Photomontage

Image courtesy of 3D Design Bureau (2022)

The proposed buildings will occupy approximately 8,050m² (29.5% of the site) which represents a 10.5% reduction in footprint comparable to the existing situation. The layout allows much of the remaining two-thirds of the site to be dedicated to landscape or designed public open spaces aside a central shared access route for the amenity of residents, visitors and other users that would constitute a positive effect in terms of site amenity. Further, the roofs of many of the proposed buildings will be in sedum and have a green character.

The open space works include significant planting that will substantially increase tree and vegetation

cover with significant improvements to the species diversification across the site including on the slopes to the north of the site towards Greenhills Road. The collective landscape works will enhance the amenity, ecological worth and landscape character though introduction of amenity gardens, landscape treatments, courtyards and planting (selected from lists provided in the *All Ireland Pollinator Code* [2]) that will give the site a much "greener" character than it currently has or has had for centuries.

Further the proposal will have positive effects on its character and increase the street life during both day and night while enhancing linkages in the Greenhills / Walkinstown area through improved public accessibility via new public realm and linked open space as set out in Chapter 13.7 below

The proposal will also allow for a more sustainable drainage system across the site via green roofs and rainwater ponds that are integrated into the landscape works.

15.5.2.2 Greenhills and Walkinstown

There will inevitably be *substantial* and significant effects to areas immediately beside the proposed development site on Greenhills Road and towards the existing Industrial Estate due to the change in use from a commercial land use to a taller mixed-use scheme and residential complex. The key change will derive from the scale and mass of the new buildings rising above that of the existing townscape that would be set in areas of public realm that would have a very different character and context to what exists at present. While assessed as significant and of *high magnitude*, the proposal will include positive effects in terms of local landscape character in terms of improved streetscape, enhanced and improved tree and vegetation cover and a set of landmark buildings giving enhanced townscape variation and identity.

This site is framed to the south and west by the Greenhills Industrial Estate and further large scale townscape elements to the north and west (and the Greenhills esker) that collectively ensure it is contained in character and visual terms. As such, this development can be successfully absorbed into this area without causing adverse townscape / landscape effects and the site lends itself to such a proposal.

Beyond a short section of Greenhills Road, the existing built environment comprises a density of building and vegetation that ensures the majority of these areas will experience *slight* / *negligible effects* (i.e., insignificant) due to the proposal being visually obscured or not forming a significant part of the setting. The majority of the Greenhills / Walkinstown area will experience *negligible* or *no* townscape or visual effects due to the proposal being visually obscured. There will be no effects to any designated historic sites / environments in this locality.

The distinctive buildings will represent an addition to the local skyline and townscape and serve as a visual backdrop to open areas towards the Walkinstown Roundabout, more distant public parks and intermittent roads with the upper parts of the development rising above the intervening townscape. The nature of the intervening townscape and limited quality or value in the Application Site area ensures that the development, while sizeable, can be accommodated and absorbed without detriment or adverse effects to any of these areas.

The proposed development will be taller than the existing buildings in this area but it not likely to be unique the city on account of the major regeneration ambitions which will inevitably be developed out with a contemporary architecture of a larger scale than currently exists.

15.5.2.3 Dublin City

The current site and setting contributes little to the character or quality of this part of the city. This development will signify a fresh phase or stage for this part of Greenhills which will have *substantial* effects on areas closer to the proposed development but the baseline setting ensures this can be

[2] https://pollinators.ie/

successfully absorbed without causing any adverse townscape / landscape effects. There are no designated views, landmarks, landscapes / townscapes, prospects or vistas affected by this proposal in an adverse, unacceptable or significant manner.

In townscape character terms, the completed development will improve the quality and character of this area symbolising progress, revitalisation and positivity with the development including significant new public (and communal) open spaces that will be a positive effect in terms of “greening” this part of the city in an area that has been historically devoid of such a characteristic. For passing traffic on the Greenhills Road, it will be seen in context with the townscape and contribute positively to this area’s identity and sense of place signifying commencement of a new architectural and landscape character.

In general, views experienced by pedestrians are focused at ground level and from these areas the proposal will be obscured by existing buildings or boundary treatments ensuring *negligible / no* effects to the vast majority of the city. Where visible in glimpse views, it will invariably be a part of a built townscape and its existing condition, proximity of buildings, infrastructure and adjacent land-uses ensure it can be accommodated without causing any detriment to townscape character. There will be new open spaces, enhanced linkages and amenity set off and around the new development that correlates with the objectives in the Development Plan (Objective REGEN zone) that, on completion and as the landscape works mature, will clearly have positive effects on this part of the city.

In summary, the effects, while significant will be a positive statement in terms of the townscape development, legibility and future while tying effectively in with many of the ambitions and objectives of the Development Plan in terms of residential-led regeneration, mixed-use development and services as addressed in the accompanying planning statement.

15.5.2.4 Visual Assessment

The following tables summarise the existing views and context of the 12 no. representative viewpoints and the likely impact on these views and visual quality deriving from the proposed development and the consequent significance of impact.

Table 15.8: Viewpoint 1 – Walkinstown Avenue

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	Walkinstown Crescent is part of a residential area located off Ballymount Road Lower and Walkinstown Avenue with this viewpoint bring located approximately 350m to the north of the Application Site. A triangular area of open space is located to the core of this residential area which comprises low-rise / two-storey terraced housing. The small park allows relatively open views to the south, across the intervening roads and eastern edge of Ballymount Trading Estate towards the Application Site area (though this is obscured). The majority of visual receptors will be local residents.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	A small portion of the proposed development will be visible from this section of area with filtered views of the higher storeys being visible amongst the trees within the open space and over the rooftops of properties on Ballymount Road Lower. The combination of distance and trees ensure that the proposal never forms a

	significant portion of the view. Any awareness of the proposal will not have a significant effect on the overall quality of the existing view or visual amenity of this area. Given the distance, and partial nature of the view, these effects are assessed as *slight neutral*.
Significance Summary	Minor: proposed development will form a minor component in the distant view but would have no significant effect the quality or character of this area or open space.

Table 15.9: Viewpoint 2 – Greenhills Road

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	The R819 Greenhills Road commences at the Walkinstown Roundabout, 235m to the north-east of the Application Site and crosses the cityscape to the south-west towards the M50 and Tallaght. Existing commercial buildings, boundary treatments and associated advertising signage are notable features in this very close proximity (c. 80m) view from the road of the eastern part of the Application Site. The majority of viewers will be road users including pedestrian, those in the adjacent residential properties on the north side of the road, those working in commercial properties and those travelling through for commuting reasons.
Viewpoint Sensitivity	Low / Medium
Predicted Visual Changes	The proposed development will be an immediately apparent component in the view and redefine the baseline characteristics dominating the built form and architecture to the south and west. This transformation will constitute a *substantial* change in view and context but one that will include positive effects due to an improvement in localised cityscape setting, architecture and use including public

	realm areas that would symbolise progress and revitalisation of this area. The broad nature of the adjacent road and associated large scale buildings and horizontal plinth provide a sufficiently wide setting that would be able to effectively accommodate and balance the scale of the proposed development in this view.
Significance Summary	Major: The proposal is likely to form a prominent and significant component within the overall view along Greenhills Road to the west.

Table 15.10: Viewpoint 3 – Greenhills Road near Walkinstown Roundabout

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	The R819 Greenhills Road commences at the Walkinstown Roundabout c.235m east of the Application Site with the road aligned with low-rise residential houses and commercial properties. Partial views of the eastern end of the site, over 195m distant, and associated buildings (including the Chadwick's premises) are afforded in the linear view to the west along the road corridor. The site beyond these is obscured by intervening townscape and built form. The majority of viewers will be road users including those using the pedestrian footpaths on both sides and those here for work or commuting reasons.
Viewpoint Sensitivity	Low / Medium – road users, adjacent residential properties and workers in nearby units
Predicted Visual Changes	The upper floors of the eastern buildings that form part of the proposal will be an immediately apparent and notable addition to the skyline to the west rising above the low intervening townscape forming a distinctive set of new buildings on the backdrop having moderate effects. Given the distance, urban context and mixed quality or from of architecture and

	townscape in this view, this addition would not have any detrimental effects on the setting or character of this part of Greenhills Road. It will not close off or affect any notable view but it would visually symbolise a change in sense of place and density of townscape to the west of Walkinstown.
Significance Summary	Moderate: The proposal is likely to form a readily apparent component within the overall view along Greenhills Road to the west.

Table 15.11: Viewpoint 4 – Walkinstown Roundabout

Image courtesy of 3D Design Bureau (2022

Viewpoint Baseline	Walkinstown Roundabout (also known as Walkinstown Cross) dates from the 1950's and is one of the busiest junctions in the city and serves as the conduit for six roads (including the Greenhills Road). The significant junction has an open characteristic with the area of roads / footpaths and roundabout extending to approximately 1 hectare being bound by low-rise (up to 3 storey) commercial buildings including public bars, restaurants and retail premises. Views are afforded to the south-west along Greenhills Road though the Application Site itself is largely obscured by intervening buildings on the west of the roundabout. The majority of viewers will be road users including pedestrians accessing local services or facilities or those passing through for work or commuting reasons
Viewpoint Sensitivity	Medium
Predicted Visual Changes	The upper parts of the proposed development will be visible from parts of the roundabout area forming a new set of buildings on the western skyline. Given the distance (c. 300m) and context of the intervening broad road-scape / townscape, the effects would be of a moderate nature and any awareness of the proposal will not have a significant or unacceptable effect on the overall quality of the existing

	view or visual amenity of this area. It will not close off any notable view but it would visually symbolise a change in sense of place and density of townscape to the west of Walkinstown.
Significance Summary	Moderate: The proposal is likely to form a readily apparent component within the overall view to the west of the roundabout.

Table 15.12: Viewpoint 5 – Beechfield Park Walkinstown

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	Beechfield Park located over 435m to the east in Walkinstown and includes sports pitches and a playground extending to approximately 1.95 hectares. The park has an open nature being predominantly mown grass with any trees on the park periphery. The park is bound by the rear of properties on Cherryfield Avenue to the west, south and east and by Beechfield Road to the north. The properties are two-storey semi-detached and terraced houses. The Application Site is over 440m from the park edge and it and all existing building are obscured by intervening townscape. The majority of visual receptors will be local residents and users of the park.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	A small portion of the proposed development will be visible in gaps between trees and over the peripheral properties on Cherryfield Avenue looking west from the internal park areas. The majority of the proposal will be visually obscured and combination of distance and partial views ensure that the proposal never forms a

	significant portion of the view. Any awareness of the proposal will not have a marked effect on the overall quality of the existing view or visual amenity of the park and effects are assessed as *slight neutral*.
Significance Summary	Minor: proposed development will form a minor component in the view but would not have a notable effect on its overall character or visual quality.

