ENVIRONMENTAL IMPACT ASSESSMENT REPORT
VOLUME 2 – MAIN REPORT

STRATEGIC HOUSING DEVELOPMENT (SHD) AT FORMER CENTRAL MENTAL HOSPITAL, DUNDRUM, DUBLIN 14

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1.0 INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) relates to a Strategic Housing Development (SHD) application by the Land Development Agency[1] (referred to as the Applicant throughout) for the redevelopment of lands at the Central Mental Hospital, Dundrum, Dublin 14.

This EIAR provides an assessment of the environmental impact and associated mitigation measures arising as a result of the proposed development. It has been prepared in accordance with the requirements of the *Planning and Development Act 2000* (as amended), the *Planning and Development Regulations 2001* (as amended) and the relevant guidance documents.

The SHD application site measures c. 9.6 ha is bound by a 4 – 5 m perimeter wall and is accessed via an entrance off Dundrum Road. The site is further bound by residential properties and gardens at Mulvey Park to the north, at Friarsland Road to the east, at Larchfield Road to the south and south east and at Annaville Grove, Annaville Park and Annaville Terrace to the west.

The proposed SHD comprises 977 no. residential units, consisting of 8 no. apartment blocks, duplexes and houses. The proposal also includes a 463 sq m childcare facility (creche), 1,419 sq m of retail floorspace, a 245 sq m medical unit, 1,684 sq m of community facilities and a 78 sq m café arising from the change of use and renovation of the existing Gatelodge building.

The SHD application site is part of a wider land holding which is subject to a Masterplan in respect of the site wide development of the lands. Whilst this planning application and EIAR relates to the SHD lands specifically, any future planning application arising from the site wide Masterplan has been considered from a cumulative impact assessment perspective. A further planning application, referred to as the Section 34 application throughout this EIAR, will be submitted to Dún Laoghaire-Rathdown County Council under Section 34 of the *Planning and Development Act 2000* (as amended). The details of this application is set out in Section 3.7.3 of this EIAR.

1.2 The Applicant

As noted above, the Applicant for the proposed development is the Land Development Agency. The legal owner of the lands is the Office of Public Works (OPW) who also control the wider Masterplan lands. This is illustrated on the Site Location Plan (Dwg. No. DCD-RAU-02_SW_XX-DR-A-1000 Rev P03.08) prepared by Reddy Architecture + Urbanism (Reddy A+U)

1.3 The Proposed Project

The 'Proposed Project' for the purposes of this EIAR is the Strategic Housing Development scheme detailed in Chapter 5 of this EIAR. The future planning application, in respect of the

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change of use of the Main Hospital Building and other development, that will also be submitted in respect of the same site wide Masterplan will be dealt with as part of the cumulative impact assessment.

An extract from the Site Location Plan, prepared by Reddy A+U is provided below and illustrates the red line boundary in respect of the proposed project.

Figure 1.1: Extract from Reddy A+U's Site Plan, Dwg. No. DCD-RAU-02-SW_XX-DR-A-1002 Rev. P03.08 showing the red line boundary for the proposed SHD project.

In terms of an overview of the proposed development, the development ('Proposed Project') will consist of the demolition of existing structures (3,736 sq m), including:

- Single storey former swimming pool / sports hall and admissions unit (2,750 sq m);
- Two storey redbrick building (305 sq m);
- Single storey ancillary and temporary structures including portacabins (677 sq m);
- Removal of existing internal sub-divisions/ fencing, including removal of security fence at Dundrum Road entrance;
- Demolition of section of porch and glazed screens at Gate Lodge building (4 sq m);
- Removal of walls adjacent to Main Hospital Building;
- Alterations and removal of section of wall to Walled Garden.

The development will also consist of alterations and partial demolition of the perimeter wall, including:

- Alterations and removal of section of perimeter wall adjacent to Rosemount Green (south);
- Formation of a new opening in perimeter wall at Annaville Grove to provide a pedestrian and cyclist access;
- Alterations and removal of sections of wall adjacent to Dundrum Road (including removal of existing gates and entrance canopy), including reduction in height of section, widening of existing vehicular access, provision of a new vehicular, cyclist and pedestrian access;
- Alterations and removal of section of perimeter wall adjacent to Mulvey Park to provide a pedestrian and cyclist access.

The development with a total gross floor area of c. 106,770 sq m (c. 106,692 sq m excluding retained existing buildings), will consist of 977 no. residential units comprising:

- 940 no. apartments (consisting of 53 no. studio units; 423 no. one bedroom units; 37 no. two bedroom (3 person) units; 317 no. two bedroom (4 person) units; and 110 no. 3 bedroom units) arranged in 9 blocks (Blocks 02-10) ranging between 2 and 6 storeys in height (with a lower ground floor to Block 03 and Block 10, resulting in part 7 storey), together with private (balconies and private terraces) and communal amenity open space provision (including courtyards and roof gardens) and ancillary residential facilities;
- 17 no. duplex apartments (consisting of 3 no. 2 bedroom units and 14 no. 3 bedrooms units located at Blocks 02, 08 and 09), together with private balconies and terraces.
- 20 no. two and three storey houses (consisting of 7 no. three bedroom units and 13 no. 4 bedrooms units) and private rear gardens located at Blocks 02, 08 and 09).

The development will also consist of 3,889 sq m of non-residential uses, comprising:

- Change of use and renovation of existing single storey Gate Lodge building (reception/staff area) to provide a café unit (78 sq m);
- 1 no restaurant unit (307 sq m) located at ground floor level at Block 03;
- 6 no. retail units (1,112 sq m) located at ground floor level at Blocks 03, 06 and 07;
- 1 no. medical unit (245 sq m) located at ground floor level at Block 02;
- A new childcare facility (463 sq m) and associated outdoor play area located at ground floor level at Block 10; and
- A new community centre facility, including a multi-purpose hall, changing rooms, meeting rooms, storage and associated facilities (1,684 sq m) located at ground and first floor level at Block 06.

Vehicular access to the site will be from the existing access off Dundrum Road, as revised, and from a new access also off Dundrum Road to the south of the existing access.

The development will also consist of the provision of public open space and related play areas; hard and soft landscaping including internal roads, cycle and pedestrian routes, pathways and boundary treatments, street furniture, wetland feature, part-basement, car parking (547 no. spaces in total, including car sharing and accessible spaces); motorcycle parking; electric vehicle charging points; bicycle parking (long and short stay spaces including stands); ESB substations, piped infrastructural services and connections (including connection into existing surface water sewer in St. Columbanus Road); ducting; plant (including external plant for district heating and pumping station); waste management provision; SuDS measures (including green roofs); attenuation tanks; sustainability measures (including solar panels); signage; public lighting; any making good works to perimeter wall and all site development and excavation works above and below ground.

The details of the proposed project are set out in full in Chapter 5.

1.4 Environmental Impact Assessment (EIA)

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

EIA forms part of the planning consent process and is carried out by the Competent Authority. An EIAR is prepared by/ on behalf of an Applicant in respect of a project seeking planning consent. The EIAR thus becomes an integral informing element in the Competent Authority's EIA. The 2014 Directive has introduced new requirements in respect of the competency of experts responsible for the preparation of the EIAR (see Section 1.5.1 below for details on the experts involved in the preparation of this document).

The environmental assessment presented in this EIAR has evaluated the *Construction* (initial site development works) and *Operational* (the day-to-day functioning/operation of the site) Phases of the proposed Project.

The EIAR describes the existing environment (baseline); identifies potential impacts of the proposed project; details any mitigation measures required to reduce or eliminate potential impacts; and predicts any residual impacts.

An overview of the EIA process and the steps involved are set out in Table 1.1 below. Further information on the approach to EIA are presented in Chapter 2 (The EIA Process).

Table 1.1: Overview of the EIA Process

Stage	Description	Status
1. Screening	Is an EIA required?	Yes
2. Scoping	The outline of the likely significant effects of the proposed project and the aspects to be considered in the impact assessment.	An informal scoping process was completed in respect of the project
3. Environmental Impact Assessment	This stage includes: • Collection of baseline information; • Analysis of the proposed project; • Assessment of impacts;	Current Stage

	• Developing mitigation measures; and • Setting out requirements for monitoring.	
4. Review and Decision	The EIAR accompanies the planning application to the planning authority (i.e. An Bord Pleanála) for determination of the application.	
5. Monitoring	Implementation and monitoring of the proposed Mitigation Measures.	Next Stage

1.5 Format and Structure of the EIAR

Table 1.2 below sets out the format and structure of this Environmental Impact Assessment Report.

Table 1.2: Structure of the EIAR

Chapter No.	Description
Volume 1: Non-Technical Summary (NTS)	
NTS	Summary of the EIAR in non-technical language
Volume 2: Main Report + Appendices	
Chapters 1 - 3	Provide an introduction and background to the proposed project
Chapter 4	An assessment of the alternatives considered for the proposed project
Chapter 5	Description of proposed project assessed in the EIA.
Chapter 6	Consultation
Chapter 7	Population and Human Health
Chapter 8	Biodiversity
Chapter 9	Land, Soils, Geology and Hydrogeology
Chapter 10	Hydrology
Chapter 11	Air Quality and Climate
Chapter 12	Noise and Vibration
Chapter 13	Landscape and Visual
Chapter 14	Cultural Heritage and Archaeology
Chapter 15	Architectural Heritage
Chapter 16	Microclimate - Wind
Chapter 17	Material Assets – Roads and Traffic
Chapter 18	Material Assets - Waste
Chapter 19	Material Assets – Built Services
Chapter 20	Interactions
Chapter 21	Cumulative Impacts

Chapter 22	Environmental Commitments/ Mitigation measures included in the EIAR document
Volume 3: Photomontages	
Photomontages	Photomontages (in conjunction with TVIA – chapter 13)

1.5.1 EIAR Project Team

The EIAR was project managed, co-ordinated and produced by Tom Phillips + Associates (TPA). TPA coordinated the EIA process and liaised between the design team and various environmental specialist consultants.

Environmental specialists were commissioned for the specialist environmental chapters of the EIAR document as required of the EIA Directive and Regulations. The amended EIA Directive (Directive 2014/52/EU) states the following in relation to the persons responsible for preparing the environmental impact assessment reports:

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

In compliance with this requirement, and in line with emerging best practice, including with the 2018 EIA Guidelines for Planning Authorities, Table 1.3 provides the names of the professionals who have prepared each element of the EIAR. It also lists their qualifications and relevant experience, demonstrating that the EIAR has been prepared by competent experts.

Table 1.3: EIAR Project Team and Environmental Specialists

Name	Role	Company	Qualification/ Experience
Lizzie Donnelly	EIAR Project Manager, Co-ordinator and Planner	Tom Phillips + Associates	**BA(hons) Geography; MA (Planning, Policy and Practice)** • Associate Planner • Corporate Member of the Irish Planning Institute (IPI) and Chartered Member of the Royal Town Planning Institute (RTPI) • Over 7 years' experience in Planning and EIA.
Dr Stephen Smyth/ Dr Edward Porter/ Sarah Robertson/ Liam Bruen	Population and Human Health Assessment.	AWN	**Dr. Stephen Smyth – BAI, Ph.D.** • Associate responsible for management of AWN's Acoustics department • 14 + years' experience assessing Health Impacts relating to Noise. • Member of Engineers Ireland and the Institute of Acoustics. **Dr. Edward Porter – BSc, Ph.D.** • Director responsible for the Air Quality and Climate team at AWN.

			• 20 + years' experience assessing health impacts relating to air quality and climate • Full Member of the Institute of Environmental Sciences (MIEnvSc), a Full Member of the Institute of Air Quality Managements (MIAQM) and is a Chartered Chemist (C Chem MRSC). • He is lead author of the EPA publication "Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)" and has peered reviewed the NRA Air Quality Guidelines (NRA, 2006). **Sarah Robertson – BA. (Hons), MSc. and a Diploma in Environmental Engineering** • Senior environmental consultant responsible for IED licence applications, EIAR management and specialist inputs to chapters including Human Health and Population. • 10 + Years working in the field of EIAR management and Impact assessment. **Liam Bruen – BSc** • Environmental Consultant responsible for EIAR development within AWN's Water department. • 1 + years' preparation of EIAR documents.
Bryan Deegan	Biodiversity Assessment	Altemar	**M.Sc. Environmental Science;** **BSc (Hons.) in Applied Marine Biology** **National Diploma in Applied Aquatic Science;** **National Certificate in Science** • (MCIEEM) Member of Chartered Institute of Ecology and Environmental Management • Over 27 years' experience as an Environmental Team Leader

			working on Irish aquatic and terrestrial development projects.
John Considine / Paul Stephenson/ Ryan Mulvaney	Land, Soils, Geology and Hydrogeology Assessment	Barrett Mahony Consulting Engineers	**John Considine - BE, MIStructE, MIEI, CEng, FConsEIM** • Director Barrett Mahony Consulting Engineers • Fellow of the Association of Consulting Engineers of Ireland • Chartered Engineer • 33 years of civil and structural engineering experience in the UK and Ireland • 10 years' experience in the preparation of EIAR documents. **Paul Stephenson - BE, MIEI, CEng** • Chartered Engineer • 12 years of civil engineering experience, specialising in geotechnics in the UK and Ireland • 3 years' experience in the preparation of EIAR documents. **Ryan Mulvaney - BSc, MEng, MIEI,** • 5 years of Civil and structural engineering experience • 3 years' experience in the preparation of EIAR documents.
Teri Hayes / Marcelo Allende	Hydrogeology Assessment	AWN Consulting	**Teri Hayes - BSc, MSc, PGeol, EurGeol** • Over 25 years of experience in water resource management and impact assessment; • Former President of the Irish Group of the Association of Hydrogeologists (IAH); • Competent person recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons). **Marcelo Allende (BSc, BEng)** • Over 15 years of experience in environmental consultancy and water resources studies; • Member of the International Association of Hydrogeologists (Irish Group); • Member of Engineers Ireland (MIEI).

Niamh Nolan	Air Quality and Climate Assessment	AWN Consulting	**BSocSci (Hons) Social Policy and Geography** • Air Quality Consultant. • Associate member of Institute of Air Quality Management (IAQM) and the Institution of Environmental Science (IES). • 2 years' experience
Aoife Kelly	Noise and Vibration Assessment	AWN Consulting	**BSc (Hons), PgDip, PhD** • Senior Acoustic Consultant • Member of Institute of Acoustics (MIOA) • 8 years of experience
Richard Barker	Landscape and Visual Assessment	Macroworks	**MLA, PG Dip (Forestry), BA (Environmental)** • Principal Landscape Architect • Corporate member ILI • Over 18 years experience in LVIA
Grace Corbett	Cultural Heritage, Archaeology Assessment	IAC	**BA in Archaeology and Classics, MA in Landscape Archaeology** • Senior Archaeological and Cultural Heritage Consultant with IAC Ltd. • Member of the Institute of Archaeologists of Ireland and the Chartered Institute for Archaeologists; • Over 17 years' experience working in the commercial archaeological sector, both in Ireland and the U.K.
Alastair Coey	Architectural Heritage	ACA	**BSC(Hons) and Dip Arch, Architecture, MUBC - Master of Urban and Building Conservation** • Member of the Royal Institute of British Architects: 4727683 • Registered with the Architects Registration Board: 046256J • Member of the Royal Institute of the Architects of Ireland: 98087 • Grade One Conservation Architect • Member of the Institute of Historic Buildings Conservation: 0828 • 30+ years experience as a specialist Conservation Architect
Dr Cristina Paduano/ Dr Patrick Okolo/ Dr Aran Safdari	Microclimate - wind	B-Fluid	**Dr Cristina Paduano - PhD in Mechanical Engineering from Trinity College Dublin, with M.Eng and B.Eng in Aerospace Engineering.** - Chartered Engineer

			- Member of Engineers Ireland. - Expert in computational fluid dynamics applications for urban environment and the construction industry - Over 18 years of experience. **Dr Patrick Okolo - PhD in Aeroacoustics from Trinity College Dublin, a M.Sc. and B.Sc. in Mechanical Engineering.** - Chartered Engineer - Member of Engineers Ireland. - Expert in computational fluid dynamics applications for the urban environment and in wind tunnel measurements for the aerospace industry. - Over 10 years of experience. **Dr Aran Safdari - PhD in Mechanical Engineering from Pusan National University, a M.Sc. and B.Sc. in Mechanical Engineering.** - Expert in airflow modelling, heat and mass transfer and multi-phase flow simulations. - Over 8 years experience.
Christy O'Sullivan	Traffic and Transport Assessment	ILTP	**Christy O'Sullivan** • a Chartered Engineer (CEng) • a Fellow of the Institution of Highways and Transportation (FIEI). • Over 30 years' experience in Traffic and Transportation. **Ben Waite – BA (Hons.) in Geography and an MSc. (Hons) in Geographic Information Science.** • Senior Transport Analyst; • Over 12 year's experience in traffic and transport design, analysis and planning.
Chonaill Bradley	Waste Management	AWN Consulting	**BScEnv AssocMCIWM** • Principal Environmental Consultant • Associate Member of the Chartered Institute of Waste Management • Over 7 years' experience in EIA, Environmental reporting and Waste Management

John Considine / Richard O'Farrell	Site Services Assessment	Barrett Mahony Consulting Engineers and EDC	**John Considine - BE, MIStructE, MIEI, CEng, FConsEIM** • Director Barrett Mahony Consulting Engineers • Fellow of the Association of Consulting Engineers of Ireland • Chartered Engineer • 33 years of civil and structural engineering experience in the UK and Ireland • 10 years' experience in the preparation of EIAR documents. **Paul Stephenson - BE, MIEI, CEng** • Chartered Engineer • 12 years of civil engineering experience, specialising in geotechnics in the UK and Ireland • 3 years' experience in the preparation of EIAR documents. **Ryan Mulvaney - BSc, MEng, MIEI,** • 5 years of Civil and structural engineering experience • 3 years' experience in the preparation of EIAR documents.

2.0 THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

2.1 EIA Legislation

The European EIA Directive 85/337/EEC was introduced in 1985. The Directive along with its three subsequent amendments was eventually codified by Directive 2011/92/EU. The 2011 Directive was further amended by Directive 2014/52/EU. The amending Directive took effect in Ireland on 16th May 2017, and the transposing legalisation (*European Union (Planning and*

Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018)) came into effect on 1st September 2018.

The EIA Directive aims to provide a high level of protection to the environment and ensures that environmental considerations are taken into account in the preparation of a proposed development or project, with the view to reducing environmental impacts. EIA also includes public participation in decision-making and thereby strengthens the quality of decisions.

The 2014 Directive requires that certain developments be assessed for *likely environmental effects* before planning approval be granted. When submitting a planning application for such development, the applicant must also submit an accompanying Environmental Impact Assessment Report (EIAR).

The Department of Housing, Planning, Community and Local Government has brought forward the *Planning and Development Regulations 2001-2018* to provide for the transposition of the Directive into the Irish planning code. To this effect, the *European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018* transposed the 2014 Directive into Irish law.

The Department has also issued the updated the 'G*uidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment'* in August 2018, to provide practical guidance on legal and procedural issues arising from the requirement to undertake EIA in accordance with Directive 2014/52/EU. These Guidelines have informed the preparation of this EIAR. The preparation of the EIAR has also had regard to the EPA *Draft Guidelines on the Information to be Contained in EIARs* (2017).

2.2 EIA Process

EIA is the process for anticipating the effects on the environment caused by a proposed development or project. Where effects are unacceptable, design or other measures can be taken to avoid or reduce these effects to acceptable levels. The EIAR is the document produced as a result of the Environmental Impact Assessment (EIA) process, that:

- Provides a description of the baseline environment;
- Identifies the potential effects as a result of the proposed development or project; and
- Provides a description of any mitigation measures required to reduce or eliminate such potential effects.

The EIA process is summarised as follows:

- **Screening**

  Is an EIA required?

- **Scoping**

  What issues should be considered within the EIAR?

- **Baseline data collection**

  Establishing a robust baseline of the existing environment on/around the proposed site.

- **Impact assessment**

  Assessment of the environmental impacts and establishing their significance.

- **Mitigation**

  A description of the mitigation measures and/or factors that reduce or eliminate any significant environmental impacts identified, which cannot be avoided practically through design.

- **Consultation**

  With statutory stakeholders, the public and other bodies.

- **Decision**

  The competent authority, in this case An Bord Pleanála, taking into account the results of consultations, decides if the proposed project can be authorised.

- **Monitoring**

  Implementation and monitoring of mitigation measures.

In accordance with the requirements of Article 3 of the 2014 Directive, the EIA shall identify, describe and assess the direct and indirect significant effects of the proposed projects, in an appropriate manner, on the following factors:

a) population and human health;
b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
c) land, soil, water, air and climate;
d) material assets, cultural heritage and the landscape;
e) the interaction between the factors referred to in points (a) to (d).

2.3 EIA Methodology

2.3.1 EIA Guidance

This assessment of environmental impacts has been completed in accordance with, but not limited to, the following legislation and current guidance:

- DHPLG (2018) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;*

- DHPLG (2017) *Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition*;
- EC (1999) *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*;
- EC (2013) *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*;
- EC (2017) *Environmental Impact Assessment of Projects. Guidance on Scoping*;
- EC (2017) *Environmental Impact Assessment of Projects. Guidance on the preparation of Environmental Impact Assessment Report;*
- EPA (2015) *Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2015);
- EPA (2017) *Draft Guidelines on the Information to be Contained in EIARs*;
- EU (2014) Directive 2014/52/EC, amending Directive 2011/92/EU on the *Assessment of the Effects of Certain Public and Private Projects on the Environmen*t;
- *Planning and Development Act 2000*, as amended; and
- *Planning and Development Regulations 2001*, as amended.

In addition to these guidance documents, all EU Directives and national legislation relating to the specialist areas (e.g. Biodiversity, Air and Climate, Noise) have been considered under each relevant environmental aspect. Specific guidance is addressed in the relevant chapters of this EIAR.