Table 15.13: Viewpoint 6 – St. Joseph's Road

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	St Joseph's Road is located within a dense housing area to the south of the Application Site and leads from St James Road to the north towards the Holy Spirit Church off Limekiln Lane to the south. The road is aligned with trees within verges and terraced two-storey houses. The Application Site, over 370m distant, is obscured by intervening buildings. The majority of visual receptors will be local residents and road users.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	A small portion of the proposed development will be visible from this section of St Joseph's Road rising in between the avenue trees and over the roofs of houses when looking north. The magnitude of change is not significant given the intervening urban context and elements, the enclosed nature of view looking north as well as extent of proposed

	development that would be visible. The effects are assessed as *slight neutral*
Significance Summary	Minor: proposed development will form a minor component in the view to the north but would not have a notable effect on its overall quality.

Table 15.14: Viewpoint 7 – Greenhills Park

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	Greenhills Park is located over 400m to the south near the Greenhills Community College and includes large areas of open grassland and some sports facilities. The park has a very open characteristic being largely set out in managed grass with little in the way of trees or vegetation on its northern boundary which is defined by a lane to the variable fences and walls at the rear of property gardens on St Brendan's Crescent and St Anthony's Crescent. While there is open vantage to the north, the nature of intervening townscape across Greenhills ensures that existing buildings on the Application Site are negligible. The majority of visual receptors will be local residents and users of the park.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	The proposed development will be a discernible change rising into the skyline to the north with the higher parts of the proposed blocks evident above the intervening residential housing having *slight neutral* effects. While an evident addition to the visual backdrop from this part of Greenhills Park, it would not have any significant or adverse effects due to distance (c. 500m from this viewpoint) and existing townscape context while having no direct influence on

	the use, enjoyment or amenity of the park.
Significance Summary	Minor: proposed development will form a minor component in the view but would not have a notable effect on its overall character or visual quality.

Table 15.14 Viewpoint 8 – St, James's Road

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	St James Road provides a circuitous connection between Limekiln Road / Tymon Park to the south and St Peters Road (R112) to the north providing access to 11 streets or lanes off it to various housing estates or areas in the Greenhills area. The road is bound by two-storey terraced housing for the majority of its route that ensure views are visually contained to the road corridor While it is approximately 160m from the Application Site at is closest point, all buildings on the site are visually obscured from the road. The majority of potential visual receptors will be local residents and commuting / through traffic.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	The majority of the development will be obscured by intervening townscape but the upper parts of some blocks will rise above the properties to the north of St James Road being a discernible addition to the backdrop and skyline in views to the north-east. It will represent a slight change in scale and nature of building in the periphery of the Greenhills area which is characterised by predominantly low rise residential estates. Effects are assessed as *slight neutral* and not significant on account of distance, viewer sensitivity and that any awareness of the proposal would not have a

	significant or marked effect on the overall quality of the existing view.
Significance Summary	Minor: proposed development will form a minor component in the view to the north-east but would not have any significant effects on its overall quality.

Table 15.15: Viewpoint 9 – Tymon Park

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	Tymon Park is situated over 720m to the south-west in the old townland of Greenhills and is located to the south of the Limekiln estate. It extends to an area of over 300 acres / 120 hectares includes 29 no. sports pitches and a children's adventure playground but is divided in two by the M50 motorway. It has a very open character due to parts of the park being grassland with views afforded in all directions over the west city, the M50 and on south towards the peripheral hills to the south. In the direction of the Application Site, the townscape comprises a dense but relatively low-rise housing estates with larger scale commercial units forming part of the view nearer the Application Site. The majority of visual receptors will be those using the park for amenity or recreational (including sporting) purposes.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	The upper floors of the proposed development will be a discernible addition to the visual backdrop / skyline set above the broader Greenhills townscape on a small part of the panoramic view to the east. Due to distance and extent and scale of intervening land-uses, the impacts are not assessed as being of a significant nature and rated as *slight neutral*. There will be no detrimental or direct effects on the character or visual amenity of Tymon Park.

Significance Summary	Minor: proposed development will form a minor component in view backdrop but would not have any significant effect on its overall quality or views from the park.

Table 15.16: Viewpoint 10 – Greenhills Road

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	Approximately 300m to the west of the site on Greenhills Road, the elevated nature of the road in conjunction with more limited roadside vegetation and built environment near the Lidl store allow slightly elevated views over the Greenhills and west Walkinstown area. The existing units on the site are largely obscured or set amongst similar utilitarian and functional buildings that ensures they are negligible components in the view. The majority of visual receptors will be passing road users heading towards Walkinstown or accessing the local supermarket.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	The proposal will rise into visual backdrop / skyline above the existing commercial lands and buildings having *moderate* effects on this section of the Greenhills Road and acting as notable and new landmark set of buildings in views to the east. Such effects should be measured against the existing setting with the majority of the view comprising utilitarian townscape of limited visual quality and value. The addition would not have any detrimental effects on the setting or character of this road but would be a major component in the visual backdrop that would symbolise progress and revitalisation of this area.

Significance Summary	Moderate: The proposal is likely to form a readily apparent component within the overall view towards Walkinstown and the city.

Table 15.17: Viewpoint 11 – Walkinstown Avenue Park

Image courtesy of 3D Design Bureau (2022)

Viewpoint Baseline	Walkinstown Avenue Park is located over 470m to the north off Walkinstown Avenue. The park has three football pitches, two GAA pitches and a tennis court). It extends to approximately 8.5 hectares with the majority of the park managed as open grassland. Looking south towards the Application Site and existing industrial units off Ballymount Road Lower, views are filtered or obscured (in summer) by a thick band of trees on the periphery of the park. The majority of visual receptors will be those using the park for amenity or recreational (including sporting) purposes.
Viewpoint Sensitivity	Medium
Predicted Visual Changes	The upper part the proposed development will be a discernible in winter months with filtered views possible through the boundary trees and being a slight change to the panoramic view to the south. Due to distance and intervening land-uses, the impacts would not be of a significant nature and rated as *slight neutral* with no detrimental or direct effects on the character of Walkinstown Avenue Park or its amenities predicted.
Significance	Minor: proposed development will form a minor component in view backdrop but

Summary	would not have any significant effect on its overall quality or views from the park.

Table 15.18: Viewpoint 12 – Greenhills Industrial Estate Service Lane

Image courtesy of 3D Design Bureau (2022

Viewpoint Baseline	Located to the south and rear of the Application Site is a narrow lane set between utility boundaries (mainly steel fences and concrete walls) that provides access to large scale warehouses and premises including iron works, motor repairs and manufacturing industries. The area has a very functional townscape character and there is little in the way of aesthetic considerations including planting towards the western end of this private lane. Views of the site are obscured by intervening walls (with barbed wire tops) that mark its boundary. The majority of visual receptors will be those in this area for employment or business reasons.
Viewpoint Sensitivity	Low
Predicted Visual Changes	The upper parts of the western end of the proposed development will rise above the intervening wall and introduce a notable change of land-use and architecture in this area. Given the existing context of the view, the change would not have any significant bearing on its quality and value.
Significance Summary	Minor: proposed development will form a notable component in view backdrop but would not have any significant effect on its overall quality.

15.6 Do-Nothing Approach

Given that the area is designated "*To facilitate enterprise and/or residential-led regeneration"* under Objective REGEN in the Development Plan, it is likely that the area site will be subject to on-going interest for mixed use or residential development in the future. The nature of any future applications is impossible to determine but they could be of a more piecemeal and disjointed nature.

Until any application is granted, it is reasonable to assume there will be limited visual or character alterations to the existing situation and townscape / landscape setting. On balance of these, it is considered that the continued use of the land for such purposes represents a Low magnitude of landscape impact.

The existing site would be subject to minimal landscape management and usage and continue to contribute negatively to the character and sense of place in the Greenhills Road and Walkinstown area.

15.7 Remedial or Reduction Measures: Mitigation

The appearance of the development is a major influence on how the site is perceived by the public so the proposed development includes extensive landscape and open space works with the overall objective of providing a layout that integrates the development into the surrounding townscape / landscape and provides a series of coordinated and linked green spaces.

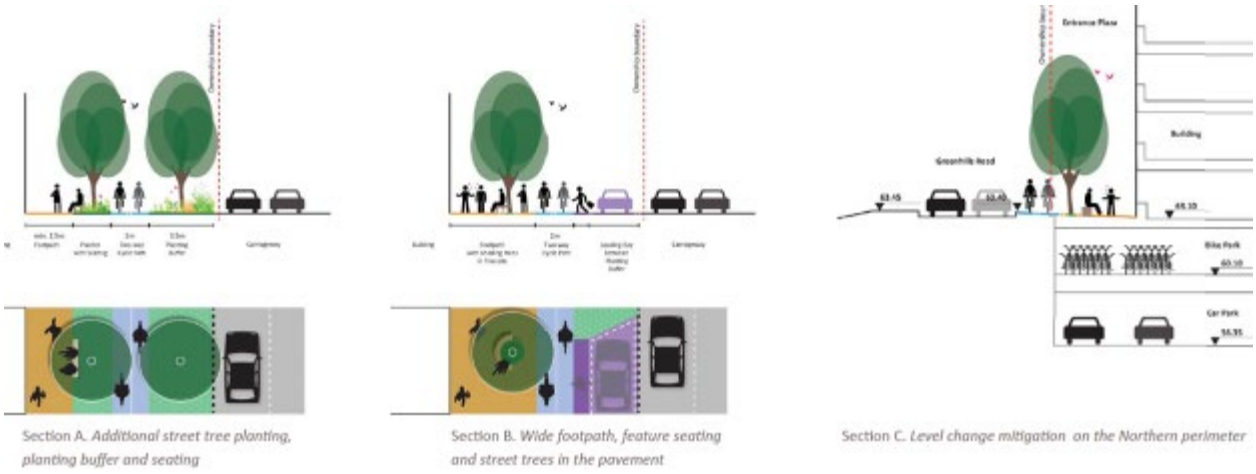
This includes designing of green infrastructure, formal and informal open spaces, public realm and other external areas for the amenity and use of residents and others in this area as shown on the Landscape Design drawings. **See Figure 15.5 Proposed Landscape Setting**

13.7.1 Landscape Design and Amenity Considerations

15.7.1.1 Circulation and Connectivity

The main vehicular entrances are off the Greenhills Road (similar to the existing road junction) providing access to the internal car parks and the external parking area to the south-west of the site.

Figure 15.4: Extract from the Landscape Design Statement



The landscape design aims to create a sense of connectivity between spaces through the use of high quality materials and the establishment of a carefully considered planting scheme with a cyclist / pedestrian footpath network helping to ensure that both residents and guests can navigate around the

site easily.

Cyclist provision is an integral part of the external design with bicycle paths following the internal road routing but separated by landscape elements including tree planting to assist in safety. Bicycle storage provision is facilitated internally and at strategic node/meeting points.