2.3.2 The Need for EIAR (EIA Screening)

Screening is Stage 1 in the process, whereby a decision is made on whether or not an EIA is required. In order to determine whether an EIA is required for the proposed project, it is necessary to determine whether it is a project listed in one of the Annexes to the Directive 2011/92/EU, as amended by Directive 2014/52/EU.

The 2014 Directive specifies the classes of project for which an EIA is required and the information which must be contained within the EIAR. In accordance with *Article 4(1)* of the 2014 Directive, all projects listed in Annex I are considered as having significant effects on the environment and shall be subject to EIA. For projects listed in Annex II of the Directive, the national authorities may determine whether an EIA is needed, either on the basis of thresholds/criteria or on a case by case examination.

These Annexes have been transposed into Irish law by the provisions of the *Planning and Development Act 2000-2020* and the *Planning and Development Regulations 2001-2020*. Specifically projects requiring mandatory EIA are listed in Part 1 and Part 2 of Schedule 5 of the *Planning and Development Regulations 2001-2020*.

Schedule 5 (Part 1) of the *Planning & Development Regulations 2001* (as amended) lists major project classes for the purposes of mandatory EIA, which typically include industrial, chemical, energy, waste, infrastructure and intensive agricultural developments. The proposed project does not correspond to a development set out in this Part and therefore, EIA is not a requirement under this provision.

Schedule 5 (Part 2) of the *Planning & Development Regulations 2001* (as amended) sets mandatory thresholds for each project class above which EIA is required. Sub-sections 10(b)(i) and 10(b)(iv) addresses '*infrastructure projects'* referring to housing and urban developments, and require that the following class of project, relevant to this project, be subject to EIA:

Class 10 – Infrastructure Projects

Subsection 10(b)(i):

> "*Construction of more than 500 dwelling units*"

This Project comprises a strategic housing development including 977 no. residential units and c. 3,889 sq m of other (non-residential) uses. The Project exceeds this threshold and therefore an EIA is required in the context of this Class of the Regulations.

Part 2 Class 10 – Infrastructure Projects

Subsection 10(b)(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 SHD Project relates to a site of c.9.6 hectares and is located within an area which comes within the definition of "*other parts of a built-up area*". The Project therefore does not exceed the threshold of 10 hectares, with respect to site area of the proposed development, however it is noted that the overall Central Mental Lands (to which the Masterplan relates) are 11.39ha in area. Regardless, an EIAR is already triggered in respect of 10(b)(i).

Part 2 Class 14 – Works of Demolition

> *"Works of demolition carried out in order to facilitate a project listed in Part 1 or Part 2 of this Schedule where such works would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7. "*

The site buildings and structures to be demolished have a total gross floor area of 3,736 sq m and range between 1-2 storeys in height. Given the scale and nature of buildings to be demolished, it is not envisaged that likely significant effects on the environment arising from the demolition will occur. Nevertheless, the likely impacts arising with respect to the demolition of these building will be assessed in full as part of the EIA, in the context of Material Assets – Waste, Material Assets - Traffic and Transportation, Noise and Vibration, Air Quality and Climate, Human Health, and as part of the Construction Environmental Management Plan. On this basis, it is considered that the Project does not require the preparation of an EIAR with respect to this Class.

2.3.3 EIA Scoping

The EPA Guidelines state that 'Scoping' is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information.

It is defined in the EC (2001) guidance as: '*determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR'.*

The EIAR will be prepared to address those aspects identified in Article 5 and Annex IV of the EIA Directive and Schedule 6 of the Regulations. The EIAR will also be prepared in the context of Section 4 of the Draft *Guidelines on the Information to be Contained in the Environmental Impact Assessment Reports,* prepared by EPA (2017). Table 2.1 below documents the scoping exercise undertaken in respect of this EIAR.

Table 2.1: Scoping exercise – potential for significant effects arising from the proposed project.

Environmental Aspect	Detailed Assessment	Justification
Population and Human Health	Yes	The proposed development has the potential to impact on population and human health, employment, local community and amenity uses, during the construction and operational phases.
Biodiversity	Yes	The subject lands are not located within any Natura 2000 or nationally designated conservation sites but is located within 15km of a number of designated sites. There is potential for habitats to be recorded on site and therefore, the proposed development therefore has potential to impact on biodiversity.
Land, Soils, Geology and Hydrogeology	Yes	The proposed development includes the excavation, movement and deposition of soil as part of the construction process. The impacts on geology and hydrogeology should therefore be assessed in terms of the groundworks, construction and operational phase of the proposed development.
Hydrology – Surface Water	Yes	The proposed development does have the potential to impact on water (including flood risk, hydrology and drainage) as there will be ground disturbance associated with the proposed development.
Air Quality and Climatic Factors	Yes	Construction and operational phases will have the potential to give rise to air quality impacts, principally relating to traffic associated with the proposed development.

Noise and Vibration	Yes	Construction and operational phases will have the potential to give rise to impacts relating to noise and vibration. A baseline noise survey has been undertaken to determine the prevailing noise level representative of the site and nearest noise sensitive locations.
Landscape and Visual	Yes	Given the height and scale of the buildings proposed when compared to the existing sensitive/ undeveloped nature of the subject lands, the LVIA will consider effects on the landscape character of the existing setting (i.e. as a result of the construction and existence of the proposed development) and visual impacts (i.e. the extent to which the proposed development when built will effect the landscape).
Cultural Heritage, Archaeology and Architectural	Yes	The site contains a number of heritage assets which gives rise to the potential for impact upon any relevant Archaeological, Architectural or Cultural Heritage. Detailed assessment is therefore required.
Wind	Yes	The proposed development will introduce a number of buildings to the site which will be taller than the surrounding existing context, it therefore has the potential to impact upon the microclimate with respect to wind and pedestrian comfort.
Material Assets – Roads and Traffic	Yes	The transportation chapter of the EIAR is required to present an assessment of the potential traffic and transport impacts of the proposed development. The assessment will be influenced by the requirements set out within *Traffic and Transport Assessment Guidelines* TII, 2017.
Material Assets – Waste Management	Yes	The proposed development may generate waste arisings that will require management during construction and operation.
Material Assets – Built Services	Yes	The Material Assets section of the EIAR will examine the likely significant effects

		of the construction and operation of the proposed development on intrinsic and valuable assets of material value.
Major Accidents and Disasters	Yes	Section 5.1.3.6 of the *Dún Laoghaire Rathdown Development Plan 2016-2022* notes that there are no 'Seveso' sites (defined within the 'COMAH Regulations as 'locations where significant quantities of dangerous substances are stored') within Dún Laoghaire-Rathdown. Major accident hazards in respect of the provisions of the Major Accidents Directive. As a result, there is no expected impact arising from major accident hazards involving dangerous substances in association with the proposed development. Due to the scale and nature of the proposed development and the location of the subject lands, potential significant impacts are not expected. Nonetheless, any potential impacts in respect of the risk of major accidents and disasters will be addressed within the Population and Human Health Chapter and Air Quality and Climate Chapter (e.g. in relation to flooding). The planning application is also supported by a standalone *Site Specific Flood Risk Assessment* which addresses flood risk in the context of climate change.
Interactions	Yes	There is the potential for multiple direct or indirect effects (from various environmental aspects) to result in an accumulation or magnified effects from the proposed development.
Cumulative Impacts	Yes	The proposed development will be in proximity to other development permitted and proposed development and thus has the potential to exacerbate or create larger, more significant effects.

Scoping was carried out on an informal basis through the submission of a report documenting an informal scoping exercise (*Environmental Impact Assessment Scoping Report (and*

Summary of Possible Effects)) submitted to both Dún Laoghaire Rathdown County Council and An Bord Pleanála at the pre-application consultation stage. In this document, the environmental aspects that were proposed to be considered in detail in this EIAR were identified on the basis that there is potential for significant effects. That said, scoping is considered to be an iterative process and is ongoing throughout the development and preparation of the EIAR.

2.4 EIA Consultation

Consultation with key stakeholders, including Dún Laoghaire Rathdown County Council and An Bord Pleanála has taken place at the pre-application stage via the Strategic Housing Development Pre-Application Consultation process.

Furthermore, this document enables the competent authority to determine the acceptability of the proposed development in the full knowledge of the project's likely significant impacts on the environment (if any). The decision-making process follows a statutory process that allows for public consultation and the receipt of advice from other key stakeholders and statutory authorities with specific environmental responsibilities. Further information on the Consultation Process is set out in Chapter 6 of this EIAR.

3.0 PLANNING AND DEVELOPMENT CONTEXT

3.1 Introduction

This Chapter provides the legislative context in relation to the planning and development of the proposed project, including an overview of the national, regional and local planning policy pertaining to the site. Regard is also given to other relevant statutory and non-statutory planning documents where appropriate.

In this case, the project is defined as a Strategic Housing Development (SHD) on the basis that it comprises *"…100 or more houses on land zoned for residential use or for a mixture of* *residential and other uses"*, as set out in Section 3 of the *Planning and Development (Housing) and Residential Tenancies Act 2016.*

3.2 National Planning Context

3.2.1 National Planning Framework – Project Ireland 2040

The *National Planning Framework* (NPF), published in February 2018, sets out a strategic development framework for the Country to 2040. The *National Planning Framework* is the Government's plan to cater for the extra one million people that will be living in Ireland, the additional two thirds of a million people working in Ireland and the half a million extra homes needed in Ireland by 2040.

The Framework focuses on:

- Growing regions, their cities, towns and villages and rural fabric.

- Building more accessible urban centres of scale.

- Better outcomes for communities and the environment, through more effective and coordinated planning, investment and delivery.

As a strategic development framework, the Plan sets the long-term context for Ireland's physical development and associated progress in economic, social and environmental terms and in an island, European and global context. Ireland 2040 will be followed and underpinned by supporting policies and actions at sectoral, regional and local levels.

Under the heading of 'Compact Growth', the NPF is:

> *"Targeting a greater proportion (40%) of future housing development to happen **within and close to existing built-up areas**. Making **better use of under-utilised land,** including 'infill' and 'brownfield' and publicly owned sites together with higher housing and jobs densities, better serviced by existing facilities and public transport".*

[**Our emphasis**.]

A recurring theme in the Plan is the requirement to ensure that the future growth of Dublin occurs within its Metropolitan limits. The NPF estimates that Dublin City and suburbs will grow by c. 264,000 people in the period to 2040. Ireland 2040 targets a significant proportion of future urban development on infill/brownfield development sites within the built envelope of existing urban areas. This is applicable to all scales of settlement, from the largest city, to the smallest village.

National Policy Objectives

The NPF outlines National Policy Objectives, which set out broader aspirations for national and regional planning. Several of these are relevant when considering the proposed development at this subject site. These include:

- ***National Policy Objective 2a*** *– A target of half (50%) of future population and employment growth will be focused in the existing five Cities and their suburbs.*

- ***National Policy Objective 3b*** *– Deliver at least half (50%) of all new homes that are targeted in the five Cities and suburbs of Dublin, Cork, Limerick, Galway and Waterford, within their existing built-up footprints.*

- ***National Policy Objective 5*** *- Develop cities and towns of sufficient scale and quality to compete internationally and to be drivers of national and regional growth, investment and prosperity.*

- ***National Policy Objective 6*** *- Regenerate and rejuvenate cities, towns and villages of all types and scale as environmental assets, that can accommodate changing roles and functions, increased residential population and employment activity and enhanced levels of amenity and design quality, in order to sustainably influence and support their surrounding area.*

- ***National Policy Objective 7*** *- Apply a tailored approach to urban development, that will be linked to the Rural and Urban Regeneration and Development Fund, with a particular focus on:-* ***Dublin****; the four Cities of Cork, Limerick, Galway and Waterford; Strengthening Ireland's overall urban structure, … Encouraging population growth in strong employment and service centres of all sizes, supported by employment growth; Reversing the stagnation or decline of many smaller urban centres, by identifying and establishing new roles and functions and enhancement of local infrastructure and amenities; Addressing the legacy of rapid unplanned growth, by facilitating amenities and services catch-up, jobs … In more self-contained settlements of all sizes, supporting a continuation of balanced population and employment growth.*

- ***National Policy Objective 8*** *– To ensure that the targeted pattern of population growth of Ireland's cities to 2040 is in accordance with the targets set out in Table 4.1.*

City	Population 2016	Population Growth to 2040[27]		Minimum Target Population 2040
		% Range	People	
Dublin - City and Suburbs	1,173,000	20-25%	235,000 - 293,000	1,408,000
Cork - City and Suburbs	209,000	50-60%	105,000 - 125,000	314,000
Limerick - City and Suburbs	94,000	50-60%	47,000 - 56,000	141,000
Galway - City and Suburbs	80,000	50-60%	40,000 - 48,000	120,000
Waterford - City and Suburbs	54,000	50-60%	27,000 - 32,000	81,000

Figure 3.1: Extract from Table 4.1 'Ireland 2040: Targeted Pattern of City Population Growth' contained within the National Planning Framework.

- ***National Policy Objective 11*** *- In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth.*

- ***National Policy Objective 28*** *- Plan for a more diverse and socially inclusive society that targets equality of opportunity and a better quality of life for all citizens, through improved integration and greater accessibility in the delivery of sustainable communities and the provision of associated services.*

- ***National Policy Objective 35*** *– Increase residential density in settlements, through a range of measures including reductions in vacancy, re-use of existing buildings, infill development schemes, area or site-based regeneration and increased building heights.*

3.2.2 Sustainable Residential Development in Urban Areas – Guidelines for Planning Authorities (2009)

The *Sustainable Residential Development in Urban Areas - Guidelines for Planning Authorities, (2009)* and its associated document *Urban Design Manual – A Best Practice Guide (2009)* illustrate essential criteria for sustainable urban residential development and describes how a scheme can integrate seamlessly into a site, taking consideration of its surroundings and thus presenting the best possible residential design scheme in built-up areas.

3.2.3 Rebuilding Ireland – Action Plan for Housing and Homelessness (2016)

Rebuilding Ireland was launched in 2016 with the aim of addressing ongoing supply issues for residential accommodation in Ireland. The overarching aim of the *Action Plan* is to increase the delivery of housing from its current undersupply across all tenures and to help individuals and families meet their housing needs.

The Action Plan provides a target to double the number of residential dwellings delivered annually by the construction sector and to provide 47,000 social housing units in the period up to 2021.

3.2.4 Sustainable Urban Housing: Design Standard for New Apartments: Guidelines for Planning Authorities (2020)

The *Sustainable Urban Housing Design Standards for New Apartment* (2020) provides for an update on guidance on apartment developments in response to the National Planning Framework and Rebuilding Ireland.

These Guidelines seek to promote high density apartment development on residentially zoned land in appropriate locations in line with the above referenced NPF overarching policies in relation to encouraging residential development within existing urban settlements.

3.2.5 Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009)

The *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas* (2009) aim to ensure the sustainable delivery of new development throughout the Country.

The Guidelines also provide guidance on the core principles of urban design when creating places of high quality and distinct identity. The Guidelines recommend that planning authorities should promote high quality design in their policy documents and in their development management process. In this regard, the Guidelines are accompanied by a Design Manual, discussed below.

Furthermore, the Guidelines provide national guidance in relation to the appropriate locations for the siting of higher density residential development, having regard to the locational characteristics of the lands in question.

3.2.6 Urban Design Manual – A Best Practice Guide (2009)

The *Urban Design Manual – A Best Practice Guide* (2009) notes 12 no. criteria that should be used to facilitate assessment of planning applications and should, therefore, be used as a guide to steer best design practice for residential proposals.

3.2.7 Delivering Homes, Sustaining Communities (2007)

This document provides the overarching policy framework for an integrated approach to housing and planning. It notes that demographic factors will continue to underpin strong demand for housing, which in turn will present considerable challenges for the physical planning of new housing and the provision of associated services. Sustainable neighbourhoods are areas where an efficient use of land, high quality design, and effective integration in the provision of p people want to live in.

3.2.8 Childcare Facilities – Guidelines for Planning Authorities (2001)

The *Childcare Guidelines* (2001) generally recommend the provision of childcare facilities for residential development with 75 no. units or more, albeit having regard to the existing geographical distribution of such facilities in the area and the emerging demographic profile of the area.

3.2.9 Design Manual for Urban Roads and Streets (DMURS) (2013)

A key objective of DMURS is to achieve safe, attractive and vibrant streets by balancing the needs of all users, and prioritising alternatives to car journeys. The manual advocates a design-led approach, which takes account of both the physical and social dimensions of place and movement.

3.2.10 The Planning System and Flood Risk Management (2009)

The Office of Public Works (OPW) and the Department of Environment, Heritage and Local Government (DEHLG) published *The Planning System and Flood Risk Management Guidelines* *for Planning Authorities*, November 2009. The *Planning Guidelines* introduce the principle of a risk-based sequential approach to managing flood risk.

3.2.11 Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities (2009)

The Appropriate Assessment Guidance was published to guide compliance with the Birds Directive, 1979 and the Habitats Directive, 1992.

3.2.12 Climate Action Plan (2019)

The Government's *Climate Action Plan* (2019) documents a broad spectrum of potential actions which can mitigate the effects of climate change as caused by pollution and the over-exploitation of natural resources. With regard to the built environment, these measures include the rational siting of urban development, the building of compact, dense and well-designed neighbourhoods, and the imposition of higher energy efficiency performance standards.

3.3 Regional Planning Context

3.3.1 Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy 2019-2031

The *Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy 2019-2031* (RSES) is a strategic plan and investment framework to shape future development and to better manage regional planning and economic development throughout the Eastern & Midland Region.

The RSES includes a strategic plan for Dublin, the Metropolitan Area Strategic Plan (MASP). To achieve the Vision the MASP identifies a number of Guiding Principles for the sustainable development of the Dublin Metropolitan Area including Compact sustainable growth, which aims to:

> *"**Promote consolidation of Dublin city and suburbs, refocus on the development of brownfield and infill lands** to achieve a target of at least 50% of all new homes within or contiguous to the existing built up area in Dublin and at least 30% in other settlements."*

[**Our emphasis**.]

The RSES includes Policy RPO 5.5 which focuses on housing delivery. It states:

> *"RPO 5.5: Future residential development in the Dublin Metropolitan Area shall follow a clear sequential approach, with a **primary focus on the consolidation of Dublin and suburbs**, supported by the development of Key Metropolitan Towns in a sequential manner as set out in the Metropolitan Area Strategic Plan (MASP) and in line with the overall Settlement Strategy for the draft RSES. Identification of suitable residential development sites shall be supported by a quality site selection process that addresses environmental concerns."*

[**Our emphasis**.]

3.4 Local level - *Dún Laoghaire Rathdown County Development Plan 2016-2022*

3.4.1 Core Strategy

The Core Strategy, which forms part of the Development Plan (contained within Section 1.2), articulates the medium-to-longer term quantitatively-based strategy for the spatial development of the *Dún Laoghaire-Rathdown area.* The Development Plan states that:

> *"The central focus of the Core Strategy is on residential development and in ensuring that there is an acceptable equilibrium between the supply of zoned, serviced land for residential development and the projected demand for new housing, over the lifetime of the Plan. In this respect, two key datasets are examined:*
>
> - *Housing Land Availability Study (Supply of zoned land)*
> - *Regional Planning Guidelines for the GDA (Population Targets)"*

Furthermore, the Core Strategy further sets out the quantum of land available for housing within the County and the approximate potential residential yield arising from that land.

On that basis, for the Development Plan period, the Core Strategy supports the overall delivery of 33,600 residential units on 640 hectares of land. This residential yield is further broken down into Serviced, Part Serviced and Unserviced Land in Dún Laoghaire-Rathdown.

Figure 4.1 below demonstrates the quantum of serviced land and the potential residential yield for that land. It shows that the Core Strategy supports the delivery of 18,000 No. residential units, on 410 hectares of serviced land. This includes the site.

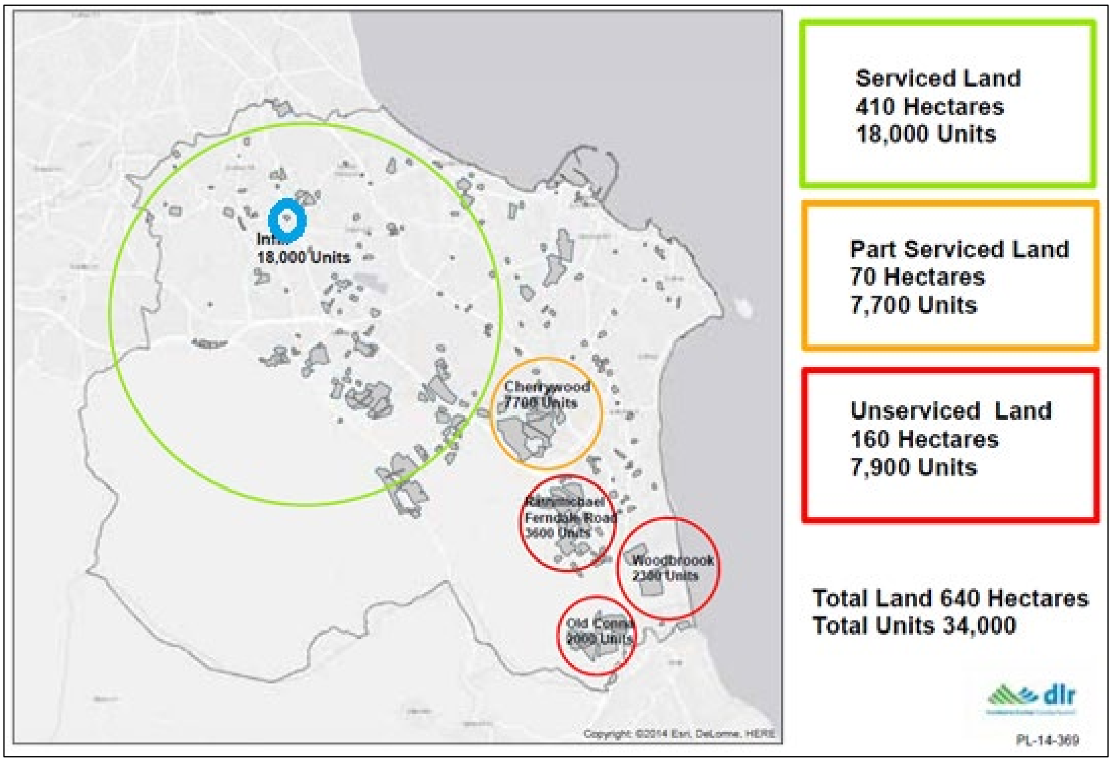


Figure 3.2: Serviced, Part Serviced and Unserviced Land in Dun Laoghaire-Rathdown County Council (with approximate location of subject site highlighted blue). (Source: *Dún Laoghaire Rathdown County Development Plan 2016-2022*.)

3.4.2 Land Zoning Objective and Designations

The application site is zoned Objective A – *'To protect and/or improve residential amenity',* as shown on Figure 3.3.

Table 8.3.2 of the Development Plan outlines 'Residential' as being 'Permitted in Principle'.

The non-residential uses proposed as part of the development include: Retail ('Shop Neighbourhood'), Community ('Community Facility'), Medical ('Doctor/Dentist etc.') Café ('Tea Room/ Café) and a creche ('Childcare Service'). Each of these uses are 'Open for Consideration' under the zoning objective.

The application site is also subject to the INST objective which provides a specific set of policy requirements for the lands. This is addressed in Section 3.4.3 below.

The blue dashed line which also encompasses the application site refers to '*boundary of lands for which a Local Area Plan will be prepared'.* At the time of writing, the Local Area Plan (LAP) had not yet been adopted or a draft published for public consultation.

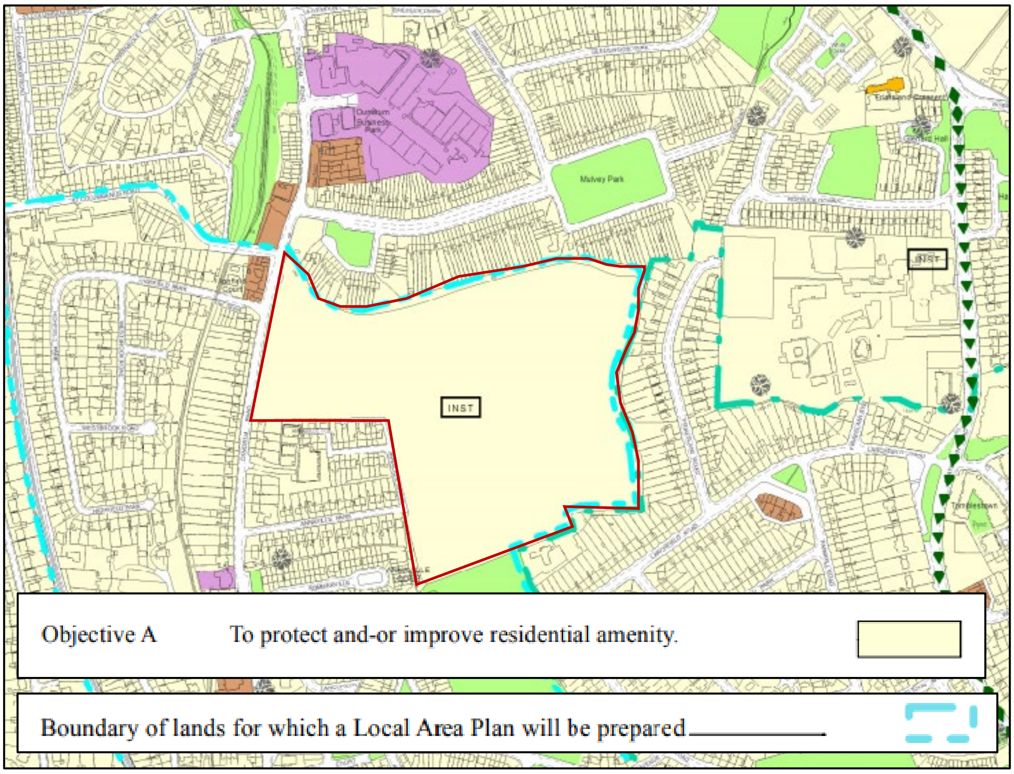


Figure 3.3: Extract from the Development Plan, illustrating the zoning objective and policy designations associated with the application site (indicative site wide boundary in red).

3.4.3 Institutional 'INST' Objective

Section 8.2.3.4 *Additional Accommodation in Existing Built-up Areas* of the Development Plan provides information surrounding the policy requirements for those lands subject to the 'INST' objective. In the first instance it states:

> *"Where no demand for an alternative institutional use is evident or foreseen, the Council may permit alternative uses subject to the area's zoning objectives and the open character of the lands being retained."* (page 179)

The Development Plan further notes:

> *"The principal aims of any eventual redevelopment of these lands will be to achieve a sustainable amount of development while ensuring the essential setting of the lands and the integrity of the main buildings are retained. In order to promote a high standard of development a comprehensive masterplan should accompany a planning application for institutional sites" (page 179).*

As per Section 8.2.3.4 and 2.1.3.5 (which contains **Policy RES5: Institutional Lands**) of the Development Plan, the policy requirements for the masterplan (and related planning applications) include:

- *Must adequately take account of the built heritage and natural assets of a site and established recreational use patterns;*

- *Public access to all or some of the lands (may be required);*

- *Every planning application lodged on institutional lands shall clearly demonstrate how they conform with the agreed masterplan for the overall site. Should any proposed development deviate from the agreed masterplan then a revised masterplan shall be agreed with the Planning Authority;*

- *A minimum open space provision of 25% of the total site area (or a population based provision in accordance with Section 8.2.8.2 whichever is the greater) will required on Institutional Lands.*

- *The open space provision must be sufficient to maintain the open character of the site – with development proposals built around existing features and layout, particularly by reference to retention of trees, boundary walls and other features as considered necessary by the Council.*

- *On Institutional Lands where existing school uses will be retained, any proposed residential development shall have regard to the future needs of the school and allow sufficient space to be retained adjacent to the school for possible future school/ expansion redevelopment.*

- *In the development of such lands, average net densities should be in the region of 35-50 units p/ha. In certain circumstances higher densities will be allowed where it is demonstrated that they can contribute towards the objective of retaining the open character and/or recreational amenities of the lands.*

Section 8.2.3.4 further states:

> *"Where no demand for an alternative institutional use is evident or foreseen, the Council may permit alternative uses subject to the area's zoning objectives and the open character of the lands being retained."*

3.4.4 Housing Policy

In addition to the policy support for increased housing delivery in Dublin, as outlined within the Core Strategy, this section sets out a number of key Development Plan policies relevant to new housing.

Residential Density

Section 2.1.3.3 of the Development Plan relates to residential density and contains Policy RES3: Residential Density which states the following:

> *"It is Council policy to promote higher residential densities provided that proposals ensure a balance between the reasonable protection of existing residential amenities and the established character of areas, with the need to provide for sustainable residential development. In promoting more compact, good quality, higher density forms of residential development it is Council*

policy to have regard to the policies and objectives contained in the following Guidelines:

- *'Sustainable Residential Development in Urban Areas' (DoEHLG 2009)*
- *'Urban Design Manual - A Best Practice Guide' (DoEHLG 2009)*
- *'Quality Housing for Sustainable Communities' (DoEHLG 2007)*
- *'Irish Design Manual for Urban Roads and Streets' (DTTaS and DoECLG, 2013)*
- *'National Climate Change Adaptation Framework - Building Resilience to Climate Change' (DoECLG, 2013)."*

Densification of Residential Areas

Section 2.1.3.4 of the Development Plan supports the densification of existing built-up areas and contains **Policy RES4: Existing Housing Stock and Densification** which states:

> *"It is Council policy to improve and conserve housing stock of the County, to densify existing built-up areas, having due regard to the amenities of existing established residential communities and to retain and improve residential amenities in established residential communities."*

Overall Housing Mix

Section 2.1.3.7 of the Development Plan relates to housing mix and contains Policy RES7: Overall Housing Mix which states:

> *"It is Council policy to encourage the establishment of sustainable residential communities by ensuring that a wide variety of housing and apartment types, sizes and tenures is provided within the County in accordance with the provisions of the Interim Housing Strategy."*

Social Housing (Part V)

Policy RES8: Provision of Social Housing of the Development Plan notes the following respect of Social Housing (Part V):

> *"It is Council policy to promote the provision of social housing in accordance with the projects outlined in the Council's Interim Housing Strategy and Government policy as outlined in the DoECLG 'Social Housing Strategy 2020'."*

3.5 *Draft Dún Laoghaire Rathdown County Development Plan 2022 – 2028*

3.5.1 Draft Core Strategy

The Core Strategy, which forms part of the Development Plan (contained within Chapter 2), articulates the medium-to-longer term quantitatively-based strategy for the spatial development of the *Dún Laoghaire-Rathdown area.* In this regard, the Development Plan states that:

> *"The central focus of the Core Strategy is on residential development and in ensuring that there is an acceptable equilibrium between the supply of zoned, serviced land for the projected demand for new housing, over the lifetime of the Plan. As set out in Section 10(2A) of The Act, the Core Strategy shall inter alia:*
>
> - *Provide relevant information to demonstrate that the Development Plan and the Housing Strategy are consistent with the NPF, RSES and with specific planning policy requirements (SPPR's) specified in Section 28 Guidelines.*
> - *Take account of any policies of the Minister in relation to national and regional population targets.*
> - *Provide details in respect of the area in the Development Plan already zoned for residential and mixed-use zonings and the proposed number of housing units to be included in the area.*
> - *Provide details in respect of the area in the Development Plan proposed to be zoned for residential use and mixed-use zonings and how the zoning proposals accord with national policy that development of land shall take place on a phased basis.*
> - *Set out a settlement hierarchy for the area of the Development Plan.*
> - *Provide relevant information to show that, in setting out objectives for retail development, the Planning Authority has had regard to any Section 28 Guidelines."*

Furthermore, the Core Strategy examines the following factors; population growth trends, population projections for the Core Strategy, housing delivery, planning and construction activity, evaluation of housing demand, housing target for the Core Strategy, and Residential Development Capacity Audit.

As part of the Core strategy, it is an objective to prepare a HNDA analysis, as outlined in policy objective CS1:

> *"It is a Policy Objective to accord with the Housing Strategy and Housing Needs Demand Assessment 2022—2028 and to carry out a regional HNDA post adoption of the Plan and to consider varying the Plan if required. (Consistent with NPO 37 of the NPF)"*

The Core Strategy Housing Target, as shown in Table 3.1 below, provides a housing target of 20,669 units for Dún Laoghaire-Rathdown for the period of 2020-2028.

Table 3.1: Core Strategy Housing Target. (Source: *Draft Dún Laoghaire Rathdown County Development Plan 2022-2028, as amended*.)

	2016	Q1 2028 – RSES High Growth Scenario
Population	218,000	256,125
Increase in Population	N/A	38,125
Total Housing Stock	86,962	110,969
Housing Target (2016 – Q1 2028)	N/A	24,007
Minus CSO Housing Completions (2017 – Q1 2021) + Estimated Completions Q2 2021 – Q1 2022)	N/A	5,492
Housing Target (Q2 2022 – Q1 2028)	N/A	18,515

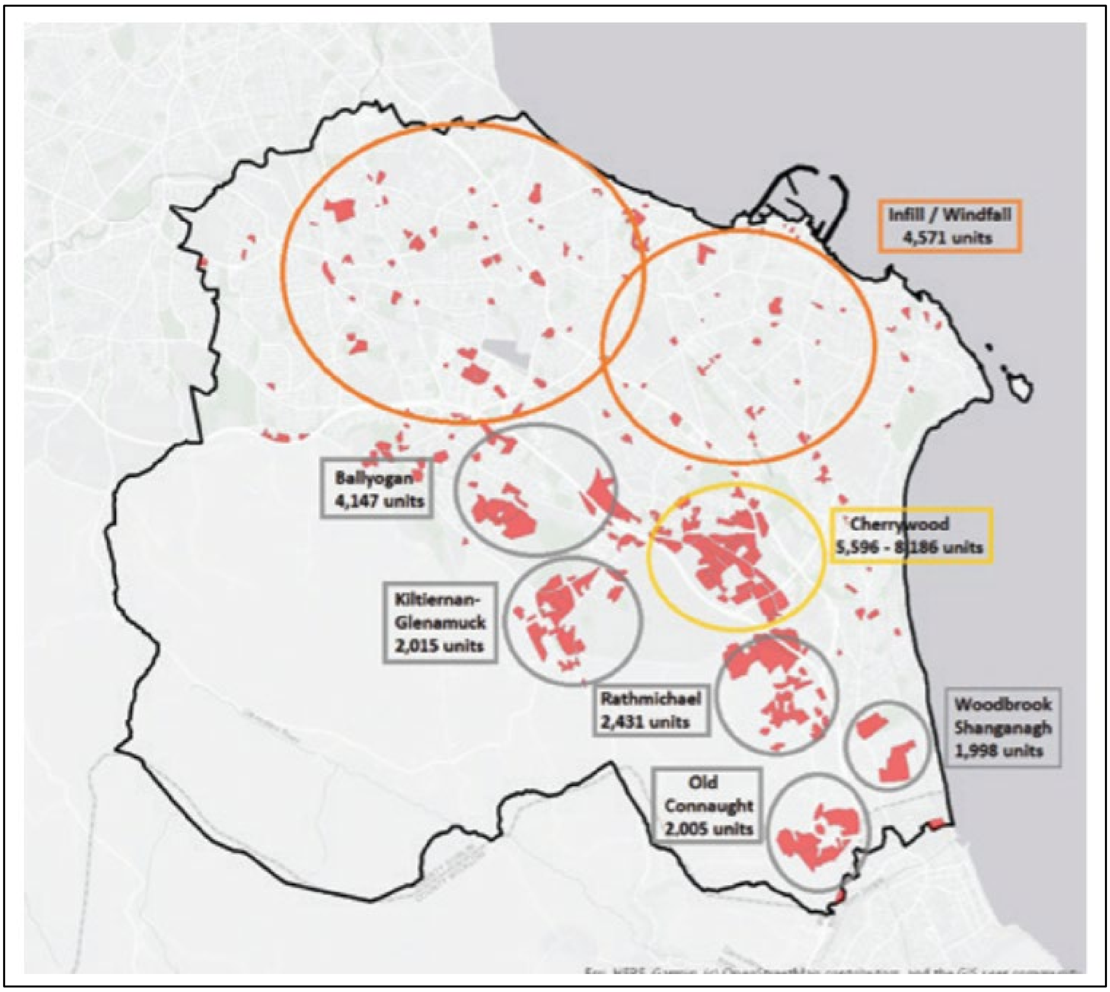


Figure 3.4: Residential Development Capacity Audit – Aggregate Data. (Source: *Draft Dún Laoghaire Rathdown County Development Plan 2022-2028*.)

3.5.2 Draft Strategic Regeneration Sites

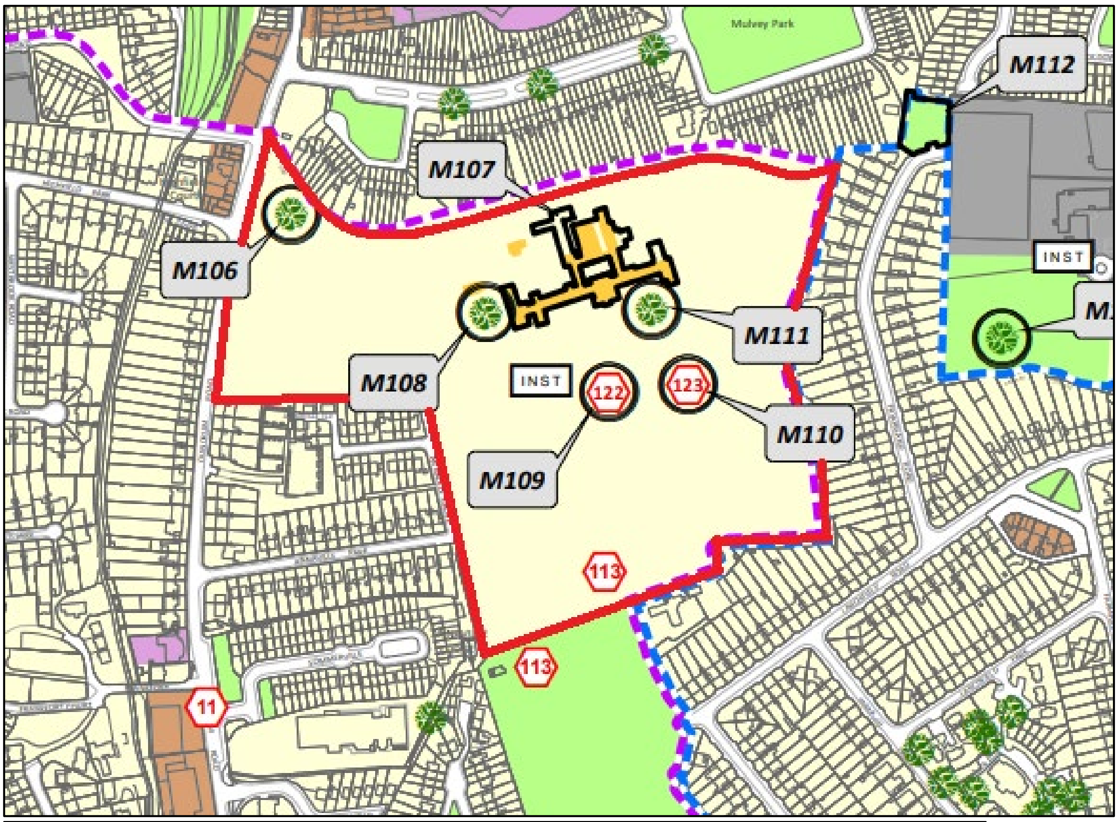
Section 2.6.2 ‘Active Land Management’ of the Draft County Development Plan contains **Policy Objective CS13: Strategic Regeneration** which is set out below.

> *“It is a Policy Objective to support the development and renewal of strategic regeneration sites in the County.”*

We note that the 'The former Dundrum Central Mental Hospital' is identified, along with four other sites, as a strategic regeneration site. We further note that these sites have been identified in recognition of their potential role in increasing the efficiency of urban land-use and delivering compact growth targets.

3.5.3 Draft Land Zoning Objective and Designations

The subject site is zoned Objective A – *'To provide residential development and improve residential amenity while protecting the existing residential amenities'*, as shown in Figure 3.5 below.



Objective A	To provide residential development and/or protect and improve residential amenity.	

To protect and/or provide for Institutional Use in open lands — INST

To protect and preserve Trees and Woodlands

Boundary of lands for which a Local Area Plan will be prepared

M106	New Tree symbol added
M107	Central Mental Hospital building footprint added
M108	New Tree symbol added
M109	New SLO symbol added
M110	New SLO symbol added
M111	New Tree symbol added

Figure 3.5: Extract from the Development Plan, illustrating the zoning objective and policy designations associated with the application site (indicative site boundary in red). (Source: *Draft Dún Laoghaire Rathdown County Development Plan 2022-2028, as amended*.)

Table 13.1.2 of the Development Plan outlines 'Residential' as being 'Permitted in Principle'. This table reflects the Proposed Amendments version of the Draft County Development Plan.

The non-residential uses proposed as part of the development include: Retail ('Shop Neighbourhood'), Community ('Community Facility'), Medical ('Doctor/Dentist etc.') Café ('Tea Room/ Café) and a creche ('Childcare Service'). Each of these uses are 'Open for Consideration' under the zoning objective.

The 'Doctor/Dentist etc.' use is subject to caveat (a) which notes that the use is open for consideration *"where the use will not have adverse effects on the 'A' zoning objective..".*

The purple dashed line which encompasses the application site refers to a 'Boundary of lands for which a Local Area Plan will be prepared'. This represents the Dundrum LAP which is currently being prepared. This is further addressed in Section 5.2 of the main *Statement of Consistency* in respect of the current Development Plan.

The application site is also subject to the INST objective, a number of Specific Local Objectives (SLOs) and tree symbols. These are addressed at Sections 3.5.4, 3.5.5, and 3.5.6 below, respectively.

3.5.4 Draft Institutional 'INST' Objective

Section 4.3.1 notes the following with regard to lands which have an 'INST' zoning objective, as is the case for the subject site:

> *"Where no demand for an alternative institutional use is evident or foreseen, the Council may permit alternative uses subject to the zoning objectives of the area being adhered to and the open character and recreational value of the lands being retained."*

The following development standards are listed in Section 4.3.1 with regard to lands containing an 'INST' objective:

- *"A minimum of 25% of the entire INST land parcel, as determined by the Planning Authority, will be required to be retained as accessible public open space. In determining the area to which the "INST" objective applies the planning authority shall have regard to the existing and historical land use and associations between land uses, and the extent to which any lands contribute to the open character and setting of the core institutional function.*

- *This provision must be sufficient to maintain the open character of the site with development proposals structured around existing features and layout, particularly by reference to retention of trees, boundary walls and other features as considered necessary by the Council (refer also to Section 12.3.8.11).*
- *The provision must be sufficient to maintain and/or improve the recreational value of the site particularly with regard to adding to the sustainable neighbourhood infrastructure of the area.*
- *Any proposal for development other than that directly related to an existing social infrastructure and/or institutional uses, will require the preparation and submission of a masterplan.*
- *Average net densities should be in the region of 35 - 50 units p/ha. In certain instances, higher densities may be permitted where it can be demonstrated that they can contribute towards the objective of retaining the open character and/or recreational amenities of the lands."*

Section 12.3.8.11 of the Draft Development Plan states that any proposed redevelopment of institutional lands requires a comprehensive Masterplan to be produced. It is noted that such a Masterplan should take account of built heritage, natural assets of the site, and established recreational use patterns, and that *"public access to all or some of the lands may be required".*

3.5.5 Draft Specific Local Objectives

There are three Specific Local Objectives (SLOs) which are pertinent to development on the lands of the Central Mental Hospital. These are SLO no. 113, SLO no. 122, and SLO No. 123.