Wide pedestrian footpaths connect the areas of public realm and alongside internal roads close that will allow interaction of these spaces with their routes and direction visually and aesthetically enhanced by tree and hedge planting. The selection of materials includes a mix of permeable concrete pavers and compacted gravel set between appropriate edgings. Urban furniture is to be located at key locations or spaces along these connections for resident or visitor use.

Identifiable future cycle and pedestrian linkages are also considered in relation to the wider connectivity and linkages to the townscape across the Greenhills / Walkinstown area.

CGI 15.1: Proposed view of development demonstrating linkages and connectivity proposals

15.7.1.2 Boundary Treatments

The proposed works include an overhaul of the planted bank to the north of the Application Site on the steeper slopes towards the Greenhills Road to both improve this planting mix and enhance its screening ability and bio-diversity benefit. Dense planting including trees, climbing plants and ground cover are integrated into the proposed retaining walls towards Greenhills Road. The area aside the replaced fence on Greenhills Road is to be replanted with a native hedgerow to provide a natural corridor and visual screen.

To the south, landscape works including hedgerows and avenue trees are proposed on the development side of the former service road to assist natural screening and site definition.

15.7.1.3 Public Realm Landscapes

The public realm includes broadened streetscapes with green infrastructure (including bioswales), a centralised public courtyard, public realm streetscapes, pocket parks, urban furniture, shared spaces and designated play areas for resident and local visitor use. The site layout will ensure properties face areas of open space (and streets) to provide passive supervision / ownership ensuring no hidden corners (as per Space Syntax research and recommendations).

The open spaces have been designed to coordinate with the changes in levels across the site and use these variations to create further pocket parks and amenity landscape areas accessed by a series of ramps and steps.

The activity area provided in the public open space is circa 235m² and includes a mix of areas for both physical activity. Incidental play elements are included elsewhere throughout the development

CGI 15.2: Elevated view of internal public open space to core of the proposed development including amenity area and seating areas

15.7.1.4 Communal Landscapes

Communal open space is provided within podium parks and roof gardens including areas of hard landscape, tree planting, lawns, ornamental planting including seating / passive amenity areas, and areas for communal garden and outdoor working. The space also includes a designated play area. The objective of the collective podium parks and communal spaces is to allow residents at all levels ready access to exterior garden spaces.

15.7.1.5 Green Roofs

60% of the roof areas of the proposed buildings will include sedum green roofs designed, in part to assist in drainage patterns by intercepting rainfall, building insulation and but also to enhance biodiversity. These areas are not accessible to residents but will contribute to the general character and environmental integrity of the development. Rain gardens are also integrated into the shared surface space to mitigated surface runoff.

15.7.1.6 Hard Landscapes Works

The selection of hard landscape materials is based on sustainability, permeability and suitability for an urbanised environment and usage. This will include natural and manufactured paving with a consistent selection of materials specified through the proposed pen spaces in terms of shape, material, form and colour.

15.7.1.7 Planting Works

Extensive soft landscape works are proposed to assist with visual integration, open space definition and screening both internally and externally. The collective tree planting will, as they mature give this site a far more wooded character than it has at this time.

Bio-diversity measures including bat and bird boxes, relocation of potentially effected ground flora into the open space and laying out of a lowland meadow are also part of the proposed development and will be undertaken under direction from site ecologists.

CGI 15.3: Internal view of proposed development indicating landscape proposals and open space arrangement of courtyard

The landscape works include for planting of trees within public open space, communal open space and along new connection routes through the proposed development that will entail over 360 no. 'semi-mature' or 'extra-heavy standard' size trees to provide an instant impression. The collective trees will, as they mature, assist in merging the proposed development into the surrounding landscape and local views as well as set about creation of the areas new landscape character. Other landscape works will include structure planting, amenity planting, garden trees, hedgerows and wooded belts. Such planting will more than compensate for the loss of the low-quality vegetation that currently exists and will enhance the overall "green" cover and nature of the site.

Figure 15.5: Proposed Landscape Setting

Planting and augmentation of existing vegetation towards Greenhills Road will consist of evergreen and deciduous trees with under-story scrub mix. A range of plant species and heights will be selected to provide quick establishment and assist in visual integration.

Amenity planting will consist of trees, native woodlands, hedgerows, shrub / groundcover planting, meadow / wildflower and grass seeding works. As the planting matures, it will change the nature of the site and its visual amenity and the height of planting for assessment purposes is as follows:-

- Planting at Year 1 : 3 metres;
- Planting at Year 15 : 8 metres; and
- Planting at maturity : 20 metres (i.e., Year 25)

Plants selected will be predominantly indigenous and species selection based on those in the "All-Ireland Pollinator Code / All Ireland Pollinator Plan 2021-2025" to ensure successful plant establishment that will merge visually and ecologically into this area. Landscape works will be undertaken by an ALCI approved landscape contractor and in accordance with *BS 4428:1989 Code of practice for general landscape operations (excluding hard surfaces*). Any trees or shrubs dying, damaged or removed will be replaced in the following planting session with plant of similar size and species. Trees supply and planting shall correspond to *BS 8545 Trees: from nursery to independence in the landscape - Recommendations.*

CGI 15.4: Internal view of public open space and proposed play area

15.8 Residual Impact of the Proposal

The proposed development is regarded as being permanent or long term in landscape and visual terms. The most appreciable effects relate to the scale and nature of the proposed development which will occupy the majority of the site footprint although 12% is to be set out as public open space and part of a wider landscape development proposal. While substantial, the new facades, architecture, building form, usage and enhanced urban realm will be *positive* and significant contributions to the townscape character of this area. Further the active frontages at ground level will equate to a significantly improved architectural relationship with the adjacent streetscape and reinvigorate use and activity on giving it a more productive and appropriate land-use for this nodal and gateway point.

The proposed development will be significantly taller than the existing buildings in this part of Greenhills and have landmark status in this area and on this route to and from Walkinstown. The broad width of Greenhills Road in conjunction with the generally large scale of adjacent townscape ensure that this

development, while higher, can be accommodated and absorbed without detriment or adverse character effects. This proposal will be a notable departure from the normal architecture having high level of design and façade detail which will mark it out in architectural terms as locally distinct. Such an introduction would enhance the existing non-descript townscape character and have positive effects on this part of the city.

The proposal will be a prominent and a significant addition to the local skyline and townscape that is likely to influence and instigate further (cumulative) changes that will have substantial and positive contribution to character of this part of Dublin. While effects are categorised as significant to areas on and aside the proposed development site, the baseline setting ensures it can be successfully absorbed into this area without causing any adverse townscape / landscape effects and it will serve this part of the city in a positive way as a building with landmark and notable architectural status.

Table 15.22: Summary of Predicted Townscape Effects

Townscape Character Area	**Landscape Sensitivity**	**Magnitude of Change**	**Significance & Magnitude of Effects**		
			Construction (Temporary)	**Operation (Permanent)**	**Residual (Permanent)**
Application Site	Low	High	Moderate negative	Moderate positive	Moderate positive
Greenhills and Walkinstown	Medium	Medium to Low	Slight negative	Slight positive	Slight positive
Dublin City	Medium	Low	Slight negative	Slight positive	Slight positive

Table 15.23: Summary of Predicted Visual Amenity Effects

Representative Viewpoint Location	**Viewpoint Sensitivity**	**Magnitude of Change**	**Significance & Magnitude of Visual Effects**		
			Construction (Temporary)	**Operation (Permanent)**	**Residual (Permanent)**
VP1: Walkinstown Crescent	Medium	Minor	Slight negative	Slight neutral	Slight Neutral
VP2: R819 Greenhills Road	Low /Medium	Major	Moderate negative	Slight positive	Slight positive
VP3: Greenhills Road near Walkinstown Roundabout	Low / Medium	Moderate	Slight negative	Slight Neutral	Slight Neutral
VP4: Walkinstown Roundabout	Medium	Moderate	Slight negative	Slight Neutral	Slight Neutral
VP5: Beechfield Park, Walkinstown	Medium	Minor	Slight neutral	Slight Neutral	Slight Neutral

VP6: St Joseph's Road	Medium	Minor	Slight neutral	Slight Neutral	Slight Neutral
VP7: Greenhills Park	Medium	Minor	Slight neutral	Slight Neutral	Slight Neutral
VP8: St James's Road	Medium	Minor	Slight neutral	Slight Neutral	Slight Neutral
VP9: Tymon Park	Medium	Minor	Slight neutral	Slight Neutral	Slight Neutral
VP10: R819 Greenhills Road	Medium	Moderate	Slight negative	Slight Neutral	Slight Neutral
VP11: Walkinstown Avenue Park	Medium	Minor	Slight neutral	Slight Neutral	Slight Neutral
VP12: Greenhills Industrial Estate Service Lane	Low	Major	Slight neutral	Slight positive	Slight positive

15.9 Potential Cumulative Impacts

Cumulative landscape or visual effects are the combined effects that arise through the interaction of two or more developments, whether of the same type or not, within the landscape and visual baseline context. Collectively they give rise to an overall combined effect.

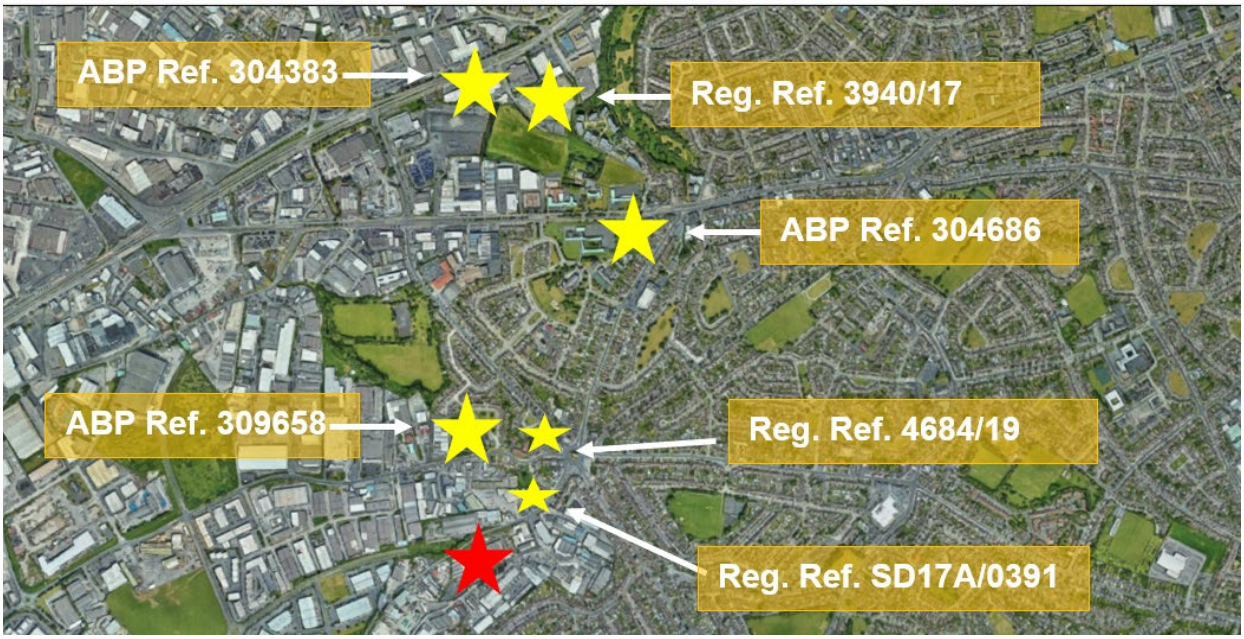
A significant cumulative effect will occur where the addition of the proposed development to other existing and developments results in a landscape or view that is defined by the presence of more than one major development and is characterised primarily by large scale development so that other patterns and components are no longer definitive.

Chapter 3.3 identifies the following SHD planning applications in this part of Dublin that could give rise to cumulative impacts as follows:-

- *CHM Premises, Ballymount Road Lower, Walkinstown, Dublin 12 (Reg. Ref. ABP-309658-21);*
- *Lands immediately east of the Assumption National School, Long Mile Road, Walkinstown, Dublin 12 (Dublin City Council) (ABP Ref. ABP-304686-19);*
- *Carraiglea Industrial Estate, Muirfield Drive, Naas Road, Dublin 12 (Dublin City Council) (Reg. Ref. 3940/17);*
- *Lands at the Former Concorde Industrial Estate, Naas Road, Walkinstown, Dublin 12 (Dublin City Council) (ABP Ref. ABP- 304383-19);*
- *Lands at 138 Walkinstown Avenue (DCC Ref. 4684/19);*
- *Lands at 22 Greenhills Road, Walkinstown, Dublin 12 (SDCC Ref. SD17A/0391).*

The closest of these developments is approximately 250m distant from the Application Site and, given the existing built form and townscape in the Dublin 12 area, there are no significant cumulative effects predicted to derive from this proposal in conjunction with these in townscape / landscape and visual amenity terms. See Figure 15.6 below.

Table 15.6: Locations of SHD planning applications (yellow stars) in relation to the subject site (red star) in Dublin 12.



15.10 Worst Case Scenario

No worst case scenario has been identified.

15.11 Monitoring and Reinstatement

The management of landscape areas will initially be undertaken by an ACLI approved landscape contractor. After 12 months the maintenance will be handed over to the long-term Management Company who will take over maintenance of set areas on completion of the development. There will be a five year guarantee after construction that all the proposed planting works still exists and has been established in line with landscape design expectations. This will ensure that no planting has been removed or damaged due to the subsequent construction or plant failure. The planning application is accompanied by Landscape Management and Maintenance Plans setting out the objectives for management of external spaces or public realm areas for a 20 year period.

Regular monitoring will be undertaken to determine success of landscape operations and ensure they are behaving in the manner anticipated at design stage. If required, elements of the design can be adapted to accommodate changes required by actual field experience.

15.12 Difficulties in Compiling Information

No difficulties were encountered in compiling the information for this chapter.

15.13 Conclusions

15.3.1 Baseline Landscape and Visual Setting

The Application Site comprises 2.79 hectares / 6.89 acres of land off Greenhills Road in Walkinstown,

Dublin 12. The city centre is located 6km to the north-east. It comprises a brownfield (redundant) site which would

The Application Site comprises an extensive area of commercial warehouses and functional buildings some of which are degraded, run-down and vacant with extensive areas of utilitarian parking provision. The majority of the site has been subject to historic quarrying with grading and modifications undertaken to facilitate industrial scale buildings and yard areas and large areas are graded flat. More significant gradients are located to the north on a bank rising towards the Greenhills Road set on an embankment associated with a glacial esker.

Bound by unsightly security fences and walls subject to graffiti and weed growth respectively, the site would be categorised as poor townscape in terms of quality and value and very capable of accommodating change in townscape / landscape and visual terms. It has been in a similar condition for some time and contributes adversely to the setting of Greenhills and Walkinstown and would be categorised as townscape of low sensitivity, quality and value. The site carries no environment, amenity, heritage, visual amenity or landscape designations and possesses nothing that would be categorised as sensitive in terms of townscape character, features or vegetation.

Beyond the Application Site and adjacent industrial park areas, the townscape of Walkinstown and Greenhills comprises a mix of good to ordinary townscape of medium sensitivity comprising extensive areas of low-rise mid-20th century housing estates and incidental parks. There are no heritage or conservation areas in this area.

The *Landscape Character Assessment of South Dublin County 2015* (LCA) noted that the key "*Landscape Value*" contributors in south Dublin are the public parks, the Dodder River Valley, 19th century industrial heritage and views out to Dublin (Wicklow) Mountains and agricultural hinterland. These are all sufficiently distant from the Application Site to be subject to any significant landscape or visual effects.

A review was also undertaken of the *Prospects to be reserved and protected*" as per the *South Dublin County Council Development Plan (2016-2022)* but this established none are in close proximity to the site or will be impacted by activity or land use on the Application Site. Site surveys identified 12 no. representative viewpoint locations where the proposed development might be visible or where key visual receptor groups might visit, work or stay and any general movement through the area. Built-up townscape, infrastructure and vegetation are features of the Greenhills townscape and this ensures that views consistently change in context, scale and extent with many views of the Application Site, even from close proximity locations closed off.

Built townscape ensures that views consistently change in context, scale and extent with many views of the Application Site, even from close proximity locations within the nearby housing estates and business parks closed off by intervening buildings or boundary features. There are no medium or longer views due to intervening townscape and the gently undulating topography not facilitating potentially elevated views towards the Application Site. Short range views of the Application Site are largely confined to an approximate 500m long corridor on the Jamestown Road.

15.13.1 Proposed Development Summary

The proposed mixed use development comprises 633 no. build-to-rent apartment units, 10 no. commercial/retail units, residential amenity/management facilities, creation of new public open spaces including plazas, public realm and enhanced streetscape.

Works include services and amenities, car parking and cycle spaces, public realm works towards Greenhills Road and the service road to the south and creation of internal public open spaces, communal open spaces, private amenity areas and roof terraces.

15.13.2 Predicted Significance of Landscape and Visual Effects

Any assessment must be measured against the current situation on site which constitutes a vacant brownfield site bound by a major road and utilitarian buildings set in a largely functional landscape that contributes negatively to local townscape and has limited aesthetic appeal. In broad terms, a proposal of this nature and scale will become part of the integrity, legibility and identity of the Greenhills and Walkinstown area with significant effects to local townscape character and visual amenity. The proposed development will constitute a significant change to the local sense of place with built form extending across the majority of the Application Site and therefore being an immediately apparent and substantial change to close proximity views from Greenhills Road and adjacent areas.

While it will be a substantial development, the baseline setting of large scale townscape, adjacent built form and broad road-scape ensure this area is capable of absorbing such a change without detriment. In all views, the proposed development would be seen in context with other large buildings, infrastructure, elements or structures and would not have any detrimental effects.

The proposal offers the opportunity for a marked improvement in the architecture and streetscape comparative to the existing situation. This includes significant planting works and extensive public realm landscape works which will provide an enhanced townscape sense of place and legibility while offering variation and relief from the prevailing similar and repetitive building type in this part of the city. Consequently, it is considered the development can be successfully absorbed into this area without causing adverse townscape / landscape effects.

Beyond close proximity areas, the existing built environment provides a density of building and vegetation that will ensure the majority of areas will experience negligible to no effects (i.e., insignificant) on townscape character and visual amenity due to the proposal being visually obscured. There will be no effects to any designated historic sites, views, townscapes, key landmarks or environments at a local or city wide level.

15.13.3 Summary Statement on Townscape and Visual Effects

The Application Site comprises a former industrial (and now brownfield) site that contributes adversely to the character and visual quality of this part of Dublin. The proposed development, while substantial, would result in a positive contribution to the townscape character and urban fabric of this part of Greenhills and Walkinstown. While recognising there are some significant local impacts, this report concludes that this proposal, on balance, has no unacceptable townscape / landscape or visual effects and can be successfully absorbed into the character and views of this part of the city.

16.0 INTERACTIONS BETWEEN ENVIRONMENTAL FACTORS

16.1 Introduction

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

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

Ms. Anne McElligott of Hughes Planning and Development Consultants, graduated from University College Cork (UCC) with a Masters in Planning and Sustainable Development (MPLAN) in 2011, having previously completed a Bachelor of Arts Degree in Geography and Irish from University College Cork in 2011. Anne has 10 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Anne is currently Associate Director in the Practice of Hughes Planning and Development Consultants.

Mr. Christopher Browne of Hughes Planning and Development Consultants, graduated from University College Dublin (UCD) with a Masters in Urban Design and Planning in 2018, having previously completed a Bachelor of Arts Degree in Geography and History from Dublin City University in 2012. Christopher has 3 years professional experience in the field of planning and development consultancy, which has included providing consultancy services in respect of several major urban regeneration projects including EIA. Christopher is currently an Executive Planner in the Practice of Hughes Planning and Development Consultants.

The preceding Chapters 4.0 to 15.0 of this EIAR identify the potential environmental impacts that may have occur as a result of the proposed development in terms of Population and Human Health; Biodiversity; Land and Soils; Water; Noise and Vibration; Air Quality and Climate; Material Assets; Waste; Archaeology, Architectural and Cultural Heritage; and Landscape and Visual Amenity. All of the potential significant effects of the proposed development and the measures proposed to mitigate them have been outlined in the preceding chapters of this report. However, for any development with the potential for significant environmental effects there is also the potential for interaction amongst these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect. The purpose of this chapter is to identify and draw attention to interactions and interdependencies between the various chapters of this EIAR and associated topic specific assessments.

As previously stated, the scoping process of this EIAR occurred concurrently with the masterplanning process. As members of the design team contributed to this EIAR, detailed elements of the scheme evolved. The relevant consultants liaised with each other and the project architects, engineers and landscape architects where necessary to review the proposed scheme and incorporate suitable mitigation measures where necessary. For example, the proposed development has been amended to provide retail units along Greenhills Road, which has informed the open space design while elevational treatments were undertaken following preparation of the sunlight and daylight assessment. Most of the interactions informed the design approach undertaken by the project architect in the first instance and were considered to be design considerations and site constraints.