SLO No.113

The Draft County Development Plan introduces Specific Local Objective (SLO) No. 113 at the southern part of Central Mental Hospital lands. The Draft Plan also introduces a corresponding SLO on the northern part of Rosemount Green. The SLO is set out below.

> *"Any integration of / or connectivity between the Central Mental Hospital lands with the adjoining residential area should include the development of enhanced sporting facilities/ infrastructure for existing and future residents."*

SLO No. 122

The Material Alterations to the Draft County Development Plan introduces SLO No. 122 to the Central Mental Hospital lands which provides for flexibility for the subject site in respect of the quantum of office floorspace permissible under the zoning objective A. The SLO is set out below:

> *"To allow offices in excess of 200 sq. metres in the former Central Mental Hospital buildings which are included on the Record of Protected Structures. Any application for offices in excess of 200 sq. metres shall (i) relate only to the former Mental Hospital Buildings with any extension to the building in office use to be only small ancillary structures, (ii) shall include a report that demonstrates that other suitable uses that*

are permitted in principle or open for consideration have been explored and that the reasons for discounting same relate to the proper planning and sustainable development of the area."

SLO No. 123

The Material Alterations to the Draft County Development Plan introduces SLO No. 123 to the Central Mental Hospital lands, in connection with the Strategic Regeneration Sites designation.

The alterations to the Draft Plan included SLO No. 123, which is relevant to the subject site, and was not included in the original draft.

"To ensure that, as Strategic Regeneration Sites, residential provision on the Central Mental Hospital Site and the Old Shopping Centre site will provide for a balanced mix of housing tenure, including affordable homes, and an acceptable mix of larger flexible units, and lifetime adaptable homes to ensure balanced, sustainable communities in Dundrum."

3.5.6 Draft Trees and Woodlands

The Material Alterations to the Draft County Development Plan includes the addition of three new tree symbols to the Central Mental Hospital lands as shown in Figure 3.5 above.

The corresponding policy wording in the Draft County Development Plan sets out the intention of the tree symbol:

"New developments shall be designed to incorporate, as far as practicable, the amenities offered by existing trees and hedgerows. New developments shall, also have regard to objectives to protect and preserve trees and woodlands (as identified on the County Development Plan Maps). The tree symbols on the maps may represent an individual tree or a cluster of trees and are not an absolute commitment to preservation. Decisions on preservation are made subject to full Arboricultural Assessment and having regard to other objectives of the Plan." (Page 287)

3.5.7 Draft Housing Policy

Residential Density

Section 4.3.1.1 of the Development Plan relates to residential density and contains Policy PHP18: Residential Density which states the following:

"It is a Policy Objective to:

- *Increase housing (houses and apartments) supply and promote compact urban growth through the consolidation and re-intensification of infill/ brownfield sites having regard to proximity and accessibility considerations, and development management criteria set out in Chapter 12.*

- *Encourage higher residential densities provided that proposals provide for high quality design and ensure a balance between the protection of existing residential amenities and the established character of the surrounding area, with the need to provide for high quality sustainable residential development."*

Overall Housing Mix

Section 4.3.2.2 of the Development Plan relates to housing mix and contains Policy PHP27: Overall Housing Mix which states:

> *"It is a Policy Objective to encourage the establishment of sustainable residential communities by ensuring that a wide variety of housing and apartment types, sizes and tenures is provided throughout the County in accordance with the provisions of the Housing Strategy and Interim Housing Need Demand Assessment (HNDA) and any future Regional HNDA."*

Social Housing

Policy PHP30: Provision of Social Housing in section 4.3.2.6 of the Development Plan notes the following respect of Social Housing (Part V):

> *"It is a Policy Objective to promote the provision of social housing in accordance with the Council's Housing Strategy and Government policy as outlined in the DoHPLG 'Social Housing Strategy 2020'. The Affordable Housing Act 2021 provides for 20% for social and affordable homes."*

3.6 Planning History of the Site

There is no planning history relating to the subject lands. An extract from Dún Laoghaire-Rathdown County Council's Planning Applications Online Search Map is provided below, showing no planning history associated with the subject lands.

We therefore conclude that no planning applications have been submitted or decided under the *Planning and Development Act 2000* (as amended).

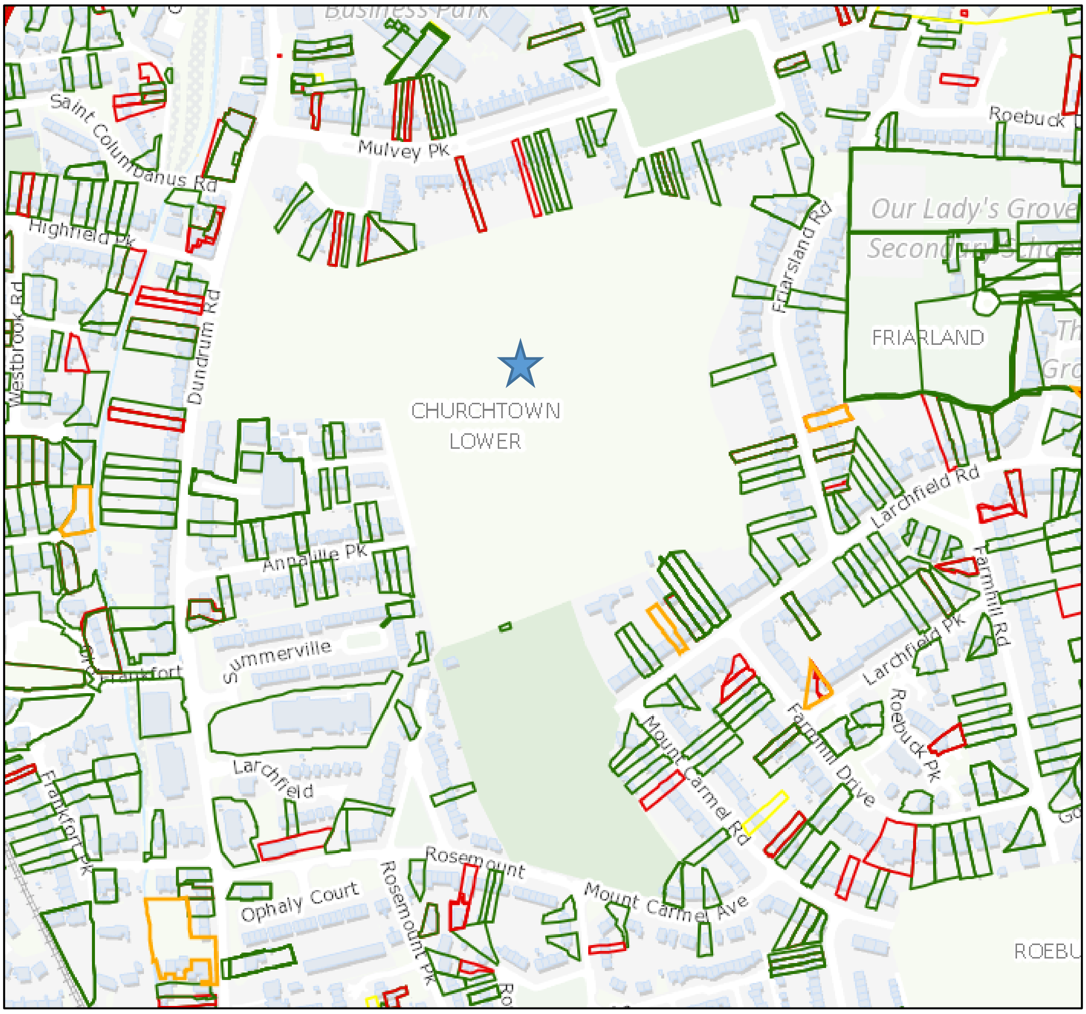


Figure 3.6: Extract from Dún Laoghaire-Rathdown County Council's Planning Applications Online Search Map.

3.7 Surrounding Development Projects

A number of development projects in the surrounding area have been identified as relevant to the assessment of environmental impacts associated with the proposed project, from a cumulative perspective. The methodology surrounding the selection of the below projects is detailed in Chapter 21 of this EIAR. Figure 3.7 shows the identified projects on a map.

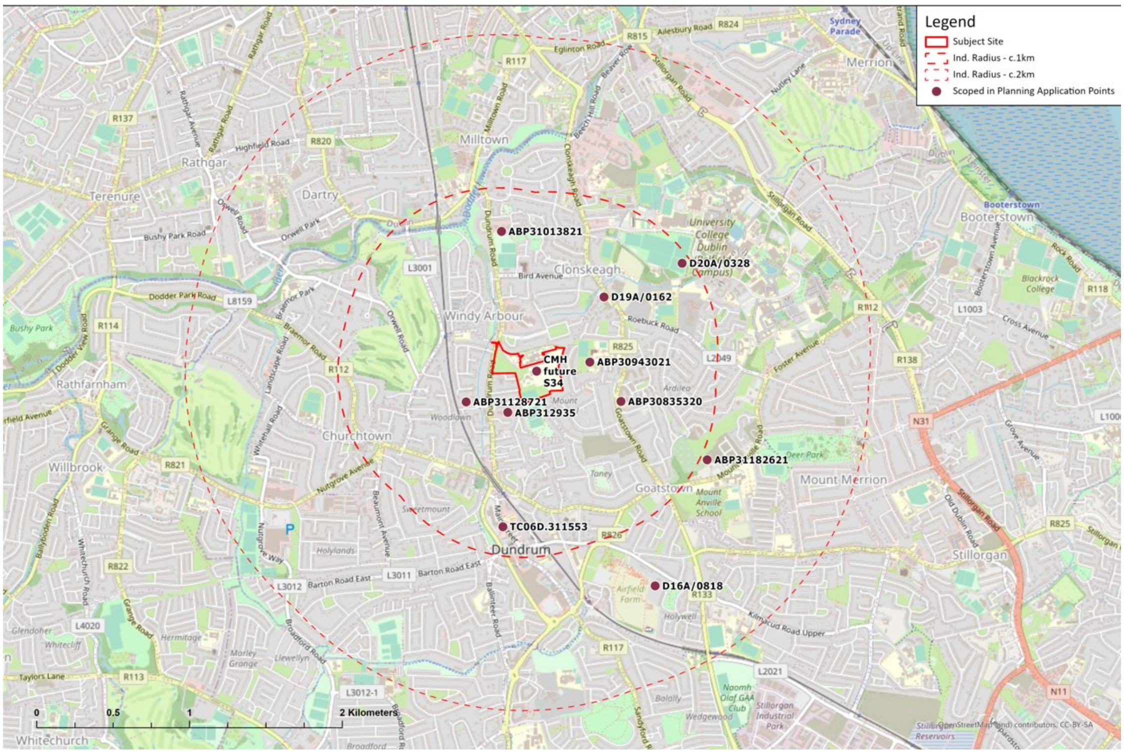


Figure 3.7: Map showing surrounding development selected for the purposes of cumulative impact assessment.

3.7.1 Committed (Permitted/ Under Construction) Projects

The below projects have been granted planning permission by Dún Laoghaire-Rathdown County Council (DLRCC) or An Bord Pleanála (ABP).

Table 3.2: Surrounding development permitted projects identified as relevant to the assessment of the proposed project.

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
D16A/0818	Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14	11th Sept 2017	- Demolition c. 425 sq m - 120 no. apartments - 120 car parking spaces - 144 bicycle spaces
ABP310138-21	Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14	25th Aug 2021	- SHD - Demolition 2,913.8 sq m - 231 no. residential units - After school childcare facility 161 sq m - Café 83 sq m - 118 no, car parking spaces - 462 no. cycle spaces - 4 no. motorcycle spaces

D19A/0162	Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14	8th August 2019	- Demolition - 43 no. residential units - 47 no. car parking spaces - 92 no. cycle parking spaces
ABP308353-20	The car sales premises currently known as Vector Motors (formerly known as Victor Motors), Goatstown Road, Dublin 14, D14FD23	3rd Feb 2021	- SHD (Student accommodation) - 960 sq m demolition - 239 no. bed spaces - 6 no car parking spaces
D20A/0328	University College Dublin, Belfield, Dublin 4	21st Jan 2021	- Extension to the existing car park to provide 239 no. additional car parking spaces, resulting in a total permanent surface car park comprising 300 no. car-parking spaces (61 no. existing spaces plus 239 no. new additional spaces). - The proposed development also seeks a modification of the Athletics Track development permitted under Dun Laoghaire Rathdown County Council Reg. Ref. D19A/0001, to omit 185 no. permitted temporary car parking spaces, resulting in a total of 70 no. temporary car parking spaces being delivered as part of the permitted Athletics track development.
ABP309430-21	2.12 ha at Our Lady's Grove, Goatstown Road, Dublin 14	3rd June 2021	- SHD - Student Accommodation - 698 no. bed spaces - 9 no. car parking - 4 no. motorcycle - 860 no. cycle parking
ABP311287-21	c.0.9ha at No. 97A Highfield Park	20th Dec 2021	- SHD - 115 no. residential units

	(D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14		- 80 sq m creche

3.7.2 Planned Projects

The below projects are planned projects that are at various stages of the planning process. They key distinction from the projects listed above is that they do not have planning permission at the time of writing.

Table 3.3: Surrounding development planned projects identified as relevant to the assessment of the proposed project.

DLRCC/ ABP Reg. Ref.	Address	Lodgement Date/ Status	Overview of Development
ABP311826-21	Lands at Knockrabo, Mount Anville Road,, Goatstown, Dublin 14	Planning permission granted by ABP on 11th March 2022. (Was a 'Planned' Project at the time of writing)	- SHD (Amendment to permitted Phase 2) - 227 no. units (134 no. additional units from permitted SHD) - 178 no. car parking spaces - 519 no. bicycle spaces
ABP312935-22	Sommerville House, Dundrum Road, Dublin 14.	Lodged on 7th March 2022 as a SHD with ABP. Decision due 27th June 2022	- SHD - 111 No. units - 39 no car parking spaces - 164 no. bicycle spaces
TC06D.311553	Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14	Lodged as a SHD Pre-Application Consultation Request with ABP. ABP feedback provided on	- SHD (Consultation) - 884 no. apartments - Creche

		14th Jan 2022.	
N/A	Lands at Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14	Pre-application engagement commenced with DLRCC. Planning application due to be lodged with DLRCC when the SHD (the proposed project) has been decided.	- 3,540 sq m demolition - 71 no. residential units - 5,566 sq m non-residential floorspace - 60 no. car parking spaces

3.7.3 Details of Future Planning Application at the Subject Lands

This section provides further detail in relation to the future planning application which will be submitted by the Applicant to Dún Laoghaire-Rathdown County Council under Section 34 of the *Planning and Development Act 2000* (as amended) once the proposed SHD project has been decided. This proposal relates to the Central Mental Hospital lands and reflects the second component of the delivery of the site-wide Masterplan for the lands which is described in detail in Chapter 5 of this EIAR (the first component being this SHD 'the proposed project').

The proposed development strategy in respect of the delivery of the site-wide Masterplan is covered in depth in both the enclosed *Planning Report* and *Response to ABP Opinion*, prepared by Tom Phillips + Associates. The compatible, yet standalone, nature of the two relevant planning proposals is detailed within these reports.

For context and for the purposes of cumulative assessment, an overview of the Section 34 proposal is set out below, including an extract from the draft Site Plan for the Section 34 application showing the red line boundary and site layout.

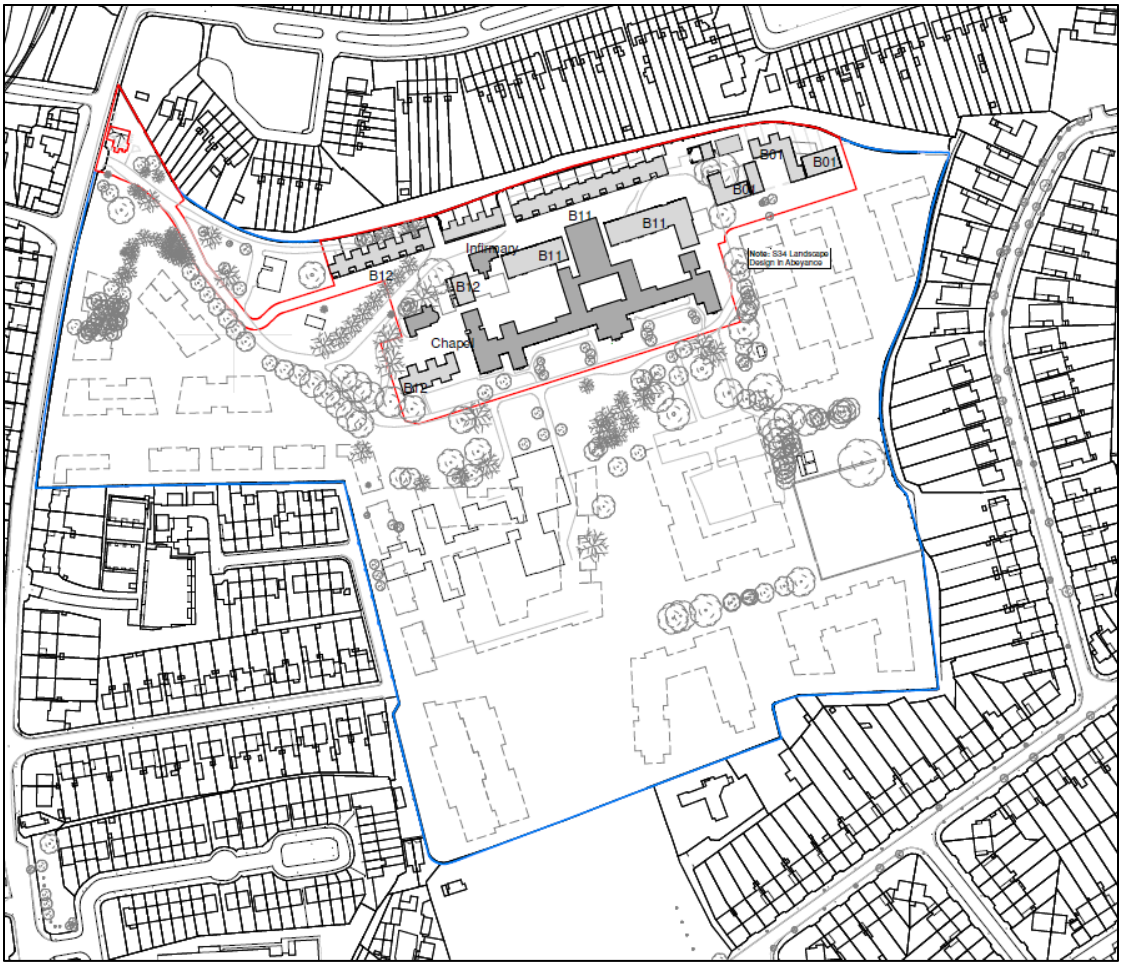


Figure 3.8: Extract from the draft Site Plan prepared by Reddy A+U for the Section 34 proposal at the Central Mental Hospital lands.

At the time of writing, it is envisaged that the future Section 34 proposal will comprise 71 no. residential units and 5,536 sq m of non-residential floorspace:

- 3,101 sq m of demolition, including:
  - Outbuildings and ancillary structures to rear of Main Hospital Building;
  - Eastern wing of Main Hospital Building (later addition to building);
  - Chimney structure;
  - Structures adjacent to farm buildings.

- Change of use and adaptation of the following existing buildings:
  - Main Hospital (5,266 sq m) – Enterprise Centre
  - Chapel (107 sq m) – Community Use
  - Infirmary (158 sq m) – Community/ Enterprise Use
  - Coach House (35 sq m) – Storage
  - Farm Buildings (246 sq m) – Residential
  - Workshops (151 sq m) – Residential

- New residential buildings:
  - Block 01 (1,111 sq m (incl. farm buildings) – 12 no. residential units
  - Block 11 (3,528 sq m) – 36 no. residential units

- Block 12 (2,133 sq m) (incl. workshops) – 20 no. residential units

- 62 no. car parking spaces.

An extract from the draft Schedule of Accommodation, prepared by Reddy A+U, for the Section 34 proposal is provided below.

	Apartments					Duplex Apartments		Houses			
Block	Studio	1-Bed	2-Bed (3P)	2-Bed	3-Bed	2-Bed (D)	3-Bed (D)	House (3-Bed)	House (4-Bed)	Total	Application
Block 01	1	1		3				7		12	S34
Block 11		18	7	4	1				9	39	S34
Block 12		2		3			5	4	6	20	S34
Total	1	21	7	10	1		5	11	15	71	
%	1%	30%	10%	14%	1%		7%	15%	21%		

Figure 3.9: Extract from draft Schedule of Accommodation for the future Section 34 proposal, prepared by Reddy A+U.

It should be noted that the Applicant intends to continue pre-application engagement with Dún Laoghaire-Rathdown County Council in respect of the Section 34 proposal before the scheme is fully finalised. This is due to the outstanding survey work that that is required to be undertaken in respect of the internals of the existing buildings to better inform proposals and assessments of potential impact (which has been delayed due to restricted access to the buildings arising from a delayed vacation of the HSE and service users). Furthermore, given that the submission of this application will follow the determination of the proposed SHD project, it is possible, should planning permission be granted, that the Section 34 proposal will require amendment to respond to any planning conditions imposed in respect of the SHD scheme.

4.0 CONSIDERATION OF ALTERNATIVES

4.1 Introduction

The consideration of alternatives is necessary to evaluate the likely environmental consequences of a range of development strategies for the site within the constraints imposed by environmental and planning conditions.

4.2 Legislative Context

Article 5 (1) of the 2014 Directive requires the consideration of reasonable alternatives which are relevant to the project and take into account the effects of the project on the environment. It states under Article 5 (1) that;

> *"Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least…"*
>
> *"…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."*

Schedule 6 of the *Planning and Development Regulations, 2001* (as amended) sets out the information which is to be contained in an EIAR and Part 1 (d) of Schedule 6 states that the following shall be included:

> *"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."*

In accordance with draft EPA Guidelines, different types of alternatives may be considered at several key stages during the process. As environmental issues emerge during the preparation of the EIAR, alternative designs may need to be considered early on in the process or alternative mitigation options may need to be considered towards the end of the process.