16.2 Impact Definitions

Section 3.7.7 of the *Draft Guidelines on the Information to be Contained in Environmental Impact Statements* published by the EPA provides guidance on how to measure and define potential impacts on the environment. The following assessment criteria have been used to assess significant interactions:

Impact Definition	**Impact Definition**
Neutral	An interaction which does not affect the environment
Positive	An interaction which improves the quality of the environment
Negative	An interaction which reduces the quality of the environment
Significance	**Definition**
Imperceptible	*Capable of measurement but without noticeable consequences*
Not Significant	*Causes noticeable changes in the character of the environment but without noticeable consequence*
Slight	*Causes noticeable changes in the character of the environment without affecting sensitivity*
Moderate	*Alters character of environment consistent with existing and emerging trends*
Significant	*By its character, magnitude and duration or intensity alters a sensitive aspect of the environments*
Profound	*Obliterates sensitive characteristics*

Table 16.1 Assessment criteria utilised in assessing the significance of interactions

16.3 Summary of Principal Interactions

The following tables highlight the interactions that occur between topics addressed by this EIAR and rate the outcome of those interactions employing the above criteria.

Subject Interaction	**Interaction With**	**Interactions/Inter-Relationships (and, where relevant mitigation proposed)**	**Residual Impact *Significance***
Population & Human Health	Air Quality & Climate	Construction vehicles, generators etc., may give rise to some CO2 and N2O emissions. However, due to the short-term and temporary nature of these works the impact on climate will not be significant.	Neutral *Slight*
Population & Human Health	Biodiversity	There is potential for disturbance to breeding birds to occur during initial construction stages. Planting of shrub and tree species to take place as part of project design. No removal of vegetation to take place during the nesting season. Standard construction phase measures are proposed.	Neutral *Not Significant*
Biodiversity	Landscape & Visual Impact	The site comprises primarily of built land. Demolition and construction will remove existing habitats on site. Planting of a range of native and non native trees and shrubs are incorporated into the	Neutral *Not Significant*

		landscape plan.	
Biodiversity	Water & Hydrology	Deterioration in water quality due to surface water discharges associated with the Construction Phase. Mitigation measures to protect surface waters and best practice construction measures will be implemented.	Neutral *Not Significant*
Biodiversity	Fauna	The construction phase of the development could impact on site fauna including a fox den, birds due to loss of potential foraging and nesting habitats and bat habitats. The den should not be disturbed during the breeding/rearing season, which typically lasts from March to June whilst appropriate bat lighting has been incorporated into the design.	Neutral *Not Significant*
Biodiversity	Land and Soils	The construction phase of the development could impact on site fauna including a fox den, birds due to loss of potential foraging and nesting habitats and bat habitats. Mitigation measures are proposed in Chapter 5 to minimize any impacts on the receiving environment.	Positive *Not Significant*
Biodiversity	Overall Ecology	SuDs measures and a landscape strategy will be implemented.	Positive *Not Significant*
Land, Soils and Geology; and Water and Hydrology	Population & Health	A negligible to small adverse impact on the hydrogeological environment, provided the mitigation measures outlined in the report are implemented. This will ensure that the predicted impact is long-term in duration and not significant in quality.	Neutral *Not Significant*
Land, Soils and Geology	Water and Hydrology	As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoil's and impact the underlying groundwater. A construction environmental management Plan incorporates a number of mitigation measures which will prevent discharge of contaminants via soils and groundwater to surface water.	Neutral *Not Significant*
Land, Soils and Geology	Air Quality & Climate	During the construction phase, dust emissions may potentially arise from soil erosion. The mitigation measures outlined, ensure that soil erosion and, indirectly, dust emissions are minimised.	Neutral *Not Significant*

		Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction.	
Land, Soils and Geology	Population & Human Health	Dust emissions during construction can potentially impact on human health. The potential for impact on ambient air quality and effects on human beings/health, arising indirectly from soil erosion and resulting dust emissions during the construction phase of development, has been considered in Chapter 9.0 of this document. Mitigation measures will ensure that any potential impact is minimized.	Neutral *Not Significant*
Land, Soils, Geology & Hydrogeology	Biodiversity	Dust emissions during construction can cause temporary impacts on local bird populations. The potential for effects on biodiversity, arising indirectly from soil erosion and resulting dust emissions during the construction phase of development, has been considered in Chapters 5.0 and 9.0 of this document.	Neutral *Not Significant*
Water and Hydrology	Biodiversity	Reduced water quality can cause effects on aquatic ecological receptors. Water quality will not deteriorate as a result of the proposed development either during the construction or long-term operational phases due to the inherent design and mitigation measures proposed during site development and construction.	Neutral *Not Significant*
Water Supply	Population & Health	Temporary disruption of potable water supply to existing users during connection works for the proposed development has been considered. Pressure on water supply due to additional users in the long term has also been addressed. Mitigation measures to reduce water usage have been designed into the proposed development.	Neutral *Not Significant*
Foul Water	Land, Soils, and Geology	Foul drainage infrastructure has the potential to interact with soils and groundwater in terms of potential leakage to these media. Drainage will be designed in accordance with the requirements of the Building Regulations and relevant IW Codes of Practice.	Neutral *Not Significant*
Air Quality & Climate	Population & Human Health	Poor air quality can affect human health. Potential adverse effects are not anticipated during either the site	Neutral *Not Significant*

		development or long term operational phase, provided preventative mitigation measures during site development and construction phases are implemented. No long term effects on human health via impact on air quality are anticipated.	
Air Quality & Climate	Material Assets – Property/Amenity	Dust deposition during construction can have potentially temporary adverse effects on property and amenity. Mitigation measures outlined for the site development and construction phases will ensure that nuisance dust is avoided and minimised throughout the duration of the development works.	Neutral *Not Significant*
Air Quality & Climate	Biodiversity	Air quality impacts can affect ecological receptors. Mitigation measures proposed will ensure that the effects are not significant.	Neutral *Not Significant*
Noise & Vibration	Health	Construction noise and vibration sources can temporarily potentially impact on human beings in terms of noise disturbance. However, a detailed CEMP incorporating mitigation measures will ensure that any potential effects are not significant. No long term effects are anticipated as the proposed Development is similar to existing development in the area.	Neutral *Not Significant*
Noise & Vibration	Biodiversity	Construction noise has the potential to impact on fauna in terms of temporary disturbance.	Neutral *Not Significant*
Wind and Micro-Climate	Human Health	Results of microclimate has shown this interaction to be not significant based on wind conditions prevalent in the area.	Neutral *Not Significant*
Traffic/ Transportation /Roads	Noise	Increased traffic flows can give rise to traffic related noise and effects on human beings. The impact of traffic related noise on the existing ambient sound environment is expected to be imperceptible with no effect anticipated on local residents.	Neutral *Not Significant*
Traffic/ Transportation /Roads	Air Quality & Climate	Increased traffic flows can give rise to traffic related air quality impacts and effects on human beings. The impact on ambient air quality levels is expected to be imperceptible with no effect anticipated on local residents. In terms of climate change, the proposed Development has been designed to encourage cycling and walking by providing routes and infrastructure. A Mobility Management Plan will be implemented.	Neutral *Not Significant*

Traffic/ Transportation /Roads	Human Beings - Safety	Increased traffic can potentially give rise to safety issues. A road safety audit has been carried out on the proposed development and recommendations have been incorporated into the proposed design where necessary.	Neutral *Not Significant*
Material Assets – Services Infrastructure	Human Health	A risk to the human health of the installer from built services can occur as a result of any excavation work in areas where built services exist, through coming into contact with live electricity lines or damaging live gas mains. Health and safety of workers will fall under the remit of the contractors appointed who will be required to comply with relevant Health and Safety legislation. From the perspective of the end user of the networks the risks to human health include: • Gas leaks or explosions. The installation of services is tightly monitored and controlled by Gas Networks Ireland to ensure the protection of human health. Therefore, the risk of effect on human health is not considered significant. • Loss of supply. This is a managed process that is the responsibility of the individual utility supplier and emergency plans will be in place. The effect is therefore considered brief and not significant. With the implementation of the aforementioned mitigation measures, the impact of the proposed built services on human health is likely to be negligible.	Neutral *Not Significant*

16.4 Cumulative Impacts

The cumulate effects with other existing and/or approved projects in the area have also been considered to determine whether these could be sufficient to generate impacts of significance on the environment. Any predicted specific cumulative impacts are outlined in the various EIAR chapters, and tend to be temporary; related to the construction period; and manageable by way of mitigation. No significant interactions are envisaged in terms of interactions arising from cumulative impacts.

16.5 'Do Nothing' Scenario

If the proposed project does not proceed, there will be no cumulative impacts arising.

16.6 Mitigation and Monitoring Measures

It is not proposed that any mitigation or monitoring will be undertaken specifically for cumulative impacts.

17.0 MITIGATION AND MONITORING MEASURES

17.1 Introduction

This section of the EIAR has been prepared by Hughes Planning and Development Consultants in association with the various EIAR consultants. More specifically, this chapter of the EIAR was prepared jointly by Mr. Kevin Hughes, Director, Ms. Anne McElligott, Associate Director, and Mr. Christopher Browne, Executive Planner, with Hughes Planning and Development Consultants.

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The central purpose of EIA is to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR document sets out a summary, for ease of reference, of the measures outlined within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring during the construction and operational phases of the proposed development. All measures included below form part of the proposed development and will be implemented in full.

It is intended that this chapter of the EIAR document will provide a useful and convenient summary to the competent/consent authority of the range of mitigation and monitoring measures proposed.

17.2 Mitigation and Monitoring Measures

The following provides a list, for ease of reference, of the mitigation and monitoring measures recommended in each chapter of the EIAR.

17.2.1 Population and Human Health

Construction Phase

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

will also be adhered to during the construction phase.

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

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

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

Operational Phase

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

Monitoring

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

17.2.2 Biodiversity

Construction Phase

Landscape Plan

The Proposed Development will result in the loss of the entire section of scrub along the northern boundary of the Site, a habitat which is considered a KER in this assessment. In order to mitigate this habitat loss, the following measures have been incorporated into the landscape design:

- The planting scheme uses a mix of native and ornamental tree and shrub species
- The planting of the northern buffer perimeter consists of largely native trees and shrubs (Prunus spinosa, Prunus padus, Crataegus monogyna)
- Incorporation of ‘green’ components in the SuDS network, namely rain garden (bioswales) planting, wetland planting and Sedum green roofs.
- The planting scheme incorporates hedgerows
- Soft landscaping has been designed with consideration of climate change. Specifically, the following planting has been chosen:
    - Native and hardy plants adjusted to urban conditions
    - Plants adapted to capturing water in bioswales
    - Sun- and shade-loving species
    - Pollinator-friendly species (with reference to the All-Ireland Pollinator Plan 2015-2020)

The planting of native flora will improve local biodiversity and increase insect abundance. This will provide additional food for bats and birds at the Site.

Aquatic Fauna and Surface Waters

The following measures set out below will protect surface waters throughout the Construction Phase:

General Surface water mitigation measures

- Storm drain inlets which could receive stormwater from the project will be protected throughout the Construction Phase. Inlet protection will be installed before soil-disturbing activities begin.
- Any imported materials will, as much as possible, be placed on site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.
- Refuelling of plant during Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.
- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site.
- All personnel working on site will be trained in pollution incident control response.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005).
- Portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel. All associated waste will be removed from site by a licenced waste disposal contractor.
- Runoff from machine service and concrete mixing areas will not enter the nearby drainage network.

All wastewater generated on-site during the Construction Phase will be stored and disposed of appropriately. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into the foul/surface water drainage network.

Contaminated soils if encountered will be segregated. If dewatering is required groundwater will be treated as required prior to discharge as agreed with Local Authority.

Reduction of noise and dust related impacts

Short-term increases in disturbance levels as a direct result of human activity and through increased generation of noise during the Construction Phase can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing.

Noise generated during the Construction Phase of the Proposed Development could cause temporary disturbance to a number of faunal species in the vicinity of the Site of the Proposed Development. To mitigate this disturbance, the following measures will be implemented:

- Selection of plant with low inherent potential for generating noise.

- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoidance of unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.
- Proper balancing of plant items with rotating parts.
- Keep internal routes well maintained and avoid steep gradients.
- Minimise drop heights for materials or ensure a resilient material underlies.
- Use of alternative reversing alarm systems on plant machinery.
- Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.
- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to nesting birds or any other fauna species in the vicinity of the Site of the Proposed Development will be reduced to a minimum.

The following general dust control measures will be followed for the duration of the Construction Phase of the Proposed Development and will ensure no significant dust related impacts occur to nearby sensitive receptors including local faunal species.

- In situations where the source of dust is within 25m of sensitive receptors screens (permeable or semi-permeable) will be erected.
- Haulage vehicles transporting gravel and other similar materials to site will be covered by a tarpaulin or similar.
- Access and exit of vehicles will be restricted to certain access/exit points.
- Vehicle speed restrictions of 20km/hr will be in place.
- Bowsers will be available during periods of dry weather throughout the construction period.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil thereby reducing the amount of dust.
- Stockpiles will be stored in sheltered areas of the site, covered, and watered regularly or as needed if exposed during dry weather.
- Gravel should be used at site exit points to remove caked-on dirt from tyre tracks.
- Equipment should be washed at the end of each work day.
- Hard surfaced roads will be wet swept to remove any deposited materials.
- Unsurfaced roads will be restricted to essential traffic only.
- If practical, wheel-washing facilities should be located at all exits from the construction site.
- Dust production as a result of site activity will be minimised by regular cleaning of the site access roads using vacuum road sweepers and washers. Access roads should be cleaned at least 0.5km on either side of the approach roads to the access points.
- Public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.

- The frequency of cleaning will be determined by the site agent and is weather and activity dependent
- The height of stockpiles will be kept to a minimum and slopes should be gentle to avoid windblown soil dust.
- The following will be dampened during dry weather:
    - Unpaved areas subject to traffic and wind
    - Stockpiles
    - Areas where there will be loading and unloading of dust-generating materials
- Under no circumstances should wastewater from equipment, wheel or surface cleaning enter the surface water drainage network.

Bats

No bat potential trees (being used as roosts) were found during survey as the Site is mostly Buddleia scrub and willow trees. However, in the unlikely event bats be noted as present during felling/scrub clearance, then works will cease immediately and a derogation licence from the National Parks and Wildlife Services (NPWS) acquired.

The majority of the buildings on the Site were deemed Negligible for bat roost suitability; however, a small number (No. 1, 2, 3, 6, 7, 8, 9 & 17) see Bat Report, Appendix 5.1) had 'Low' potential, i.e. "a structure with one or more potential roost sites that could be used by individual bats opportunistically." Therefore, as a cautionary recommendation a pre-demolition bat survey should be carried out on these buildings.

Planting of shrub and tree species to take place as part of project design.

Bat sensitive lighting measures incorporated into the public lighting design.

Placement and maintenance of bat boxes (minimum 5) on trees along the Site boundary.

Birds

The warehouses and buildings designated for demolition will be checked by a qualified ecologist for nesting birds prior to demolition. Any clearance of vegetation will ideally be carried out outside the main breeding season, i.e. 1st March to 31st August, in compliance with the Wildlife Act 2000. Should any vegetation removal be required during this period, this vegetation will be checked for bird nests, and if any are noted during this evaluation prior to removal, a derogation licence will be required from the NPWS. Similarly, a derogation licence will be required for the removal of nests within the warehouses or buildings if found during the pre-demolition survey. This would note the section of habitat that is a nest site, the precise location within the hedgerow/trees/warehouses, the species of bird present; and also elaborate the means by which the birds would be protected prior to nest removal. If eggs have been laid, the nest will be protected until the young have fledged after which time the nest could be destroyed (under licence from the NPWS only). This would also require further compensatory measures including nesting sites for birds if practicable.

Planting of shrub and tree species to take place as part of project design. No removal of vegetation to take place during the nesting season.

Construction related noise control/minimisation measures to be implemented.

Fox

Although Foxes are not afforded legal protection in Ireland, care should be taken when disturbing the den and the area around it. Foxes are protected from a variety of hunting/extermination techniques as per the Wildlife Acts 1976 to 2012; and from acts of cruelty as per the Animal Health and Welfare Act 2013. The den should not be disturbed during the breeding/rearing season, which typically lasts from March to June. If destroying the den at other times, care should be taken to allow the occupant to escape.

Invasive Flora

To prevent the spread of Butterfly Bush within and outside the Site boundary management options for its removal are provided below:

The Butterfly Bush is a member of the Buddlejaceae family. It is very fast growing and can reach 2m in its first year, producing flowers and setting seed. As Butterfly Bush tolerates very poor soils, it is capable of growing on walls, rock outcrops or sub-soils (NRA, 2010). The following is based on NRA (2010) guidelines:

Management methods such as digging it out are applicable only to minor infestations at the initial stage of invasion. Hand-picking of young plants is feasible but should be undertaken with care to avoid soil disturbance which can give rise to a flush of new seedling. Grubbing of mature stands as a sole attempt at control is not recommended for the same reason. After uprooting, it is essential to plant the ground in order to prevent a flush of new seedling growth. When it is cut, Buddleia grows back from the stump very vigorously. Mowing of young plants does not provide control as they re-sprout with vigour. Where removal of mature plants is not feasible in the short term, the flower heads should be cut off in June before seed set. Chemical control recommended practice for the application of herbicides requires cutting back of plants to a basal stump during active growth (late spring to early summer) which is then treated (brushed on) immediately with a systemic weed killer mix (Starr et al, 2003). Foliar application of approved herbicides may be adequate for limited infestations of younger plants, but should be followed up at 6 monthly intervals. At this point it must be stressed that all Plant Protection Products must be used in accordance with the product label and with Good Plant Protection Practice as prescribed in the European Communities (Authorization, Placing on the Market, Use and Control of Plant Protection Products) Regulations, 2003 (S.I. No. 83 of 2003). Again, it should be noted that it is an offence to use Plant Protection Products in a manner other than that specified on the label. The methods outlined are not in accordance with the product label and so it will be necessary to discuss the use of such methods with the Pesticides Control Service with a view to seeking approval under the derogation procedures provided under the Plant Protection Regulations.

Biosecurity

The following will be adhered to, to avoid the introduction of invasive species to the Proposed Development site.

- Any material required on the site will be sourced from a stock that has been screened for the presence of any invasive species by a suitably qualified ecologist and where it is confirmed that none are present.
- All machinery will be thoroughly cleaned and disinfected prior to arrival on site to prevent the spread of invasive species.

Operational Phase

Bats

In order to preserve the commuting potential of the treelines/hedgerows remaining and to minimise

disturbance to bats utilising the Site in general, the lighting of the Proposed Development has been designed to minimise light-spill onto habitats used by the local bat population for foraging or commuting (Hormon O'Brien, 2021). Specifically:

- Lighting has only been installed where necessary for public safety. These lights have been designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations while still providing the primary function of safely lighting the circulation routes.
- Reflectance's – Downward lighting can be reflected from bright surfaces. To minimize bat disturbance, the design avoids the use of bright surfaces and incorporates darker colour lamp heads and poles to reduce reflectance.
- Shielding of Luminaires & Light - To minimize bat disturbance, the design avoids the use of upward lighting by shielding or by downward directional focus.
- Type of Light – To minimize bat disturbance, the design avoids the use of strong UV lighting. The lighting design is based on the use of LED lighting which has minimal or no UV output of significance.

Furthermore, the planting of native Irish tree species has been incorporated into the landscape design. A series of 5+ bat boxes will be erected on trees around the Site to provide future roosting opportunities.

Birds

It is recommended that Swift Boxes or Bricks are incorporated into the Proposed Development where possible. The incorporation of Swift Boxes or Bricks would help recover the declining swift population, which are now Red Listed in Ireland (Gilbert et al., 2021). The following recommendations are extracted from "Saving Swifts" by Birdwatch Ireland1.

Swift bricks/boxes:

- should be constructed of long-lasting material and securely fixed in position.
- should be erected at least five metres above ground level
- should be erected in sheltered cool areas out of the sun, or under an overhang and /or under the eaves. Bricks can be placed at any aspect, however, as they tend not to overheat the way that externally fitted boxes can.
- should have a clear airspace in front for access
- should be grouped (side by side in rows) as swifts are colony nesters
- should avoid sites which can be accessed by predators- cats, squirrels, magpies, rats.
- should avoid sites near plate glass windows because they are a known collision hazard for birds.
- should not be placed directly above ledges or other obstructions. Swifts drop before taking flight and can collide with obstacles below the nest entrance.
- should not be one above the other.
- should not be near spotlights or later fit spotlights near them.

It is advised to install a Swift calling system to attract Swifts and encourage them to take up residence at a new site.

Monitoring

[1] https://birdwatchireland.ie/app/uploads/2019/10/Saving-Swifts-Guide_pdf.pdf

There is no requirement for monitoring.

17.2.3 Lands, Soil and Geology

Construction Phase

In order to reduce impacts on the soils and geology environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation/ infill and export from site;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

Construction Environmental Management Plan (CEMP)

An Outline Construction Environmental Management Plan (CEMP) has been prepared by AWN (2022) for the proposed development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed CEMP. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

Control of Soil Excavation

Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services will require to excavate c. 24,008 m^3 and 5,500m^3 of imported material. Suitable soils could be reused on site as backfill, where possible. Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

According to onsite investigations, the bedrock vulnerability is ‘High’ to ‘Extreme’ throughout the site. Removal and reinstatement of subsoil cover will not alter the vulnerability category of the underlying bedrock. The deposition of infill soil would increase the overburden thickness and thus may even decrease the groundwater vulnerability.

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.

Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Site investigations classified the subsoils as mostly 'inert' as presented in Section 6.3.8 above. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body. Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible.

Dust suppression measures (e.g., damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

Source of Fill and Aggregates

All fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company.