The EPA Guidelines (Draft) states:

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

The consideration and examination of alternatives is set out below.

4.3 Alternatives Examined

4.3.1 *'Do-Nothing'* Alternative

A 'do-nothing scenario' has been considered in respect of the site. It was found to represent an unsustainable and inefficient use of strategically important lands for the delivery of residential development, as reflected by the land zoning objective and Core Strategy contained within the *Dún Laoghaire-Rathdown County Development Plan 2016-2022*.

From an environmental perspective, the do-nothing alternative has been considered in respect of each environmental factor throughout this EIAR. In population and human health terms, if the development was not built, negative impacts would likely arise in respect of the non-provision of housing, the associated local services and community and public open space provision. In the do-nothing scenario, it is also expected that negative impact would arise in respect of the Central Mental Hospital buildings and grounds on the basis that they would likely become disused following the scheduled move of the facility to Portrane.

Further to this, the do-nothing scenario is likely to be neutral in environmental terms, in respect of land, soils, geology and hydrogeology, noise and vibration, townscape and visual impact assessment, archaeology and cultural heritage, waste, built services and roads and traffic.

In relation to biodiversity, if the site was to remain undeveloped, it is expected that the biodiversity value would increase as a result of neglect or a reduction in maintenance of the site.

However, as a result of the zoning of the lands and the specific reference to the strategic importance of the site from a residential capacity perspective contained within the Development Plan, together with consideration of the proximity of the lands and accessibility to Dublin City and significant employment locations, the 'do-nothing scenario' was discounted.

4.3.2 Alternative Locations

The Central Mental Hospital lands are state owned and deemed no longer required for institutional use. The subject lands have been identified at a national level for redevelopment to contribute to the fulfilment of the LDA's remit, as a state-sponsored commercial body, to optimise state lands to deliver compact urban development and affordable housing.

The proposed location for this strategic housing development is therefore identified at a national level and interconnected with the legislated remit of the LDA (as per the *Affordable Housing Bill 2020* and *Land Development Agency Act 2021.)*

The planning policy provisions at all tiers support the redevelopment of the subject lands in line with the above objective, having regard to the land zoning objective, the location of the lands in an existing built up area and the scale of the lands which provides capacity for a significant number of new homes. Furthermore, we note the identification of the site as a Strategic Regeneration Site in the Draft *Dún Laoghaire Rathdown County Development Plan 2022-2028.*

As such, from a planning perspective, the site is considered appropriate for a development of the proposed nature and will deliver housing on state lands, in line with an identified national priority.

In addition to the above planning considerations, the following environmental considerations were undertaken in respect of the subject lands in relation to their suitability for a higher density residential development. The key considerations are noted and discussed below.

- Proximity to public transport and pedestrian and cyclist infrastructure;
- Proximity of surrounding local road network to regional and national roadwork (for construction traffic access);
- Availability of social infrastructure and services;
- Built up/ urban surrounding landscape (townscape);
- Availability of utilities, water, electrical and gas infrastructure;
- Proximity to existing population.

Having regard to the considerations outlined above, the subject site was considered to be a suitable location for the proposed development for the following reasons:

- The connectivity of the subject site with the regional and national road network, public transport provision and existing social infrastructure was considered to have the potential to contribute to reduced transport emissions and associated noise and air quality impacts that could arise from a residential development.

- The availability of utilities, water, electrical and gas infrastructure provides opportunity to connect into existing services and infrastructure (subject to capacity), avoiding significant and further reaching construction activities associated with the introduction of new piped infrastructure etc. It is considered that this has the potential to reduce impact upon the land, soils and local biodiversity.

- The location of the lands in an existing urban built up area and in close proximity to a Major Town Centre (Dundrum Town Centre) is considered to provide potential for positive impacts surrounding the population, including employment opportunities at the construction and operation stage. It is also considered that the site is well located to provide benefits to the existing local population in relation to local facilities and amenities, public open space and community uses. It is also considered that the existing social infrastructure, including open space, educational institutions, retail and leisure provision in the surrounding area has the potential to support the proposed population.

- In landscape and visual terms, whilst the site is identified as having notable heritage and natural assets, the characteristics of the existing surrounding context (urban/ built up) is considered to have the potential to absorb further development.

In summary, having regard to the environmental considerations above, the proposed location is considered to be appropriate for a development of the proposed scale and nature.

4.3.3 Alternative Design and Layout

An extensive Masterplanning process was undertaken to establish the optimal redevelopment for the lands. The supporting *Masterplan Report*, enclosed with this planning application, sets out how the proposed scheme has responded to a range of site constraints and opportunities. It also outlines how the design process has considered feedback at key stages from consultation and engagement to balance the issues and opportunities in order to establish design principles that ensure that the potential for the redevelopment of the lands is optimised.

The Mastreplanning process resulted in a number of emerging concept options for the redevelopment of the lands which were then analysed from a strengths and weaknesses perspective to ensure that the optimal option was developed into a detailed scheme. A capacity study was undertaken in respect of each concept with indicative building heights and an approximate number of units arising from each option. Further detail of the concept options was not developed until the chosen concept option (No. 3) was further developed into the pre-application scheme.

4.3.3.1 Alternative Design 1 – Masterplan Concept Option 1

The site layout for Option 1 was designed to maximise the landscape and ecology features on the site and connect into the existing open space to the south. It seeks to retain the heritage buildings at the site (including the Main Hospital Building, Farm Buildings, Infirmary and the Chapel) and introduces a significant quantum of new built form, in the form of apartment blocks, to the site. The site layout retains a significant amount of open space and creates a neighbourhood centre at the middle of the site.

This option also introduces a number of new pedestrian and cyclist connections to the west and south of the site. The proposal includes the introduction of a new vehicular access point to the south of the existing vehicle access point on Dundrum Road which connects to a new vehicle access across Rosemount Green to the south. In this option, the existing vehicular access point is no longer used as an access point, rather a pedestrian and cycle access.

From a capacity perspective, Option 1 was expected to deliver approximately 1000 no. units at building heights ranging between 2 and 6 storeys.

Figure 4.1: Extract from the *Masterplan Report* (2022) showing Masterplan Concept 1.

As part of the Masterplanning process, a strengths and weaknesses exercise was undertaken in respect of each option. Each option was also considered from an environmental perspective, as outlined below.

Masterplan Stage - Concept Option 1	
Strengths	**Weaknesses**
Increased permeability with Dundrum Road through introduction of second access and part removal of perimeter wall.	Private courtyard spaces
Retention of natural open space / heritage buildings	Fragmented open space provision
New central greenspace	Lacks diversity in plot sizes and/or uses
Largely car-free pedestrian and cycle ways	More built footprint
Human scale of development to minimise impact on visual amenities	Lack of dual aspect units
Second vehicular access point to the south	Pedestrian route has potential result in loss of mature trees
	Lack of permeability through site, potential to result in rat run (traffic issues)
	Potential for daylight, sunlight and overshadowing impact on receiving environment due to proximity of blocks to boundary.

	Potential for impact at Rosemount Green arising from access road.

Many of the strengths and weaknesses listed above were considered in the context of the factors listed at Article 3(1) of the EIA Directive. This includes landscape and visual impact and architectural and cultural heritage considerations in respect of the decision to retain the open space character of the lands and the heritage buildings. The introduction of pedestrian and cycle ways and connection into the surrounding area was considered in respect of population and human health, including considerations relating to reduced transport emissions and associated noise and air impacts. The potential for the loss of mature trees was considered in the context of biodiversity related impacts. Importantly, the lack of vehicular permeability within the site was considered in relation to potential impact from roads and traffic perspective.

Option 1 was ultimately ruled out due to the potential internal traffic issues arising from the site layout and resultant movement strategy. The potential loss of mature trees arising from the siting of the pedestrian route also gave rise to concerns surrounding potential biodiversity impacts.

4.3.3.2 Alternative Design 2 – Masterplan Concept Option 2

The site layout for Option 2 was heritage-led and designed to enhance the setting of the heritage assets (i.e. the Main Hospital Building, Chapel, Infirmary). As part of this, the proposal seeks to retain the heritage buildings at the site and maximise their visibility from across the wider site, including views from the south. Like Option 1, the proposal introduces a significant quantum of new built form, in the form of apartment blocks, to the site. The site layout retains a significant amount of open space and creates two key neighbourhood centres.

This option also introduces a number of new pedestrian and cyclist connections to the west and south of the site. The proposal includes the utilisation of the existing vehicular access point on Dundrum Road which connects to a new vehicle access across Rosemount Green to the south.

From a capacity perspective, Option 1 was expected to deliver approximately 950 no. units at building heights ranging between 2 and 6 storeys.

Figure 4.2: Extract from the *Masterplan Report* (2022) showing Masterplan Concept 2.

Masterplan Stage - Concept Option 2	
Strengths	**Weaknesses**
Retention of heritage buildings and good south to north visibility of main hospital building	Lacks clear distinction between public and communal open space
Strong desire lines/public realm	Lack of vehicular permeability within site, potential to result in rat run (traffic issues)
Two neighbourhood centres/ civic spaces/ hubs	Lesser quantum of open space
Varied typologies creating distinct architecture	Higher ratio of built footprint
Increased permeability with Dundrum Road through introduction of second access point and removal of perimeter wall.	Potential for daylight, sunlight and overshadowing impact on receiving environment due to proximity of blocks to boundary
Second vehicular access point to the south	Challenging to meet dual aspect unit requirement
	Potential for wind at key location within site
	Undefined civic space
	Pedestrian route has potential result in loss of mature trees
	Closer proximity of taller built form to key heritage buildings.

	Potential for impact at Rosemount Green arising from access road.

Many of the strengths and weaknesses listed above were considered in the context of the factors listed at Article 3(1) of the EIA Directive. Like Option 1, the introduction of pedestrian and cycle ways and connection into the surrounding area was considered in respect of population and human health, including considerations relating to reduced transport emissions and associated noise and air impacts. However, due to the nature of the internal road network, the lack of vehicular permeability within the site was considered to result in potential impact from roads and traffic perspective.

In terms of architectural and cultural heritage considerations, the provision of views of the Main Hospital Building from the south of the site was considered to present a potential positive in this regard. Nevertheless, this was considered in the context of the proximity of the proposed built form (at an increased height when compared to Option 1) to the heritage buildings which was highlighted as having potential for significant adverse impact. The siting of the buildings was further considered in relation to wind/ microclimate considerations and identified has having potential to give rise to adverse impacts in this regard.

Furthermore, landscape and visual impact and architectural and cultural heritage considerations arose in respect of the decision to retain the open space character of the lands and the heritage buildings. As per Option 1, the potential for the loss of mature trees was considered in the context of biodiversity related impacts and gave rise to concerns surrounding potential biodiversity impacts.

Ultimately, due to the potential for impact arising from the closer interface between the proposed built form and the Main Hospital Building, the loss of mature trees and the potential traffic impacts arising from the lack of vehicular permeability within the interna road network, Option 2 was discounted.

4.3.3.3 Alternative Design 3 – Concept Option 3

The site layout for Option 3 was largely influenced by an objective to promote the community, for example, through strengthening the relationship between the new and existing community. The site layout and design strategy was therefore focused at creating public spaces appropriate for a range of users, activities and social interaction which would also foster a positive relationship with the existing open space to the south (Rosemount Green). The siting of the buildings to the south of the site was designed to create opportunities for the further provision of community facilities i.e. a community centre, multi-use hall etc.

This option also introduces a number of new pedestrian and cyclist connections to the west and south of the site. The proposal includes the utilisation of the existing vehicular access point on Dundrum Road which connects to a new vehicle access across Rosemount Green to the south. The internal road proposal keeps vehicular traffic to the periphery of the site, with home zones and shared spaces which prioritise the pedestrian.

From a capacity perspective, Option 3 was expected to deliver approximately 1000 no. units at building heights ranging between 2 and 6 storeys.

Figure 4.3: Extract from the *Masterplan Report* (2022) showing Masterplan Concept 3.

Masterplan Stage - Concept Option 3	
Strengths	**Weaknesses**
Provides opportunities for the delivery of Community facilities, including a multi-use games area, close to existing public open space.	Potential for Impact at Rosemount Green arising from access road
High density urban core	Access road across the site has potential to result in rat run (traffic issues)
Responds to view corridor axis	Lack of permeability onto Dundrum Road due to retention of perimeter of wall
Responds to requirement for dual aspect units	
Greater provision of public open space	
Site layout results in continuous green link between Dundrum Road and Rosemount Green which enhances green infrastructure	
Alteration to building placement at northwest corner of site result in retention of Category A trees	
Smaller residential development adjacent to Annaville – benefit from daylight and sunlight perspective and overshadowing	

Maintains vista at the front of the main hospital building.	

Many of the strengths and weaknesses listed above were considered in the context of the factors listed at Article 3(1) of the EIA Directive. The introduction of pedestrian and cycle ways and connection into the surrounding area was considered in respect of population and human health, including considerations relating to reduced transport emissions and associated noise and air impacts. Further in respect of population related considerations, the introduction of public open space, together with the proposal of community facilities was considered as a potential significant positive benefit to the surrounding area.

In terms of architectural and cultural heritage considerations, the protection of the immediate setting to the front of the Main Hospital Building was considered to present a potential positive in this regard. Nevertheless, this was considered in the context of the proximity of the proposed built form to the heritage buildings which was highlighted as having potential for significant adverse impact.

Furthermore, landscape and visual impact and architectural and cultural heritage considerations arose in respect of the decision to retain the open space character of the lands and the heritage buildings. As per Option 1 and 2, the potential for the loss of mature trees was considered in the context of biodiversity related impacts and gave rise to concerns surrounding potential biodiversity impacts.

Noting the environmental and planning considerations set out above, Option 3 was deemed to be the preferred option and was further developed into the pre-application scheme. Refer to the following discussion surrounding Option 3.1 and the Pre-Application Scheme below.

4.3.3.4 Alternative Design 4 – Concept Option 3.1

Progressing from the optioneering stage, Option 3 was selected as the preferred basis for further design development and refinement.

This option was considered to combine all of the best attributes of each of the foregoing options as appropriate to the scale and urban grain of the area, creating a significant number of homes and community facilities along with associated public spaces and social infrastructure to support a new community.

Also, as the site's interface with Annaville had been identified as an area where masterplan concept design Option 3 had certain shortcomings, this was identified as an area requiring further design analysis and exploration of design options.

Further analysis of Option 3 was carried out, together with ongoing consultation with DLRCC and the local residents, which led to Option 3.1. The material changes involved increases to the height of the buildings to further optimise the redevelopment of the lands, including heights of up to 11 storeys towards the centre of the lands, the removal of the vehicular access over Rosemount Green and the provision of a new entrance at Dundrum Road to the south of the existing entrance. This creates a greater sense of space and visual connection at Dundrum Road. Pedestrian and cyclist connection is proposed from the existing path at Rosemount Green through the site and to Mulvey Park via a new opening under Option 3.1.

Figure 4.4: Extract from the *Masterplan Report* (2022) showing Masterplan Concept 3.1.

Masterplan Option 3.1 forms the basis of the pre-application scheme discussed in greater depth below. The relevant environmental considerations pursuant to Article 3(1) of the EIA Directive are also discussed below in relation to the detailed scheme. An extract of the resultant Masterplan site layout is provided below.

Figure 4.5: Extract from the Pre-Application Masterplan Document, showing the illustrative Masterplan site plan for the wider lands.

4.3.3.5 Alternative Design 5 – The Pre-Application Scheme

This SHD scheme was submitted to An Bord Pleanála for pre-application consultation and included design development since Masterplanning stage, including the development of landscaping and engineering proposals. The site boundary incorporated the majority of the Masterplan lands, excluding the Main Hospital Building (see Figure 4.6 below for pre-application stage site location plan and red line boundary. The key development statistics are set out below:

Table 4.1: Key development statistics for the Pre-Application SHD Scheme.

Key Statistic	Pre-Application Scheme
SHD Site Area	10.9 ha
Gross Floor Area (GFA)	c.131,547 sq m
Demolition	c.6,915 sq m
No. of Residential Units	1,259 no. units
Non-Residential Floorspace	4,450 sq m
Gross Residential Density	115 units p/h (based on site area of 10.9 ha)

Net Residential Density	177 units p/h (based on net site area of 7.1ha)
Site Coverage	32.6%
Plot Ratio	1.2:1
Building Height	2 – 11 storeys
Public Open Space	c. 38,312 sq m (34% of site area)
Car Parking Spaces	540 no. spaces (390 no. residential spaces (0.3 spaces per unit) and 150 no. non-residential and visitor)

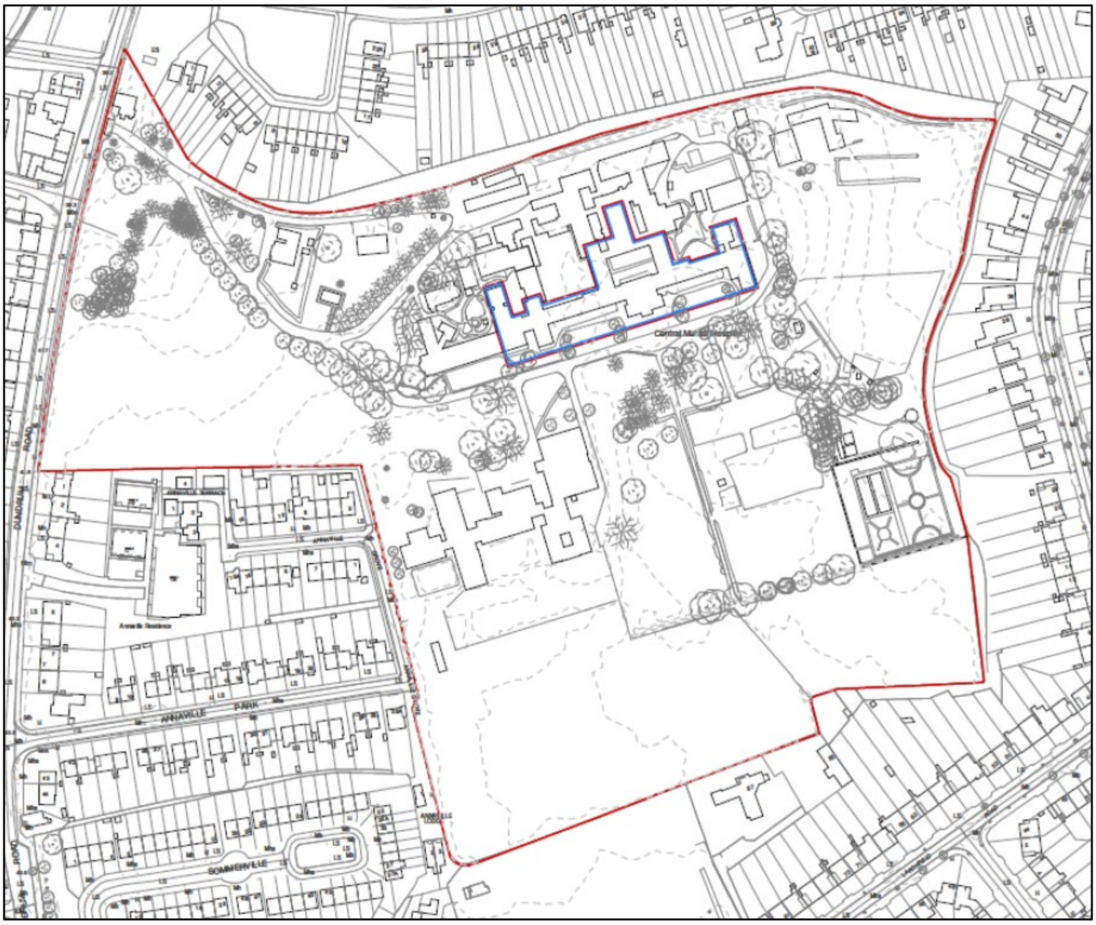


Figure 4.6: Extract from Reddy A+U's Site Location Plan for the Pre-Application SHD Scheme.

This iteration of the SHD scheme is underpinned by the Masterplan proposal outlined in Section 3.4.4.3 and was further developed to introduce residential development to the rear of the main hospital and include the adaptive reuse of the Chapel, Infirmary and workshop buildings. The Main Hospital Building was excluded from the red line as part of the development strategy which proposed the adaptive re-use of the Main Hospital Building as an Enterprise Centre as the subject of a separate planning application to An Bord Pleanála.

The building height strategy included heights ranging between 2 and 11 storeys, with the building elements of increased height located at the centre of the scheme.

Figure 4.7: Extract from Reddy A+U's Pre-Application Architectural Design Report showing the SHD Site Plan.

This scheme was the subject of detailed discussion and feedback from An Bord Pleanála and Dún Laoghaire Rathdown County Council. A number of points were raised in respect of the acceptability of the scheme in relation to the following items (not exhaustive) –

- Development strategy
- Movement strategy
- Interface between the proposed new built form and heritage buildings
- Impact on residential amenity (i.e. overlooking)
- Reduced car parking provision

From an environmental perspective, this scheme was the subject of detailed considerations including the introduction of a significant quantum of new development to an existing residential area, including new homes, commercial uses and public open space. Ultimately, the scheme was amended (which resulted in the proposed project) to address the planning related concerns raised by An Bord Pleanála and Dún Laoghaire Rathdown County Council. However, our environmental considerations in respect of the environment factors set out in Article 3(1) of the EIA Directive are provided below.

- **Population and Human Health:** It was considered that the development would introduce a significant quantum of new development to an existing residential area, including new homes, commercial uses and public open space. We therefore identified the potential for the proposed development to impact positively upon, inter alia, population, employment and amenity. From a human health perspective, we considered the interactions between human health with air quality and noise impacts and noted the potential for temporary significant adverse impacts.