As mentioned above, it is anticipated that approximately 5,500 m^3 engineered fill will be required to facilitate construction. There will be no impact to mineral resources in the area as a result of the Proposed Development.

Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site), this should be sensitively located away from surface water, gulleys or drains. These refuelling areas are to be identified in the CEMP prepared by the construction contractor. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemicals which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

Control of Water during Construction

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the trenches are kept relatively dry. Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

There shall not be discharge of silty water from the works to any watercourse, should any discharge of construction water be required during the construction phase, discharge will be to foul sewer following agreement with SDCC/ Irish Water. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to water. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to water or sewer.

In order to minimise the risk of contamination, any stockpiled material designated for removal will be removed off-site as soon as possible. Surface water drain gratings in areas near or close to where stockpiles are located will be covered by appropriate durable polyurethane covers or similar. Active treatment systems such as siltbusters or similar may will be adopted, depending on turbidity levels and discharge limits.

Operational Phase

There are no discharges to ground included in the design and no abstractions from the aquifer. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.

Monitoring

Construction Phase

Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 10 m from surface water receptors. 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. A log the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not occur.

Operational Phase

No future soil or groundwater monitoring is proposed as part of the proposed project as no bulk chemical storage on site. 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.

17.2.4 Water

Construction Phase

Construction Environmental Management Plan (CEMP)

An Outline Construction Environmental Management Plan (CEMP) has been prepared by AWN (2022) for the proposed development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed CEMP. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

Surface Water Run-off

As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, mitigations will be put in place to manage run-off during the construction phase.

Any run-off will be intercepted on site, where the ground falls towards adjoining properties or public roads/footpaths. This will be achieved with open drains or French drains and collected for treatment

based on the conditions of a SDCC and/or Irish Water licence, prior to pumping to the surface sewer network.

Direct uncontrolled run-off into the drainage ditch running through the site will not be allowed. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses/ stormwater sewer/ drainage ditch, refuelling of machinery off site) and hydrocarbon interceptors.

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing stormwater sewer network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the sewer. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated. Based on SI information (Ground Investigations Ireland, 2021), it is not anticipated that there will be rock removal required for the proposed single storey basements in the development, for building foundations, for service trenches or for any other works.

Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be away from surface water gulleys, the existing open ditch or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

Soil Removal and Compaction

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust.

All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Site investigations carried out at the site in 2021 found no residual contamination on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Operational Phase

The proposed development will provide a significant improvement to the local drainage catchment as it is proposed to provide full attenuation in compliance with the requirements of the Greater Dublin Strategic Drainage Study. A number of design measures will be put in place to minimise the likelihood of any spills entering the water environment to include the design of the car park with hydrocarbon interceptors (refer to Section 7.4.1.2 above). In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.

Monitoring

Construction Phase

During construction phase the following monitoring measures will be considered:

- Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off.
- Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling, etc.

Operational Phase

Maintenance of the surface water drainage system, including hydrocarbon interceptors, and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

17.2.5 Noise and Vibration

Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites* Parts 1 and 2. Whist construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

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

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.

- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant should be switched off when not in use and not left idling.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound attenuation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Construction Phase – Vibration

The vibration from construction activities will be limited to the values set out in Section 8.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

Operational Phase

Additional Traffic on Adjacent Roads

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

Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria are achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward Noise Impact

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

In this instance residential units on the facades highlighted in Figure 8.12 will be provided with glazing and ventilation that achieves the minimum sound insulation performances as set out in Table 8.20 and Table 8.21. Other facades in the development have no minimum requirement for sound insulation.

Table 8.1 Sound Insulation Performance Requirements for Glazing, SRI (dB)

Mark-up	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
Red	27	26	33	39	39	47	37
Orange	19	27	34	39	35	40	35

The overall R_w and $D_{ne,w}$ outlined in this section are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing and ventilation configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 8.20.

The following performance requirements apply to all ventilation paths from outside the building. This can be achieved by passive acoustic wall or window vents or via mechanical ventilation systems.

Table 8.2 Sound Insulation Performance Requirements for Ventilation, Dn,e,w (dB)

Mark-up	Octave Band Centre Frequency (Hz)						$D_{n,e,w}$
	125	250	500	1k	2k	4k	
Red	35	34	33	38	49	45	39
Orange	29	32	37	36	35	40	37

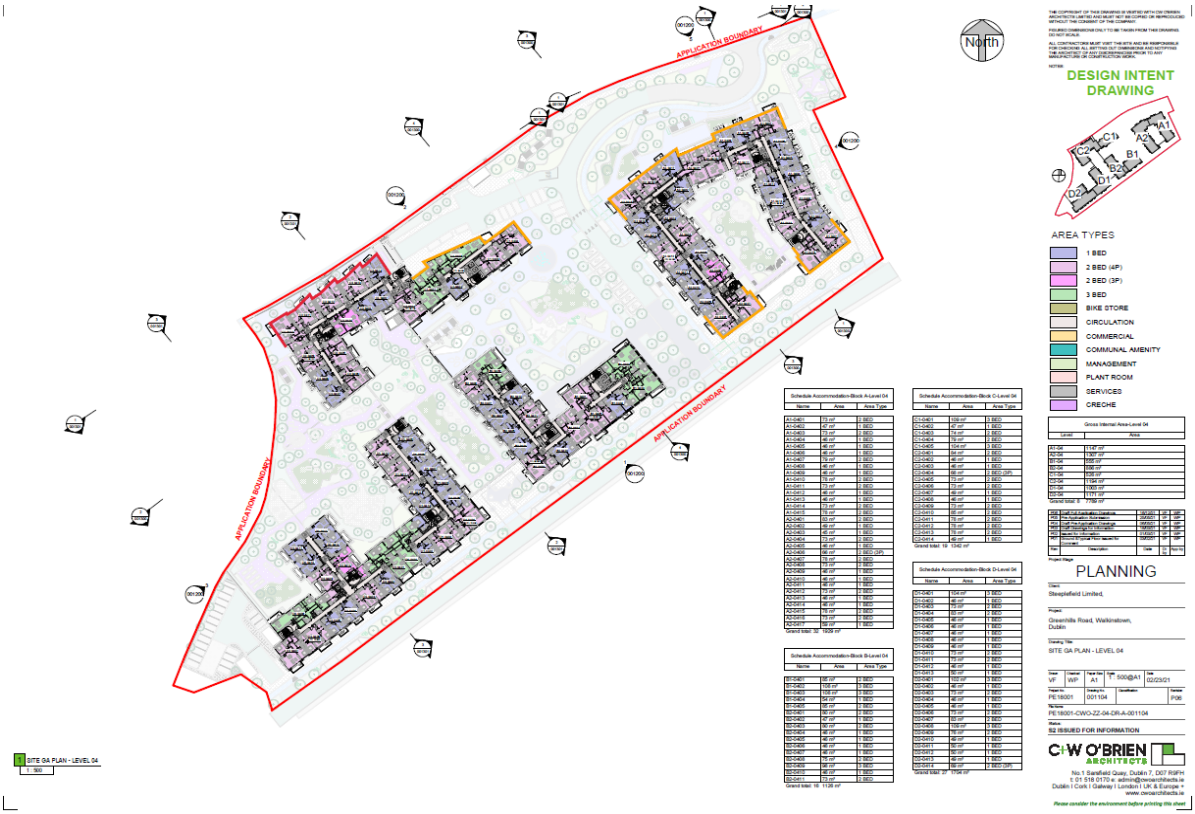

Figure 8.1 Façade Acoustic Requirements

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

The assessment has demonstrated that the recommended internal noise criteria will be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.

Operational Phase – Vibration

Based on the nature of the proposed development there are no appreciable sources of vibration during the operational phase of the development. No mitigation is deemed necessary.

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

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

Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

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

17.2.6 Odour, Air Quality and Climate

Construction Phase

Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the Dust Management Plan. The key aspects of controlling dust are listed below. Full details of the Dust Management Plan can be found in Appendix 9.2. These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

In summary the measures which will be implemented will include:

- Prior to demolition blocks will be soft stripped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression will be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction will be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised, if necessary fine water sprays should be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

- During movement of materials especially soil, both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Climate

Construction stage traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the development. Construction vehicles, generators etc., may give rise to some CO2 emissions. However, due to short-term nature of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

Operational Phase

The impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site specific mitigation measures are required.

The proposed development has been designed to minimise the impact to climate where possible during operation. Details of the measures to be incorporated into the design of the development are outlined in Section 9.4.3.2 and within the Building Lifecycle Report and Sustainability Report prepared in support of this planning application.

Monitoring

Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/(m2*day) during the monitoring period between 28 – 32 days.

Operational Phase

There is no monitoring recommended for the operational phase of the proposed development as impacts to air quality and climate are predicted to be imperceptible.

17.2.7 Wind and Microclimate

Construction Phase

No mitigation measures are required during the construction phase

Operational Phase

No mitigation measures are proposed for the operational phase.

Monitoring

No monitoring is required.

17.2.8 Material Assets - Utilities

Construction Phase

Ongoing consultation with Irish Water, Eirgrid, ESB Networks and other relevant service providers will ensure a smooth construction schedule without disruption to local and business community. Best practice measures shall be put in place to ensure that there are no interruptions to these utilities, unless this has been agreed in advance.

Power and Electricity Supply
The power demand for the construction phase will be relatively minor and the connection works are entirely within proposed site boundaries.

The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users.

Once the construction of the unit substations is completed, ESB Networks will complete the commissioning in accordance with the statutory requirements.

Telecommunications
The existing telecommunications will be extended from the perimeter of the site to the proposed development. Strict quality control measures will be undertaken while laying telecommunications cables. The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator.

Surface Water Infrastructure
A temporary drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff by the site during construction. Run-off water containing silt will be contained on site to ensure adequate silt removal. It is not anticipated that there will be any interruptions to service in existing surface water sewers, but should interruptions be anticipated, they will be agreed in advance.

Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses/ stormwater sewer/ drainage ditch, refuelling of machinery off site) and hydrocarbon interceptors.

Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration (where existing water in the ground enters the surface water infrastructure) and ex-filtration (where water in the surface water infrastructure escapes into the ground).

Foul Drainage Infrastructure
Prior to temporary connection of the foul drainage to the public network, approval will be given to ensure there is enough capacity in the public network for the proposed development's foul water discharge.

The works contractor will be obliged to put a number of measures in place to ensure that there is no impact on the public network during the construction works. Foul drainage for the proposed development will be in accordance with the Building Regulations Technical Guidance Document H for design and construction. Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

Water Supply
A temporary connection will be put in place for the construction phase.

The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to service from the public watermain. It is not anticipated that there will be any interruptions to service from the public watermain, but should interruptions be anticipated, they will be agreed in advance.

Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

Operational Phase

Power and Electricity Supply
In circumstances where consultation with ESB Networks, EirGrid or another relevant service provider has taken place, the proposed work will be in line with their requirements or guidelines. Therefore, no mitigation measures are required in relation to Power and Electricity Supply.

Telecommunications
The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator. In circumstances where statutory telecommunications operator is in compliance with their requirements and guidelines continues.
Therefore, no mitigation measures are required in relation to telecommunications.

Surface Water Infrastructure
As mentioned in Section 11.4.2, the surface water drainage system for the proposed development incorporates the designed SuDS mitigation measures.

These measures include Extensive Green Roofs, Intensive Green Roofs, Permeable Paving, Porous Asphalt, Petrol Interceptor, a Attenuation Tank, Rain Gardens, Tree Pits and Hydrobrakes. Implementation of these measures will prevent an increase in surface water flow offsite.

The allowable runoff rate has been established by the project engineers, Lohan & Donnelly Consulting Engineers, using the methodology set out in the *Engineering Services Report.* To ensure that the existing surface water sewer is not over capacitated, the flow of surface water leaving the last manhole “SW02” on site (as per Greater Dublin Regional Code of Practice for Drainage Works, Rev 6) will be limited to 8.021 l/s via a hydro-brake, a flow control device capable of managing the flow rate of water. Refer to Appendix E & F for Q-Bar and run-off calculations.

Foul Drainage Infrastructure
As discussed in Section 11.4.2 above, IW have provided a CoF for the wastewater requirements for the development (which are detailed in the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers, which accompanies the planning application) can be accommodated, subject to upgrades.

Foul drainage for the proposed development will be in accordance with the relevant standards for design and construction, including the Irish Water Code of Practice for Wastewater Infrastructure, The Building Regulations Technical Guidance Document (TGD) ‘Part H’ & the Regional Code of Practice for Drainage

Works. It will be necessary to carry out further detailed study and investigations to confirm the available capacity and to determine the full extent of any upgrades which may be required to be completed to Irish Water Infrastructure, prior to agreeing to the proposed connection.

No mitigation measures are required in relation to foul drainage infrastructure during the operational phase.

Water Supply
The proposed development will be connected to a 200mm MDPE (medium density polyethylene) type PE-80 water main. The proposed network connection will be metered, with associated hydrants and valves as per Irish Water requirements. As the connection works will be approved to ensure there is capacity for water supply to the proposed development, it not anticipated that this would have any perceptible offsite impact.

As discussed in Section 11.4.2 above, IW have provided a CoF for the water requirements for the development (which are detailed in the *Engineering Services Report* prepared by Lohan & Donnelly Consulting Engineers, which accompanies the planning application) can be accommodated, subject to upgrades. No mitigation measures are required in relation to water supply during the operational phase.

Monitoring

During construction phase the following monitoring measures will be considered:

- Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off.
- Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling etc.

Maintenance of the surface water drainage system, including hydrocarbon interceptors, and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

17.2.9 Material Assets - Waste

Construction Phase

The following mitigation measures will be implemented during the construction phase of the Proposed Development:

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (DoEHLG, 2006), and is included as Appendix 12.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the Proposed Development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the C&D WMP (Appendix 12.1) in agreement with SDCC, or submit an addendum to the C&D WMP to SDCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will be required to fully implement the C&D WMP throughout the duration of the proposed construction and demolition phases.

A quantity of topsoil, sub soil and clay which will need to be excavated to facilitate the Proposed Development. Project Engineers have estimated that c. 22,808m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Waste Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition, excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the Proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the *EMR Waste Management Plan 2015 – 2021*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

Operational Phase

As previously stated, a project specific OWMP has been prepared and is included as Appendix 12.2.

- The Facilities Manager, residents and tenants of the development during the operational phase will be responsible for ensuring a high level of recycling, reuse and recovery in their individual units in accordance with the SDCC waste-byelaws.

In addition, the following mitigation measures will be implemented:

- The Facilities Manager, residents and tenants will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Waste electrical and electronic equipment (WEEE);
    - Batteries (non-hazardous and hazardous);
    - Cooking oil;
    - Light bulbs;
    - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
    - Furniture (and from time to time other bulky waste); and
    - Abandoned bicycles.
    -
- The Operator / Buildings Manager will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The Operator / Buildings Manager will ensure that all waste collected from the Site of the proposed Development will be reused, recycled, or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator / Buildings Manager will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.

These mitigation measures will ensure the waste arising from the Proposed Development during the operational phase is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, *the Litter Pollution Act 1997*, the *EMR Waste Management Plan 2015 – 2021* and the SDCC Household and Commercial Waste Bye-Laws 2018. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

Monitoring

The management of waste during the construction phase will be monitored by the Contactor's appointed Waste Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

The management of waste during the operational phase will be monitored by the residents to ensure effective implementation of the SDCC waste bye-laws internally and by the nominated waste contractor(s).

Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The C&D WMP specifies the need for a Waste Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Waste Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the Proposed Development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future Developments.

Operational Phase

During the operational phase, waste generation volumes will be monitored by residents. It is unlikely that the number of bins in individual households will require adjustment.

17.2.10 Material Assets - Traffic

Construction Phase

To mitigate the environmental impact as a result of the constructions works during the duration of the construction phase, the following mitigation measures will be implemented:

- To reduce the strain on the morning traffic, specifically during the peak traffic flows between 08:00 – 09:00, no HGV's vehicles will be permitted to leave/enter the site during these times. All on site HGV's which have entered the site prior to the peak traffic flows will be escorted to a waiting area be loaded (if applicable) and be ready to leave at 09:00.
- All and any requirements with regards to the construction traffic management made by the local authority will be adhered to.
- Appropriate road signage will be used to ensure the safety of all road users and construction personnel.
- Sufficient on-site car parking spaces will be provided to ensure no impact on the local road network.
- All site offices and compounds will be located within the site boundary.
- All workers and visitors will be informed regarding parking/access arrangements for the site. By making the workers and visitors aware of the access/parking arrangements, an appropriate means of transport can be chosen and no strain on the adjacent local roads imposed as a result of site affiliated visitors/personnel parking.

Operational Phase

The following mitigation measures are proposed for the operational phase of the Proposed Development with reference to the road network:

The proposed development will have a moderate impact with a moderately negative and long-term effect on the Walkinstown Roundabout and Greenhills Road / Ballymount Road Upper junctions, the following mitigation measures have been incorporated into the design to limit the effect.

The above traffic assessment details that both junctions are at present busy and congested during the morning and evening peak hours of travel, and will continue to experience increased congestion going into the future if the required conservative growth estimates are applied to existing surveyed network flow, with estimated total generated traffic from both proposed and planned adjacent development not adding in any significant way to existing and future predicted congestion levels at both critical junctions within this comprehensive traffic analysis.

Given that the critical junctions under analysis are congested, it is appropriate that there is mitigation to minimise car usage by residents and visitors to the Proposed Development. This comprises the limited on-site car parking spaces.
It is proposed within this development to provide car parking space for 64% of the 633 No. apartment units proposed.

The trip generation estimates for this project outlined within this report are conservative and robust as they are based on sites with greater car parking provision than proposed for the Proposed Development.

It is highly likely, therefore, that the actual traffic impact of the proposal will be less than predicted, as the limited car parking provision will require residents to actively seek out alternative modes of travel

particularly for their journey to work / college within the morning and evening peak. The significant availability of cycle parking at the development will facilitate this accessing of alternative modes, as will the information on public transport, cycling and walking routes disseminated to residents by the mobility management plan coordinator appointed for the development (see duties of mobility management plan coordinator in accompanying Mobility Management Plan).

Table 13-17 contains the modal splits for car, bus and LUAS travel for the 5 No. Electoral Districts close to the subject site.

Mode	CAR DRIVER (%)	CAR PASSENGER (%)	BUS (%)	LUAS/TRAIN (%)	CYCLING (%)	WALKING (%)	NOT STATED / VAN / HOME (%)
Terenure-St James	56	2	16	1	7	6	12
Tallaght-Kilmanagh	59	3	6	10	4	6	12
Templeogue-Limekiln	58	3	14	1	7	3	14
Terenure-Greentrees	54	3	15	0	10	4	14
Terenure-Cherryfield	54	3	16	1	8	6	14
Weighted Average	56	3	13	3	7	5	13 (3/6/4)

Table 13-17- Modal splits for electoral districts in vicinity of Proposed Development (2016 census – SAPMAP data source)

The above table demonstrates that, for existing residents close to the Proposed Development, 56%, just over half, commute by private car as detailed within the 2016 Census, with 16% commuting by bus or train and 12% cycling or walking.

It is expected that residents at the Proposed Development would undertake a similar pattern of mode usage, thus resulting in reduced traffic impact on the local road network relative to that envisaged within the conservatively-framed traffic assessment, given that greater than 40% of commuters would travel by non-private-car-based modes.

Monitoring

No monitoring is proposed.

17.2.11 Archaeology, Architectural and Curtural Heritage

Construction Phase

As noted above in Sections 14.5.1.1, 14.5.1.2 and 14.5.1.3, the proposed development will have no direct impacts on any archaeological monuments or structures of historical, archaeological or architectural heritage interest; in addition given the developmental history of the site, it is not deemed likely that any previously unrecorded subsurface archaeological features might be positioned within the subject site. Consequently, no mitigation measures are deemed necessary.

Operational Phase

As noted above in Section 14.5.2, there are no extant monuments or structures of historical, archaeological or architectural heritage interest located within the defined Cultural Heritage Study Area. It is considered that the overall proposed development will not impact on the views or setting of any monuments or structures of Cultural Heritage interest and no mitigation measures are deemed

necessary.

Monitoring

No monitoring measures are required.

17.2.12 Landscape and Visual Amenity

Construction Phase

The appearance of the development is a major influence on how the site is perceived by the public so the proposed development includes for extensive landscape and open space works with the overall objective of providing a layout that integrates the development into the surrounding townscape / landscape and provides a series of coordinated and linked green spaces.

This includes designing of green infrastructure, formal and informal open spaces, public realm and other external areas for the amenity and use of residents and others in this area as shown on the Landscape Design drawings.

Operational Phase

No mitigation measures are proposed for the operational phase.

Monitoring

The management of landscape areas will initially be undertaken by an ACLI approved landscape contractor. After 12 months the maintenance will be handed over to the long-term Management Company who will take over maintenance of set areas on completion of the development. There will be a five year guarantee after construction that all the proposed planting works still exists and has established in line with landscape design expectations. This will ensure that no planting has been removed or damaged due to the subsequent construction or plant failure. The planning application is accompanied by Landscape Management and Maintenance Plans setting out the objectives for management of external spaces or public realm areas for a 20 year period.

Regular monitoring will be undertaken to determine success of landscape operations and ensure they are behaving in the manner anticipated at design stage. If required, elements of the design can be adapted to accommodate changes required by actual field experience.