- **Biodiversity:** This development would result in the demolition of a number of existing buildings, the disruption and alteration of the existing and established landscape, as well as significant changes to the nature of the use of the site. Ecological survey work was undertaken to inform assessments in relation to potential impact upon habitats and flora, mammals, bats and wintering birds. In terms of potential impacts, with mitigation measures in place, the ecology impacts were expected to be minor negative, albeit long term in duration.

  Furthermore, having regard to Article 6(3) of the EU Habitats Directive, due to the identification of a direct pathway between the application site and the Natura 2000 site in Dublin Bay, an Appropriate Assessment Screening and Natura Impact Statement (NIS) was submitted at the pre-application stage. The NIS concluded:

  > *"Following the implementation of the mitigation measures outlined, the construction and presence of this development would not be deemed to have a significant impact. No significant impacts are likely on Natura 2000 sites, alone in combination with other plans and projects based on the implementation of mitigation measures."*

- **Land, Soils, Geology and Hydrogeology:** This development would be inclusive of both demolition and the construction of a number of new buildings and hard landscaping works. We therefore identified the potential for impacts in this regard, mainly arising from the excavation required during the construction process. Other areas of potential impact were considered to arise from the stripping of topsoil, construction traffic, accidental spills and leaks/ contamination and any interactions with human health in this regard.

- **Hydrology (Surface Water):** We identified the potential for the development to impact upon the environment in terms of hydrology, during the construction and operational phase, given the locational characteristics of the site from a hydrological perspective. In this regard, we noted that the site lies within the Liffey and Dublin Bay catchment and the Dodder River sub-catchment. It was further noted that there is an open drainage ditch within the site boundary which discharges into Dublin Bay. The main considerations in this regard relate to the potential impacts arising from surface water run-off during social excavation.

- **Air Quality and Climatic Factors:** We considered the potential for air quality impacts arising from the construction stage. The greatest potential for air quality impacts was considered to arise from dust emissions and their impact upon nearby sensitive receptors. In terms of the operational phase, potential impact arising from traffic movements associated with the development was also considered.

- **Noise and Vibration:** We considered the potential for noise and vibration impacts arising from the construction of this scheme upon nearby sensitive receptors, mainly neighbouring residential properties. From an operational perspective, potential impacts were identified in respect of changes to noise levels arising from additional traffic associated with the development. We also considered the potential for noise impact arising from any outdoor seating associated with the non-residential uses within the scheme.

- **Townscape and Visual Impact Assessment:** Given the increased height of the development when compared to the existing low-rise context, it was expected that the increased height at the site (up to 11 storeys) had the potential to impact upon the surrounding townscape which may alter its character. From a visual impact perspective, the potential for the development to change views to/ across the site was considered in the context of potential impact upon visual amenities. The existing insular and largely undeveloped lands were considered to be relatively sensitive to change, also having regard to the historic/ cultural heritage dimensions of the landscape within the site boundary.

- **Archaeology:** From an archaeological perspective, the construction of this development would involve extensive disturbance of ground and therefore would have the potential to impact upon any archaeological remains or features present at the site. The archaeological desk-based study identified the potential for archaeological features in areas where this development proposed new built form.

- **Architectural Heritage:** From an architectural perspective, the application site presents heritage value in both the existing buildings and the landscape, potential impact in this regard has therefore been considered. The development seeks the demolition of a number of buildings and ancillary built form associated with the Main Hospital Building, the construction of new built form within the setting of identified heritage buildings, the renovation and refurbishment of heritage buildings and significant changes to the landscape.

- **Microclimate/ Wind:** We considered wind and microclimate impacts on the basis that the development, arranged in a number of blocks/ buildings at a height of 2-11 storeys, would result in significant changes to the landscape and therefore has the potential to change the microclimate and pedestrian comfort levels.

- **Roads and Traffic:** Due to the scale of this development, the construction phase was considered to have the potential to generate a notable number of additional traffic movements. Furthermore, the development was inclusive of car parking at a ratio of 0.3 spaces per unit and was therefore considered in the context of potential impact arising from additional traffic movements within the area. It also includes cycle parking, and a number of new access points for vehicles, cyclists and pedestrians. The operational phase of the proposed development therefore has potential to change (and therefore impact) the nature of the surrounding area from a traffic and transport perspective.

- **Waste:** This development, both at construction and operation stage, would produce waste. We therefore considered identified the potential for impacts in this regard, together with the necessity for the appropriate management of waste at both stages.

- **Built Services:** Due to the nature of the development, we have considered the potential for the development to impact upon existing site services/ utilities, from both a construction and operation phase perspective. The site is serviced as existing, but it is noted that the operational development will result in an increased demand upon services such as the public watermain system. From an Irish Water perspective, the capacity of existing infrastructure to serve the development was considered in consultation with Irish Water themselves.

4.3.3.6 Alternative Design 6 – The Proposed Project

The proposed project constitutes the final alternative, and preferred, option. The design has been progressed via an iterative process with design amendments arising from consultation with An Bord Pleanála and Dún Laoghaire Rathdown County Council during the pre-application process. The current scheme takes account of both planning and environmental considerations arising throughout the design process. This planning application submission, which includes this EIAR, provides a full assessment of the proposed project from a planning and environmental perspective.

4.3.4 Alternative Process

The development strategy surrounding the delivery of the full Masterplan proposal has been considered in detail and is documented in Section 1.2 of the *Planning Report*. The decision to pursue the Strategic Housing Development (SHD) provisions in respect of the proposed project is considered to represent the optimal solution in the context of the various project specific constraints and the remit of the LDA as a state agency. We further highlight that the legislative provisions in respect of SHD were enacted to facilitate the fast-track delivery of housing in line with national objectives surrounding housing need. The SHD process is therefore considered entirely appropriate for the proposed project.

Given the residential nature of the scheme, it is not envisaged that there are any alternative processes that could have been followed in respect of the assessment of environmental impact.

It is therefore concluded that the consideration of an alternative process is not considered relevant to this EIAR.

5.0 DESCRIPTION OF THE PROPOSED PROJECT

5.1 Introduction

This Chapter, in accordance with Article 5(1)(a) of the EIA Directive, provides: *"…information on the site, design, size and other relevant features of the project".*

The assessment provided in the following Chapters, undertaken by the various specialists, is underpinned by the description of the project as set out below.

5.2 Background to the Site

5.2.1 Site History

There have been no previous planning applications within the subject site of the proposed development. All existing structures on the site were built prior to the establishment of the planning system or built under special powers associated with the current use of the site.

Prior to any development on the site, the grounds were used as farmland.

The original 'Central Criminal Lunatic Asylum' building was completed in 1850, with further building works in 1863. The enclosed environs of the asylum featured multiple airing courts, lean-to shelters and privies, being divided between male and female quarters by a single wall. Adjacent facilities to the main building included an infirmary, kitchen and laundry. A central yard was located inside the entrance, enclosed by the surrounding buildings.

The gate lodge (gate house) was built in 1853, echoing the style of the main hospital building. The protestant chapel was completed in 1866. An unspecified portion of the boundary wall was rebuilt in 1868.

Prior to 1871, a gazebo was erected, referred to as the 'bandstand', and was later relocated within the site, but has since been removed from the site. It was also in the years prior to 1871 that the final and current configuration of the boundary wall was established, now including a portion of land to the south of the site which had previously been farmland.

A Roman Catholic chapel was built in 1901, which caused a change to the entrance drive. A group of buildings were established to the west half of the now former kitchen garden after World War II, alongside other smaller structures located elsewhere on the site. The east half of the former kitchen garden was later redeveloped into a car park.

While most historic buildings remain in situ, losses include the mortuary and a small building to the south.

Many new additions to the site and its facilities were completed throughout the late 20th century, including a large HSE facility to the south of the main building in the late 1980s/ early 1990s.

5.2.2 Current Site Use

The site is currently in use as a secure mental health facility/ hospital; much of the site comprises landscaped open space used in association with the hospital. The surrounding lands are predominantly in residential use with the land to the south of the site a designated open space used as a sports pitch.

The site is currently being used by the HSE as the Central Mental Hospital for Ireland, though the site is due to be vacated in 2022, with a scheduled move to a new facility in Portrane. This move is written into law under the Central Mental Hospital (Relocation) Act 2020, with the current facility being described by the HSE as *"no longer fit to provide the best patient care experience".*

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5.2.3 Site Location and Surrounding Area

The site is located at the Central Mental Hospital lands in Dundrum, Dublin 14. The entire site is 11.39 ha and currently still occupied by the HSE and will be vacated in 2022. The SHD lands are 9.6 ha.

The site is bound by a 4 – 5 m perimeter wall and is accessed via an entrance off Dundrum Road. The overall site comprises a number of existing buildings including the main Hospital building, the Chapel and a number of associated buildings and small temporary structures. The site also consists of a number of landscape features such as a walled garden, an orchard and mature trees.

In terms of statutory designations, both the Hospital building and the Chapel appear on the National Inventory of Architectural Heritage (NIAH):

- Hospital (Reg. No. 60220001) – Rated as 'National' importance;
- Chapel (Reg. No. 60220002) – Rated as 'Regional' importance.

Furthermore, the *Draft Dún Laoghaire Rathdown County Development Plan 2022-2028*, which was issued for display in January 2021, listed a number of structures at the site as 'proposed Protected Structures'. The 'Asylum', 'Catholic Chapel' and 'Hospital Building' were also included in the Record of Protected Structures:

- Asylum (RPS No. 2072);
- Catholic Chapel (RPS No. 2071); and
- Hospital Building (RPS No. 2073)

None of the aforementioned buildings are located within the red line associated with the SHD project with the exception of a small amount of ancillary-built form associated with the Hospital Building which is included for demolition.

In terms of surrounding existing context, Dundrum Road and the Luas Green Line is located to the west of the site, each providing a strong north-south connection. The site is bound by residential properties and gardens at Mulvey Park to the north, at Friarsland Road to the east, at Larchfield Road to the south and south east and at Annaville Grove, Annaville Park and Annaville Terrace to the west. The surrounding residential properties are generally one or two storeys in scale with a four storey apartment block located close to the site boundary near Annaville Grove. In addition to the residential properties referred to above, part of the sites southernmost boundary abuts Rosemount Green, a DLRCC public open space and football pitch.

The site is well served by existing public transport infrastructure; the nearest Luas Green line stop is located approximately 450m west of the site at Windy Arbour. Dublin Bus network infrastructure includes stops at Dundrum Road (R117), Goatstown Road (R825), Churchtown Road and Taney Road (both R112).

The wider environs of the site are predominantly characterised by low scale residential. However, there are a number of commercial uses within close proximity.

This includes Dundrum Town Centre (and Shopping Centre), approx. 1.6 km to the south of the application site entrance. From the site, Dundrum Town Centre is reachable in 20 minutes by foot, 6 minutes by bike and 7 minutes by bus.

Dundrum Business Park is located approximately 200m to the north of the site which comprises a number of office blocks and associated car parking.

Dublin City Centre is located approximately 7.2 km from the application site and accessible by both Luas (27 minutes) and bus (22 minutes).

There are a number of schools in close proximity, namely, Our Lady's National School, Jesus and Mary College, Our Lady's Grove and Our Lady's Grove Primary School. University College Dublin (UCD) is located within c. 1 km (as the crow flies) to the northeast of the application site.

In terms of retail provision, as noted above, the proposed development site is located c. 1km north of Dundrum Town Centre, which is identified as a 'Level 2 – Major Town Centre' within the Retail Hierarchy for the Greater Dublin Area (GDA) set out in the *Dún Laoghaire-Rathdown County Development Plan 2016-2022.*

5.2.4 Site Specific Flood Risk Assessment (SSFRA)

The flood risk assessment has been carried out in accordance with the OPW publication *"The Planning System and Flood Risk Assessment Guidelines for Planning Authorities".* 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.

1. River Slang: The site lies outside the predicted 1 in 1000 year flood extent of flooding on this river.

2. Surface Water Drainage:

    a) The system is designed for a 100yr storm + 20% climate change without flooding.
    b) The surface water drainage from the site to the surface water sewer network will discharge at rates no greater than the existing greenfield runoff rates thereby not increasing the risk of flooding to adjoining areas or downstream from the site.
    c) Overland flow routes in the event of a significant & unlikely blockage of the surface water drainage system have been considered. Overland flows are contained within the site in a controlled manner without risk to the residential buildings on site.

3. Standard mitigation measures will apply on site. House and apartment floor levels are set 150mm above the surrounding ground level to minimise flood risk. All basements on site will be waterproofed. The top of basement car park entrance ramps will be set 100mm above the surrounding ground levels to avoid backflow of surface water down the ramps.

The site features a gradual slope downwards from the southwest corner towards the northeast corner, and from the western portion of the site downwards to the Dundrum Road entrance. The site also features 2 no. natural catchment areas.

5.2.5 Existing Site Access

The site is currently accessed via the vehicular entrance off Dundrum Road. The site is currently served by a single access point only.

5.3 The Need for the Proposed Project

The proposed project, a large-scale residential development, is supported by planning policy at all tiers. The project delivers a significant number of new homes as required to meet housing objectives outlined throughout the relevant policy documents. The relevant national, regional and local planning policy is outlined in in Chapter 3 (Planning and Development Context) and further in the supporting planning documentation.

Furthermore, the Applicant (the LDA) is making a significant positive contribution towards enabling an affordable housing sector in Ireland. As part of this, the LDA is working towards providing new homes and making them available to individuals and families through the schemes provided by the enactment of the *Affordable Housing Bill 2020.*

Within the remit of the LDA to deliver significant housing growth, it is the LDA's vision to transform the Central Mental Hospital site in Dundrum into a leading example of sustainable living which delivers a mix of tenures where people of all ages can live, whilst retaining and celebrating the site's historic assets and providing an outstanding destination for leisure with distinctive and diverse public spaces. Further to this, the LDA is focused on realising compact growth which promotes modal shift towards healthy, active and sustainable mobility.

Further detail surrounding the function of the LDA is contained within Section 14 of the *Land Development Agency Act 2021.*

5.4 Overview of Construction Phase and Construction Works

For full construction related details, refer to the *Construction Environmental Management Plan* (CEMP) prepared by Barrett Mahony Consulting Engineers. A summary is provided below.

5.4.1 Construction Phase

The project will be constructed and handed over in a number of phased building clusters. The exact number of phases and the make-up of each will be subject to market conditions and commercial considerations at the time. It is currently envisaged that there will be five phased clusters as shown in Figure 5.1 below and that the construction of the phases will partially overlap and run concurrently. Subject to planning permission and commercial considerations the construction is expected to run from late 2022 to late 2028, six years and 2 months approximately.

Completion of the first residential units is anticipated in mid-2024. These dates are only an estimate, the exact start date and completions dates may be delayed due to any planning appeals and will also depend on the length of the tendering process.

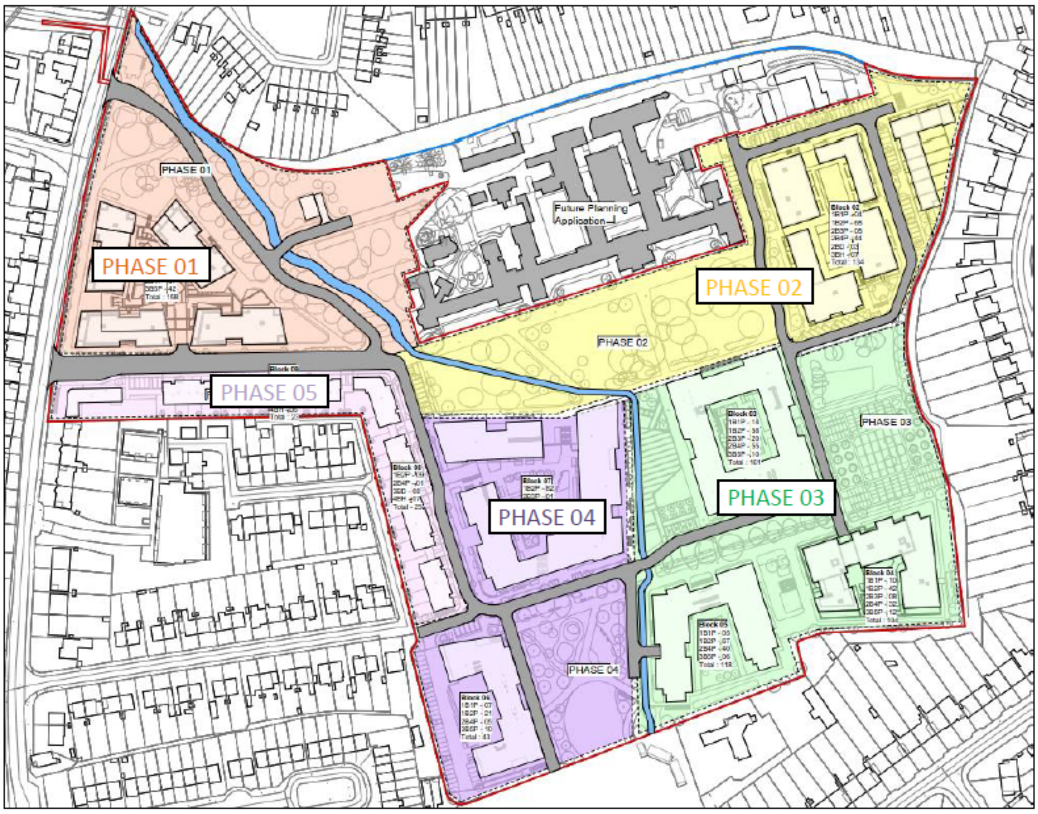

Figure 5.1: Illustrative Plan showing proposed construction phasing.

5.4.2 Proposed Construction Works

The proposed development will be divided into a number of phases as set out in the preceding section. Works in each phase will consist of the following:

Enabling Works:

- Secure site and set up contractor welfare facilities and site accommodation.
- Locate and terminate existing live services.
- Install tree protection and remove trees that are earmarked to be felled.
- Asbestos surveys to be carried out to existing buildings.
- Removal of Structures listed for demolition.
- Excavate and remove material to the required formation. This will require a site strip and removal from the site of material or temporary stock piling.
- Maintain the existing entrance and incorporate new haul roads and hardstanding as required.
- Make good and install any finished boundary treatments that can be installed at this stage.

Main Construction Works:

- Foundations: Excavate foundations down to boulder clay for the houses and duplexes.
- Bored piled foundations will be required for the apartment blocks.
- Basement/half-basement: In-situ reinforced concrete (RC) walls and slabs. External waterproofing membrane.
- Houses: Typically masonry and timber construction.
- Duplex units: Typically masonry, precast slab dividing floor & upper level timber floor/roof construction.
- Retail, creche and community spaces: In-situ RC frame with beam and slab floors. Glazing and cladding. These spaces are generally incorporated into the new apartment buildings. The community hall will be constructed in structural steel.
- Residential Apartments: RC frame with flat slab floors, typically supported off RC blade columns. In-situ RC stair/lift cores. Precast concrete or brick cladding typically with glazing.
- Glazing & cladding to all buildings.
- Architectural finishes, non-loadbearing walls, ceilings, sanitary ware, ironmongery etc. associated with the above.
- Mechanical & Electrical services and lift installations associated with the above.
- External landscaping & green roof finishes.
- Buried drainage, water supply and other buried services associated with the development.

5.4.3 Construction Working Hours

Unless required otherwise by Dún Laoghaire-Rathdown County Council, it is proposed that standard construction working hours should apply, i.e.: 8am to 7pm Monday to Friday and 8am to 2pm on Saturdays.

If there is any occasion where work may be carried out outside normal daytime working hours, Dún Laoghaire-Rathdown County City Council, local residents and businesses in the area which are likely to be affected by the proposed works will be notified in advance.

The Project Supervisor Construction Stage (PSCS) will liaise with the Client to agree specific arrangements for activities outside of normal working hours that will minimise the risk and disruption to residents and members of the public. All reasonable precautions will be taken for the operation of plant and equipment to avoid nuisance and excess noise impact on the surrounding residents.

5.4.4 Site Access and Egress

It is proposed that construction traffic access to the site will be primarily off a new second access road off Dundrum Road, circa 150m from the existing entrance. It is proposed that this new entrance will be the main access to the construction site throughout the works, while the upgraded existing entrance will be available for the public and residents of the development.

Controlled access points to the site, in the form of gates or doors/turnstiles, will be kept locked at any time that these areas are not monitored (e.g. outside working hours).

During working hours, a gateman will control traffic movements and deliveries at any active site access to ensure safe access and egress to & from site onto the public roads. All personnel working on site must have a valid Safe Pass card and be inducted by the Main Contractor with regard to site specific information.

5.4.7 Construction Traffic

The works associated with the new development will result in additional traffic on the neighbouring road network, with vehicle movements associated with the removal of excavated material, demolition waste, construction waste, and the delivery of new materials, concrete trucks etc.

It is proposed that construction traffic access to the site will be primarily off a new second access road off Dundrum Road, circa 150m from the existing entrance as shown in Figure 8.1. It is proposed that this new entrance will be the main access to the construction site throughout the works, while the upgraded existing entrance will be available for the public and residents of the new development.

Unloading bays will be provided for deliveries to the site within the hoarded perimeter of the site for each phase. They are required to be accessible by tower crane and fork lifts. Appropriately demarcated storage zones will be used to separate and segregate materials.

All deliveries to site will be scheduled to ensure their timely arrival and to avoid the need for storing large quantities of materials on site. Deliveries will be scheduled outside of peak traffic hours to avoid disturbance to pedestrian and vehicular traffic in vicinity of the site. The storage area is to be located on site. The vehicular site security barrier in each phase of the development will be located at a sufficient distance back from the site entrance to allow construction traffic to build up inside of the site in the event of a high concentration of deliveries at once, for example, during a concrete pour. No construction or delivery vehicle are to be left outside of the site while waiting to gain access to the site. There is no available space on Dundrum Road or roads within the development for construction traffic to queue.

The construction traffic access routes are shown on Figure 5.2 below.

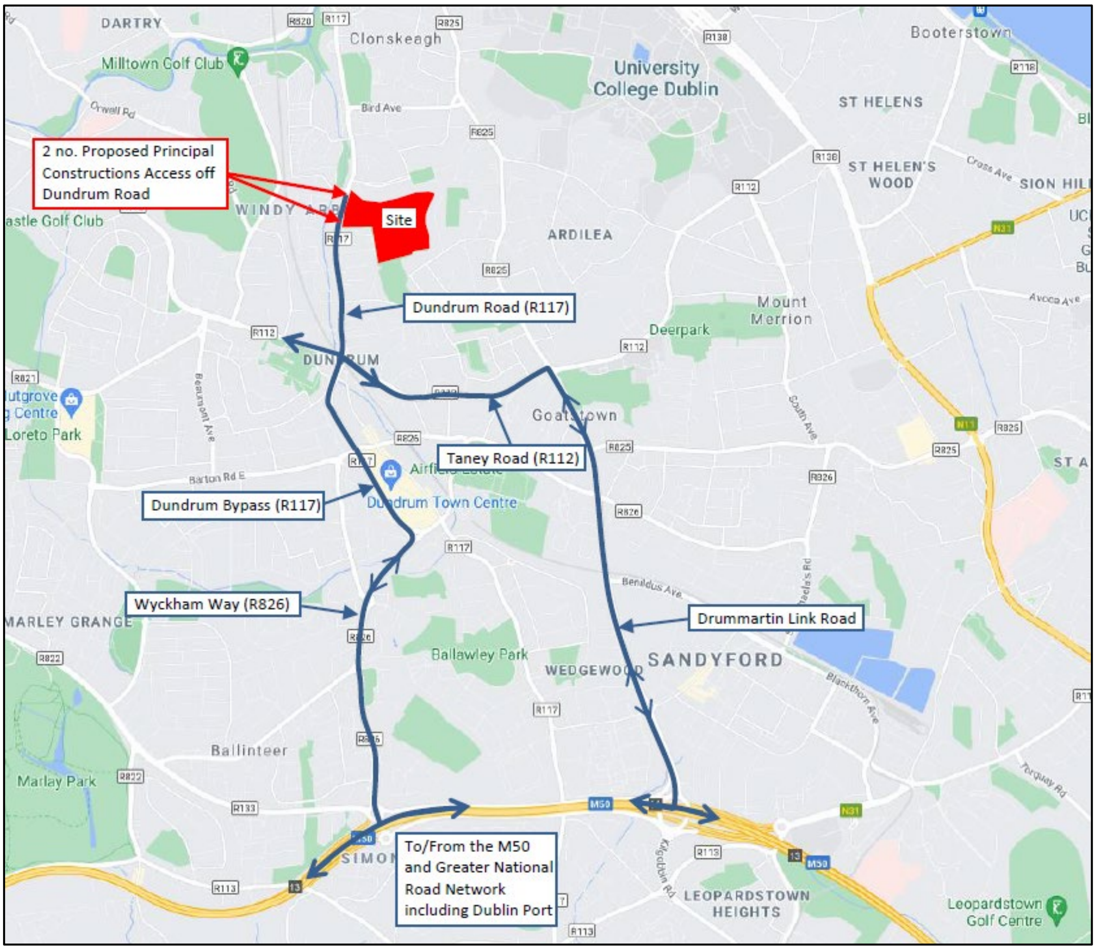

Figure 5.2: Annotated map showing proposed construction traffic access routes.

5.4.8 Health and Safety

The site will be made secure during each phase by implementing the following measures:

- Operate a site induction process for all site staff.
- Ensure all site staff shall have current 'safe pass' cards.
- Install adequate site hoarding to the site boundary.
- Maintain site security staff at all times.
- Separate pedestrian access from construction at the main site entrance off the Dundrum Road and provide a safe walkway for pedestrians along the main access road in to the site.
- Ensure restricted access is maintained to the works.

5.4.9 Construction Waste

Construction waste arising from the proposed development will be handled in line with the *Construction and Demolition Resource Waste Management Plan* prepared by AWN and enclosed as Appendix 18.1 of this EIAR.

5.5 Description of the Operational Phase of the Proposed Project

In summary, the proposed development is a strategic housing development comprising 977 no. new homes, 3,889 sq m of non-residential floorspace and approximately 3.05 ha of public open space. The table below provides the key development statistics.

Development Statistic	Proposed Development
Site Area	9.6 ha
Net (Residential) Site Area (excluding public open space and Gatelodge*)	6.54 ha
No. of Residential Units	977 (957 no. apartments and 20 no. houses)
Non-Residential Floorspace	3,889 sq m
Gross Residential Density	102 units per hectare
Net Residential Density	150 units per hectare
Plot Ratio	1.11
Site Coverage	32% (including basements)
Height	2 – 6 storeys (with part-basement)
Car Parking	547 no. spaces (489 no. residential spaces and 58 no. non-residential and visitor) 70 no. Motorbike Spaces

5.5.1 Demolition

The development will consist of the demolition of existing structures (3,736 sq m), including:

- Single storey former swimming pool / sports hall and admissions unit (2,750 sq m);
- Two storey redbrick building (305 sq m);
- Single storey ancillary and temporary structures including portacabins (677 sq m);
- Removal of existing internal sub-divisions/ fencing, including removal of security fence at Dundrum Road entrance;
- Demolition of section of porch and glazed screens at Gate Lodge building (4 sq m);
- Removal of walls adjacent to Main Hospital Building;
- Alterations and removal of section of wall to Walled Garden.

5.5.2 Residential Development

The proposed development will deliver 977 no. residential units arranged in 9 no. blocks (Blocks 02-10) ranging between 2 and 6 storeys in height with part-basement.

The proposed housing mix is as follows:

<table>
<tr><th></th><th>Apartments</th><th>Duplexes</th><th>Houses</th><th colspan="2">Total</th></tr>
<tr><td>Studio</td><td>53</td><td></td><td></td><td colspan="2">53 (5.4%)</td></tr>
<tr><td>1 bed</td><td>423</td><td></td><td></td><td colspan="2">423 (43.3%)</td></tr>
<tr><td>2 bed (3 person)</td><td>37</td><td></td><td></td><td colspan="2" rowspan="2">357 (36.5%)</td></tr>
<tr><td>2 bed</td><td>317</td><td>3</td><td></td></tr>
<tr><td>3 bed</td><td>110</td><td>14</td><td>7</td><td>131 (13.4%)</td><td rowspan="2">144 (14.7%)</td></tr>
<tr><td>4 bed</td><td></td><td></td><td>13</td><td>13 (1.3%)</td></tr>
<tr><td></td><td>940</td><td>17</td><td>20</td><td colspan="2">977</td></tr>
</table>

The proposed residential units will be arranged as follows:

Block 02

Block 02 is located within the north-eastern part of the site, adjacent to the Main Hospital Building and consists of a new apartment block with a central podium space. The podium space comprises a landscaped communal courtyard with parking below. The height of Block 02 ranges between 2 and 6 storeys in height, with a half basement. The building has a gross floor area of 13,640 sq m and comprises 134 no. residential units, including:

- 134 no. apartments (4 no. studio units, 68 no. 1 bed units, 8 no. 2 bed 3 person units and 44 no. 2 bed 4 person units);
- 3 no. duplex apartments (3 no. 2 bed units); and
- 7 no. houses (7 no. 3 bed units)

The proposed medical floorspace (245 sq m) is located within Block 02.

Block 03

Block 03 is located towards the centre of the site, to the west of the Walled Garden. The building ranges between 4 and 6 storeys in height with half-basement and lower ground floor (resulting in 7 storeys of stacked apartments in one location) and is arranged around a central podium which provides a landscaped communal courtyard with car parking below.

The building has a gross floor area of 16,881 sq m and comprises 161 no. residential units, including:

- 161 no. apartments (18 no. studio units, 68 no. 1 bed units, 20 no. 2 bed 3 person units, 55 no. 2 bed 4 person units and 10 no. 3 bed units)

Proposed retail units and a restaurant unit are located at the ground floor of Block 03.

Block 04

Block 04 is located in the far south eastern corner of the site and is to the south of the Walled Garden. It is arranged around a central podium comprising a communal landscaped courtyard and car parking below and ranges between 4 and 6 storeys in height.

The building has a gross floor area of 11,689 sq m and comprises 104 no. apartments, including:

- 104 no. apartments (10 no. studio units, 58 no. 1 bed units, 8 no. 2 bed 3 person units, 32 no. 2 bed 4 person units and 12 no. 3 bed units).

Block 05

Block 05 is located in the centre of the southern part of the site and is arranged around a central podium comprising a communal landscaped courtyard above car parking. It ranges between 4 and 6 storeys in height.

The building has a gross floor area of 11,489 sq m and comprises 118 no. residential units, including:

- 118 no. apartments (5 no. studio units, 67 no. 1 bed units, 40 no. 2 bed 4 person units and 6 no. 3 bed units)

Block 06

Block 06 is located in the south western corner of the site and ranges between 2 and 4 storeys in height. The building comprises two landscaped roof gardens which are accessed from the residential cores. At ground and first floor level, the building includes community facilities consisting of a multipurpose hall, community rooms and sports changing facilities (1,684 sq m).

The building has a gross floor area of 5,960 sq m and comprises 43 no. residential units, including:

- 43 no. apartments (7 no. studio units, 21 no. 1 bed units, 5 no. 2 bed 4 persons and 3 bed units).

Block 07

Block 07 is located in the centre part of the site, adjacent to the proposed plaza. The building ranges between 4 and 6 storeys in height and is arranged around a central podium comprising a landscaped communal courtyard and car parking below.

The building has a gross floor area of 23,596 sq m and comprises 211 no. residential units, including:

- 211 no. apartments (82 no. 1 bed units, 1 no. 2 bed 3 person units, 101 no. 2 bed 4 person units and 27 no. 3 bed units)

The building also comprises retail floorspace (810 sq m) at ground floor level, arranged in 4 no. units.

Block 08

Block 08 is located along the western site boundary, adjacent to Annaville Park. The building heights range between 2 and 3 storeys and comprises a mix of unit type. External residential amenity is provided by way of private rear gardens, in addition to balconies and terraces, depending on unit type.

Block 08 has a gross residential area of 2,756 sq m and comprises 25 no. residential units, including:

- 10 no. apartments (9 no. 1 bed units and 1 no. 2 bed 4 person units)
- 8 no. duplex units (8 no. 3 bed units)
- 7 no. houses (7 no. 4 bed units)

Block 09

Block 09 is located in the north western corner of the site, adjacent to the boundary with Annaville Grove and comprises primarily 3 storey housing with some apartments and duplex units close to the proposed new Dundrum Road entrance. External residential amenity is provided by way of private rear gardens, in addition to balconies and terraces, depending on unit type.

Block 09 has a gross residential area of 2,612 sq m and comprises 23 no. residential units, including:

- 11 no. apartments (6 no. 1 bed units, 2 no. 2 bed 4 person units and 3 no. 3 bed units)
- 6 no. duplex units (6 no. 3 bed units)
- 6 no. houses (6 no. 3 bed units)

Block 10

Block 10 is located on the western side of the site, adjacent to the boundary with Dundrum Road. The buildings are arranged around a central podium comprising a communal landscaped courtyard and car parking below and range between 4 and 6 storeys in height with a half-basement and lower ground floor, resulting in 7 storeys of stacked apartments in one location.

Block 10 has a gross floor area of 17,241 sq m and comprises 158 no. residential units, including:

- 158 no. apartments (9 no. studio unit, 70 no. 1 bed units, 37 no. 2 bed units and 42 no. 3 bed units)

The building also comprises a childcare facility (463 sq m) with external amenity space at ground floor level.

5.5.3 Non-Residential Development

The proposed development will deliver a varied non-residential provision which will be integrated into the proposed residential blocks (mainly at ground floor level) and within the existing Gatelodge.

The proposed non-residential uses include a childcare facility (463 sq m), a medical centre (245 sq m), 7 no. retail/ café units (1,419 sq m) and a community facility (1,684 sq m). The new community centre facility includes a multi-purpose hall changing rooms and meetings rooms.

The proposed non-residential uses will serve both the residents of the proposed development and be accessible to the existing community.

5.5.4 Landscape Strategy and Design

The landscape architecture proposal aims to create a diverse planting scheme that contributes to the overall biodiversity within the development and the wider area. Plant species have been selected with direct reference to the 'All-Ireland Pollinator Plan 2015-2020' and the approach aims to align with the specific policies and objectives as set out in both the *Dún Laoghaire-Rathdown Development Plan 2016-2022* and Draft Development Plan 2022-2028.

The overall planting approach is focused on creating a rich and biodiverse planting footprint in the context of a significant re-development of the site. The removal of existing hedgerows and grassland is offset by the addition of pollinator friendly wildflower meadows, tree planting and mixed native woodland along the Eco Corridor and in the community park south of the site. All retained tree and hedgerow protection measures will be in accordance with the mitigation recommendations prescribed in the ecologists and arborist report.
A variety of open space and softworks currently exists on the site. These elements function as part of the overall green framework of the site, providing a hierarchy of space that is not only visual aesthetic but provides opportunities for rest and recreation.

Proposed Tree Planting Species

The general planting strategy throughout the scheme is for significant structure tree planting with 2 metre clear stems to provide a leafy canopy layer, softening the proposed buildings and a base layer of low shrub/ groundcover and hedge planting to create low level seasonal interest and colour softening the hard surfaced areas and car parking. Eye level between the two planting types is kept clear to maintain sight lines throughout the scheme.

Native and naturalised tree species are to be planted within the public open space to increase opportunities for native wildlife. These will ultimately be large scale trees to designate a parkland character.

Street tree planting will consist of species with fastigiate or neat forms suitable to the scale of the streetscape and those which will thrive in a streetscape environment. Street tree planting is located to avoid impacts with street lighting. Street trees will be planted into a minimum of 7cu.m. topsoil, with the use of urban tree soils, root barriers to protect water utilities and topsoil loaded rootcells to increase rooting areas outside the main tree pit area as necessary.

Courtyard/Podium trees have been chosen for seasonal diversity and small form. They will be planted in raised beds in the podium developments. Private garden dwellings have a fruit tree planting in the gardens to enhance overall biodiversity and habitat creation on site.

Proposed Overall Planting Species

Native/adaptive climbers have been proposed through the scheme along the existing boundary wall. Species are chosen for robustness, seasonality, and biodiversity. Habitats will be formed along this boundary edge to the development public realm providing both visual and ecological rewards.

Low level shrub and groundcover planting will be in single species blocks taken from an overall palette of species throughout the scheme with flowers and fruits attractive to wildlife such as bees and butterflies. Species will be of maximum 1m height at maturity to maintain clear sight lines.

The principal objective of the landscape proposals is to provide a high quality public realm, which is accessible, safe and distinctive. Planting and landscape works will be carried out in accordance with BS4428. Trees will be advanced/semi-mature rootballed stock, in accordance with BS 8545.

Low level, low maintenance shrub planting will be used in planting beds containerised with a minimum size of 2 litre pots, Climbers will have 1 litre pots, all with a 75mm well composted fine bark mulch.

Hard Landscaping

The hardworks palette has been chosen to enhance the hard surfaces and network of plaza's, roads and paths which link and connect the development. For the historic landscape/ amenity trails, a self bound gravel in buff colour is proposed. This surface will form the main surface on the central park, offering an opportunity for walking and recreation. Hard paving will be provided to accent areas/ focal points. Further to this, roadside pathways will consist of brushed concrete. These paths will run alongside the road network and offer routes for pedestrians and cyclists. Macadam surface will incorporate buff textured aggregate to compliments path surfaces. Blister paving will be provided at crossing to ensure legibility for the visually impaired.

Key Open Spaces

The proposal includes 3.41 ha of open space, 3.05 ha of which is classified as publicly accessible open space. The key open spaces include:

The proposed project includes c.30,146 sq m of publicly accessible open space. The proposed landscape strategy provides a number of key open spaces across the site, including:

- Central Parkland
- Entrance Plaza
- Central Square

- Community Park
- Walled Garden
- Elm Park Eco-Corridor
- Podiums

Figure 5.3: Extract from Aecom's Landscape Architecture and Public Realm Design Report showing the key aspects of the landscape strategy.

Play Strategy

The proposed landscape strategy includes a number of play spaces, including formal and informal play spaces. There are two designated playgrounds, one to the north of the site adjacent to the cycle track and the other in the community park south of site, in addition to informal 'natural play' opportunities throughout the site. Local play opportunities occur in the semi-private podium spaces.

Environment Strategy

In terms of habitat creation, the differing SuDs components contribute to habitat creation throughout the development. For example, water bodies and ponds will be vital habitats for frogs, toads, newts and a variety of insects including dragonflies. Further to this, the public open spaces through the development have native meadow planting as per the All Ireland National Pollinator Plan together with species rich grasslands that provide habitats and food for insects and bees. Other habitats that will created through the proposed open space include:

- Open bonded brickwork within detailing of infrastructure buildings allowing for bat roosting;

- Bird and Mammalian nest boxes throughout the open public space;
- Log piles simulate fallen trees, and are valuable for mosses, lichens and fungi, as well as many insects through the wetlands and extensive greenroofs; and
- Crushed aggregate pathways along secondary pathways allows water to permeate naturally through the soil, without the need for drainage channels and associated infrastructure.

SuDs Components

The proposed SuDs strategy includes:

- Green roofs
- Permeable paving
- Bioretention systems
- Existing drains/ swales
- Raingardens
- Integrated wetlands
- Tree planting

Refer to the *Landscape Architecture and Public Realm Design Report* prepared by Aecom for full details in relation to landscaping proposals.

5.5.5 Public Open Space

The proposed development provides a significant quantum of high-quality open space which will be accessible to the public (3.05 ha). The proposed public open space provision equates to c. 32% of the total SHD site area. The space has been designed inclusively to serve the existing community as well as the residents of the proposed residential development. The removal of the southern section of the existing perimeter wall will result in a continuation of public open space between the proposed development and the existing Rosemount Green.

The proposed public open space incorporates a number of landscape features, such as the walled garden, mature trees and courtyard and open green space that contribute to the setting of the Main Hospital Building.

5.5.6 New Vehicular, Cyclist and Pedestrian Connections

In order to integrate the proposed development into the surrounding area, ensure permeability and improved connectivity between the application site and surrounding streets and achieve a positive interface with the surrounding public realm, the proposed development includes the removal of a number of sections of existing perimeter wall. It is noteworthy that the boundary wall remains intact at the various boundaries with neighboring residential development. The proposed wall removal and resultant new connections are detailed below:

- A section of perimeter wall adjacent to Rosemount Green (south) will be removed to provide an interface with Rosemount Green. This will provide cyclist and pedestrian connection between the site and Rosemount Green.

- A new opening in the wall is proposed adjacent to Annaville Park, at the western boundary, to provide a cyclist and pedestrian connection.

- Partial wall removal is proposed adjacent to Dundrum Road, this will provide a second vehicular access onto Dundrum Road which will also facilitate cyclist and pedestrian access.

- To the north of the existing Dundrum Road entrance, further partial wall removal is proposed to enhance permeability and visibility.

5.5.7 Car Parking and Cycle Parking

The proposed development provides car parking for both the residential and non-residential components of the scheme, totaling in 547 no. spaces, comprising:

- 402 no. residential spaces
- 62 no. additional residential spaces for visitors (15% of total residential parking)
- 12 no. car club spaces
- 15 no. travel club spaces
- 58 no. non-residential spaces

The parking proposal also includes 70 no. motorcycle spaces.

In terms of cycle parking, the total residential cycle parking provision will be 1,670 no. long stay spaces and 516 no. short stay spaces (a total of 2,186 no. spaces).

5.5.8 Site Utilities

Foul Network Design

The proposed foul drainage network comprises of a series of 150mm, 225mm and 300mm diameter pipes, designed for a minimum velocity of 0.75m/s (self-cleansing) and maximum velocity of 3.0m/s. A pipe friction coefficient of 1.5mm has been assumed.

Each residential block is serviced by 225mm diameter (SN8 uPVC) branch connections in accordance with the Irish Water Code of Practice for Wastewater Infrastructure. It is noted the proposed foul outfall pipe is 300mm diameter pipe at 1:100 minimum fall which has a capacity of approximately 100 l/s and is deemed adequate for the peak foul flows anticipated.

Water Supply

The proposed development will be connected to the new Ø250mm public watermain in the Dundrum Road.

The proposed watermain system through the site will vary between 250mm diameter, 200 diameter, 150mm diameter and 100mm diameter.

Natural Gas

The site is served by a 250mm main entering Northwest on the site per diagram below. The pipe at 25mBar low-pressure gas network entering Northwest and extends to the Central Mental Hospital. See map that follows. There is an existing pressure reducing station within the site and the existing gas lines feed the hospital and swimming pool building.

The proposed development includes a district heating system to supply the apartment blocks (primarily fuelled by air source heat pumps) and individual air source heat pumps for the townhouses.

The new development will primarily require electrical driven heat pumps and air source heat pumps, so the gas load is anticipated to be limited to commercial facilities and possibly back up gas boilers for the DH system. The new gas load is forecasted to be in the order of 4.5-5MW and following discussions with BGE is not anticipated to be a concern. If the load proves challenging at a later date in design development, there is a larger 315mm gas pipe available.

Electricity

The existing site consists of 2 ESBN supplies fed from 2 separate substations located on Larchfield Road and opposite St. Columbanus Road. Connection 1 is rated at 10KV/20KV/400V/230V and consists of an overhead line terminating at the end of Larchfield Road South of the site.

Connection 1 is tapped from the overhead line and is installed underground and terminates South of the site.

Connection 2 extends from the substation opposite St. Columbanus Road and terminates within the Central Mental Hospital grounds North of the main building. Connection 2 is rated at 10KV/20KV/400V/230V.

The proposed development will require a new HV infrastructure that will feed multiple substations around the site. The substation requirement has been assessed and allowed for within the architectural layouts. The final design details to be clarified by the ESB post planning.

ESBN conducted a capacity study and released their findings in April 2021. To facilitate the development, ESBN confirmed that a new High Voltage supply is required. ESBN will install a 1Km new HV ring entering from the Southeast and connecting to the new substations via a HV ring circuit.

The new substation will require unobstructed 24/7 access for the ESB in line with their guidelines. A formalised application process to the ESB will be required post planning once the planning process is concluded.

Telecommunications

The Central Mental Hospital is currently fed from the EIR network. The EIR network enters the site from the Dundrum Road.

Virgin Media, although entering the site currently, is also currently available in the area with ample coverage around the site. A Virgin Media network extends around the perimeter wall adjacent to Dundrum Road.

The proposed development will consist of approximately 9 Comms rooms – to be finalised during detailed internal design. Each apartment block and commercial unit will have individual comms rooms to facilitate telecommunications. The proposed development will consist of separate underground networks connecting to all new apartment blocks and commercial premises.

6.0 CONSULTATION

6.1 Introduction

This Chapter describes the consultation process in respect of the proposed project.

The EIA Directive places emphasis on effective public participation in decision-making procedures for projects that require EIA.

This planning application will be submitted following the consultations prescribed by the SHD legislation (Planning and Development (Housing) and Residential Tenancies Act, 2016 and Planning and Development (Strategic Housing Development) Regulations 2017) and includes:

Stage 1 – Consultation with the Planning Authority under Section 247 of the Planning and Development Act 2000, as amended.

Stage 2 – Pre-application Consultation with An Bord Pleanála under Section 6 of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

Stage 3 – Planning Application to be submitted directly to An Bord Pleanála with statutory public consultation.

6.2 Consultation with Dún Laoghaire-Rathdown County Council – Stage 1

Significant pre-application consultation took place with Dún Laoghaire Rathdown County Council (DLRCC), prior to engagement with An Bord Pleanála. In the first instance, 4 no. Masterplan focused meetings were held, followed by 2 no. SHD specific S247 pre-planning meetings.

The meeting dates are listed below:

- Masterplan Meeting No. 1 – 1st October 2020;
- Masterplan Meeting No. 2 – 30th October 2020;
- Masterplan Meeting No. 3 – 20th November 2021;
- Masterplan Meeting No. 4 – 15th January 2021;
- SHD S247 Pre-Planning Meeting No. 1 – 26th February 2021;
- SHD S247 Pre-Planning Meeting No. 2 – 29th April 2021.

Throughout the pre-application consultation process with DLRCC, discussions were undertaken with the following Council departments:

- Planning
- Conservation
- Roads and Transportation
- Parks and Landscaping
- Drainage

6.3 Pre-Application Consultation – Stage 2

In line with Section 6 of the *Planning and Development (Housing) and Residential Tenancies Act, 2016*, pre-application consultation was requested with An Bord Pleanála and a tripartite meeting was held on 1st October 2021. The pre-application consultation was allocated reference no. ABP 310640-21. An Bord Pleanála subsequently issued their Notice of Pre-Application Consultation Opinion in October 2021.

The documentation provided to An Bord Pleanála and Dún Laoghaire Rathdown County Council at this stage included a detailed screening and scoping report in respect of Environmental Impact Assessment.

The key issues for further consideration, as identified by An Bord Pleanála in their Opinion, were:

- Development Strategy
- Design Strategy
- Architectural Heritage
- Traffic and Transportation
- Residential amenities

The discussions and following Opinion from the Board (which is addressed in detail in the *Response to An Bord Pleanála's Opinion*, prepared by Tom Phillips + Associates) resulted in a number of changes to the scheme, including a revised development strategy. Refer to the enclosed *Response to An Bord Pleanála's Opinion* for full details.

6.3.1 Other Consultation

Consultation with Irish Water

Consultation was first undertaken with Irish Water in the form of a pre-connection enquiry back in April 2020 as the Masterplan proposal was emerging to ensure sufficient capacity in the system. It was confirmed that subject to further details and conditions, the proposed connection to Irish Water network(s) to provide for the proposal could be facilitated.

Subsequently, following discussions with Irish Water, a new Pre-Connection Enquiry was made by Barrett Mahony Consulting Engineers (BMCE) in respect of the pre-application scheme. In September 2021, Irish Water confirmed that the proposed water and wastewater connections from the development to their networks were feasible, subject to implementation of site-specific comments. This detailed in the Confirmation of Feasibility letter from Irish Water enclosed as Appendix 5 of the *Infrastructure Report* prepared by BMCE.

In summary the project works associated with the Irish Water comments are as follows:

1. Water: An upgrade of the existing water main on the Dundrum Road approximately 720metres in length will be required to facilitate the development.

2. Wastewater: A pumping station will be provided on site to limit the outflow from the site to the combined sewer in the Dundrum Road in front of the development.

3. Surface Water: All surface water (rainwater) collected on site will be discharged to a separate system within the site which in turn will discharge to a surface water sewer on St. Columbanus Road close to the existing entrance off the Dundrum Road.

Further to this, a design submission was made to Irish Water on the basis of the final proposal. On 3rd March 2022, Irish Water confirmed that it has no objection to the proposals.

Consultation with the National Transport Authority (NTA)

Further pre-consultation engagement was undertaken with the NTA which comprised a meeting, held on 14th January 2022, between the Applicant team, the NTA and DLRCC Transportation Department. The purpose of the meeting was to discuss the changes that had occurred to the scheme between the pre-application stage and final SHD proposal and to ensure that the overall proposed development was consistent with the transport planning for the area.

Public Consultation

The Applicant launched an extensive Community and Stakeholder and Engagement process in September 2020 which included leaflet distribution, information gathering through surveys, virtual consultation rooms, a project website, webinars and email correspondence.

This process engaged local residents, Resident Association Groups, local community/ voluntary groups and sports groups.

The process is summarised in the enclosed *Report on Stakeholder and Community Engagement*, prepared by KPMG.

6.4 Planning Application – Stage 3

This planning application is submitted directly to An Bord Pleanála for assessment; as part of this, further consultation will take place. This will comprise the public display of the application and all accompanying documents. Any submissions arising from the consultation process will be submitted directly to An Bord Pleanála and considered as part of the decision-making process.

Pursuant to Article 285(5)(a) of the Planning and Development (Strategic Housing Development) Regulations 2017, the following authorities have also been notified in respect of this planning application:

1. Irish Water
2. Minister for Tourism, Culture, Arts, Gaeltacht, Sport and Media
3. Heritage Council
4. An Taisce
5. An Comhairle Ealaíon
6. Fáilte Ireland
7. National Transport Authority
8. Transport Infrastructure Ireland
9. Department of Education and Skills

10. Dún Laoghaire Rathdown County Childcare Committee.

7.0 POPULATION AND HUMAN HEALTH

7.1 Introduction

This chapter has been prepared by AWN consulting Ltd and evaluates the likely impacts of the Proposed Development (as defined in Chapter 5 of this EIA Report) on population and human health.

This chapter has been prepared by Sarah Robertson, Dr. Stephen Smyth, Dr. Edward Porter and Liam Bruen.

Sarah Robertson is a Senior Environmental Consultant in AWN Consulting with responsibility for IED licence applications, GMM and DAFM ABP certificates. She also provides EIAR management and specialist input to EIAR chapters including human health and population assessments. Sarah has over ten years' experience working in the environmental field in impact assessment, EIAR management, environmental masterplans, urban planning, waste management, specialist ecological surveys, AA screening and Natura Impact Statements. Sarah holds a BA. Hons (mod Science), MSc. and a Diploma in Environmental Engineering, and has worked in Ireland, the UK, and the USA.

Dr. Stephen Smyth (Associate) holds a BAI and a PhD in Mechanical Engineering from TCD and is a member of Engineers Ireland and a Member of the Institute of Acoustics. He has experience in both environmental and building acoustics and has coordinated the data capture survey of Northern Ireland's major road and rail networks and Belfast City in preparation of noise maps as required under the European Noise Directive.

Dr. Edward Porter is Director with responsibility for Air Quality with AWN Consulting. He holds a BSc from the University of Sussex (Chemistry), has completed a PhD in Environmental Chemistry (Air Quality) in UCD where he graduated in 1997 and is a Full Member of the Royal Society of Chemistry (MRSC CChem), the Institute of Environmental Sciences (MIEnvSc) and the Institute of Air Quality Management (MIAQM). He specialises in the fields of air quality, EIA and air dispersion modelling.

Liam Bruen is an environmental consultant with over 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.

In accordance with the Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017), and Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015), this chapter has considered the "existence, activities and health of people" with respect to "topics which are manifested in the environment such as employment and housing areas, amenities, extended infrastructure or resource utilisation and associated emissions". Issues examined in this chapter include:

- Demography;
- Population;

- Employment;
- Social Infrastructure;
- Land Use and Settlement Patterns
- Landscape, Amenity and Tourism;
- Natural Resources;
- Land, Soil, Geology and Hydrogeology;
- Hydrology;
- Air Quality;
- Noise & Vibration;
- Material Assets;
- Microclimate;
- Traffic;

Where these topics are dealt with in further detail elsewhere in this EIA Report, the relevant chapters have been cross referenced in this Chapter.

7.2 Methodology

In accordance with the Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017), this chapter has considered that:

> *"in an EIAR the assessment of impacts on population and human health should refer to the assessment of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g., under environmental factors of air, water soil etc".*

As per Article 3 of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU:

The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

a) population and human health;
b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
c) land, soil, water, air and climate;
d) material assets, cultural heritage and the landscape;
e) the interaction between the factors referred to in points (a) to (d).

2) The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned."

The 2017 publication by the European Commission (EC), Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, considered that:

> *"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 following guidelines have informed the preparation of this chapter:

- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessments (Department of Housing, Planning and Local Government – August, 2018);*
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, Draft August 2017);*
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2002);*
- *Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment (European Union, 2017);*
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHPLG, 2018).*
- *Environmental Noise Guidelines for the European Region (hereafter referred to as the WHO Noise Guidelines) (WHO 2018);*

The preparation of this chapter was also informed by desktop studies of relevant policy documents and data sources including:

- Central Statistics Office (2021) – *Census 2016, Census 2011, Census 2006*
- Central Statistics Office (2021) – *CSO PxStat*
- ESRI (2021) - Quarterly Economic Commentary, Winter 2021
- DoHPLG (2017) - Rebuilding Ireland – Action Plan for Housing and Homelessness
- Childcare Act (1991) - (Early Years Services) Regulations 2016
- Tusla Early Years Inspectorate Reports (2021) – Registered Childcare Facilities
- Department of Health (2021) – Health in Ireland, 2021
- Health Safety Authority (2021) – www.hsa.ie
- HSE Service Records (2021) – www.hse.ie
- ECAD (2021) – Eircode Address Database
- Google Maps and Places (2021)

In order to assess the likely significant impacts of the proposed development on population and human health, an analysis of recent Census data was undertaken relating to the economic, demographic and social characteristics of the study area.

7.2.1 Assessment of Significance & Sensitivity

The assessment of significance is a professional appraisal based on the sensitivity of the receptor and the magnitude of the effect.

Within any area, the sensitivity of individuals in a population will vary. As such, it would be neither representative of the population, nor a fair representation of the range of sensitivities in a population were an overall sensitivity classification assigned to the population in question. As such, the precautionary principle has been adopted for this assessment, which assumes that the population within the study area is of a uniformly high sensitivity.

7.2.2 Magnitude of Impact

The magnitude of predicted impacts has been quantified in this assessment using the terms outlined in Table 7.1 below

Table 7.1: Description of magnitude of predicted impacts

Magnitude	Description of Magnitude
High	Change in an environmental and/or socio-economic factor(s) as a result of the Proposed Development which would result in a major change to existing baseline conditions (adverse or beneficial)
Medium	Change in an environmental and/or socio-economic factor(s) as a result of the Proposed Development which would result in a moderate change to existing baseline conditions (adverse or beneficial)
Low	Change in an environmental and/or socio-economic factor(s) as a result of the Proposed Development which would result in a minor change to existing baseline conditions (adverse or beneficial)
Negligible	Change in an environmental and/or socio-economic factor(s) as a result of the Proposed Development which would not result in change to existing baseline conditions at a population level, but may still result in an individual impact (adverse or beneficial)
No change	No change would occur as a result of the Proposed Development which would alter the exiting baseline conditions (adverse or beneficial)

7.3.3 Significance of Effects

The assessment of significant effects in this assessment is a professional appraisal and has been based on the relationship between the magnitude of effects (Section 7.2.2) and the sensitivity of the receptor. Table 7.2 below provides a matrix on the measure of the significance of effects as determined by the relationship between the magnitude of impact and the sensitivity of receptors

Table 7.2 Significance of effects and the sensitivity of the receptor					
		Magnitude of Impact			
		Negligible	Low	Medium	High
Sensitivity of Receptor	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

7.2.4 Study Area

The Proposed Development site is located in County Dublin, and in the electoral district of Clonskeagh-Windy Arbour (ED 5031).

The area selected for the assessment of the impact on human health are the 10 No. electoral divisions (EDs) within a 1km radius of the proposed development are identified in figure 7.1. They are Churchtown-Woodlawn (ED 5026), Churchtown-Orwell (ED 5025), Dundrum-Sweetmount (ED 5040), Clonskeagh-Farranboley (ED 5028), Clonskeagh-Milltown (ED 5029), Clonskeagh-Belfield (ED 5027), Clonskeagh-Roebuck (ED 5030), Dundrum-Taney (ED 5041), Dundrum-Kilmacud (ED 5038), Clonskeagh-Windy Arbour (ED 5031).

The proposed development is within the Dún Laoghaire-Rathdown Local Authority (LA) administrative boundary. Where relevant, information with relation to the national and Local authority averages in each demographic area is also provided.

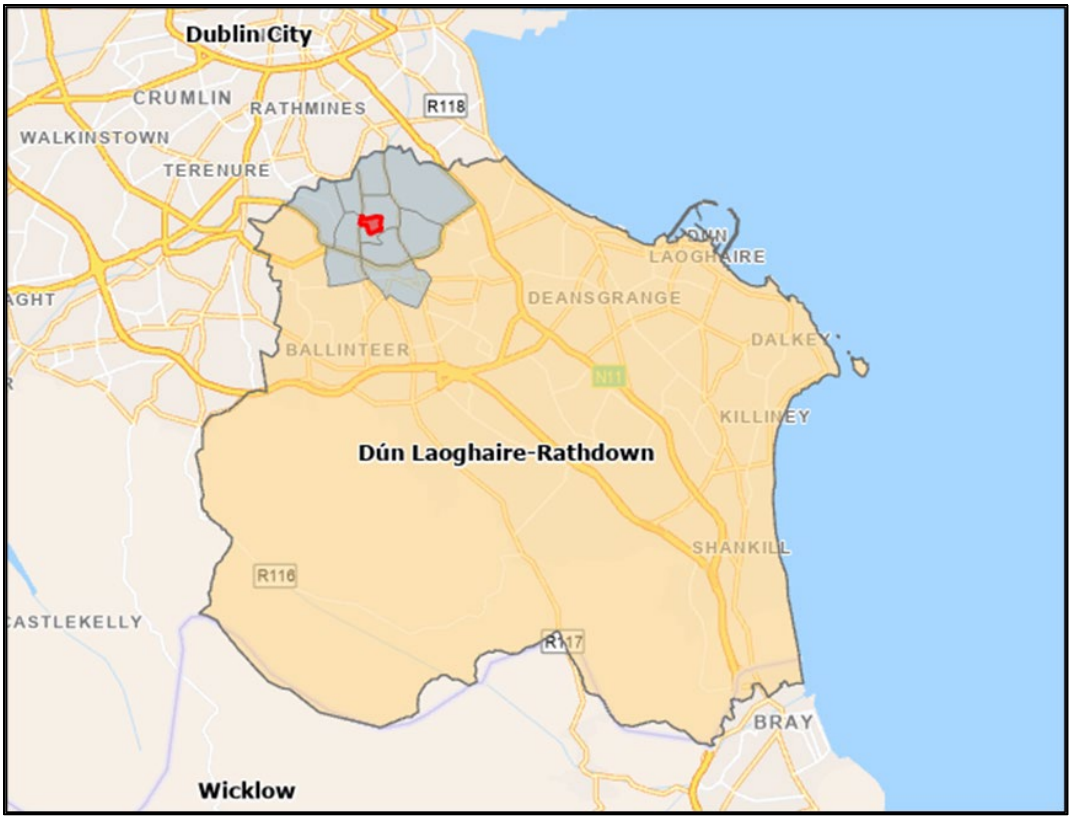

Figure 7.1: Extent of CSO enumeration areas utilised in demographic analysis. Location of subject site within the ED Study Area indicated by red polygon. Source: CSO/TPA, 2021.

7.3 Baseline Environment

An assessment of the baseline environment and associated key factors are outlined in detail below.

7.3.1 Population and Demographics

7.3.1.1 Population

The most recent census of the population was carried out by the CSO on the 24th of April 2016, and the previous census on the 10th of April 2011. The census compiles data for the whole state as well as smaller individual areas including counties, cities, towns, and electoral divisions. Taking into consideration the location of the Proposed Development, the census information on population, age profile, employment, and social class, has been analysed in relation to the development site.

Table 7.3 denotes the population change for the state, and electoral districts for the census years 2011 and 2016. The latest census data shows that the population of Clonskeagh-Windy Arbour ED, the area surrounding the development site, increased in size by 8.5% between the years 2011 and 2016 compared with an increase of 3.8% nationally. The average rate of population growth across the study area was an increase in 6.2%. The general increase in growth rate of surrounding areas, when compared to the state figures and Dún Laoghaire-

Rathdown suggests the increasing economic role of the areas surrounding the Proposed Development site.

Table 7.3: Population Trends at LA and State Level (Source: CSO 2011, 2016).			
Study Area	**2011**	**2016**	**% Change**
Dún Laoghaire-Rathdown	206,261	218,018	+5.7%
Ireland	4,588,252	4,761,865	+3.8%

Table 7.4: Population Trends at Local Electoral Division Level (Source: CSO 2011, 2016).			
Local Electoral Divisions	**2011**	**2016**	**% Change**
Churchtown-Orwell	1,794	1,943	+8.3%
Churchtown-Woodlawn	1,384	1,481	+7.0%
Clonskeagh-Belfield	2,740	3,122	+13.9%
Clonskeagh-Farranboley	1,501	1,615	+7.6%
Clonskeagh-Milltown	1,975	2,049	+3.7%
Clonskeagh-Roebuck	2,556	2,699	+5.6%
Clonskeagh-Windy Arbour	2,521	2,736	+8.5%
Dundrum-Kilmacud	3,196	3,274	+2.4%
Dundrum-Sweetmount	2,089	2,165	+3.6%
Dundrum-Taney	2,449	2,491	+1.7%
Churchtown-Orwell	1,794	1,943	+8.3%
Cumulative ED Study Area	22,205	23,575	+6.2%

7.3.1.2 Age Profile

With respect to the population breakdown of the study area, the age profile of the local ED area is similar to that of the wider LA area, as shown in Table 7.5.

However, the Young Adults (19-24 years) cohort forms higher percentage of the local ED area (17%), compared to the rest of Dún Laoghaire-Rathdown (9%). As a result, the Adults (35-64 years) and Primary (5-12 years) cohorts form a proportionally lower segment of the population, at 48% and 8% respectively.

Table 7.5: Comparison of Age Profile of ED and LA Study Areas (Source: CSO 2016).				
Age Cohorts	**Combined ED Area**		**Dún Laoghaire-Rathdown**	
Population	**Population**	**% Total**	**Population**	**% Total**
Preschool (0-4 years)	1,293	**5%**	13,810	**6%**
Primary (5-12 years)	1,982	**8%**	21,302	**10%**
Secondary (13-18 years)	1,579	**7%**	15,651	**7%**
Young Adults (19-24 years)	4,019	**17%**	19,088	**9%**
Adults (25-64 years)	11,220	**48%**	113,498	**52%**
Older Adults (65+ years)	3,482	**15%**	34,669	**16%**

Total	**23,575**	**100%**	**218,018**	**100%**

The average age of the local ED population was slightly lower at 38.3 than the local authority population (39.0) in 2016, but higher than the national average of 37.4, ranging from 27.4 (Clonskeagh-Belfield) to 44.4 (Churchtown-Orwell) across the study area.

Just like the average age the average dependency ratio within the local ED area (44.1) was also lower than elsewhere in the local authority or state (c. 52 in each area), with an even lower ratio of 41.0 recorded for Clonskeagh-Windy Arbour, which includes the proposed development site.

Table 7.6: Dependency Ratio of LA and State Study Areas (Source: CSO 2016).

Enumeration Area	Average Age	Population	Dependent Population	Dependency Ratio
Dún Laoghaire-Rathdown	39.0	218,018	74,708	52.1
Ireland	37.4	4,761,865	1,644,119	52.7

Table 7.7: Dependency Ratio of Local ED Study Area (Source: CSO 2016).

Local Electoral Divisions	Average Age	Population	Dependent Population[2]	Dependency Ratio[3]
Churchtown-Orwell	44.4	1,943	801	70.1
Churchtown-Woodlawn	40.0	1,481	542	57.8
Clonskeagh-Belfield	27.4	3,122	357	12.9
Clonskeagh-Farranboley	40.9	1,615	535	49.5
Clonskeagh-Milltown	36.6	2,049	652	46.7
Clonskeagh-Roebuck	38.3	2,699	888	49.0
Clonskeagh-Windy Arbour	37.3	2,736	796	41.0
Dundrum-Kilmacud	37.0	3,274	944	40.5
Dundrum-Sweetmount	41.1	2,165	805	59.2
Dundrum-Taney	39.6	2,491	891	55.7
Cumulative ED Study Area	38.3	23,575	7,211	44.1

[2] Population aged 0-14 years of age or 65+ years of age at time of 2016 Census.

[3] *Census of Population 2016 - Profile 3 An Age Profile of Ireland:* Dependents are defined for statistical purposes as people outside the normal working age of 15-64. Dependency ratios are used to give a useful indication of the age structure of a population with young (0-14) and old (65+) shown as a percentage of the population of working age (15-64).

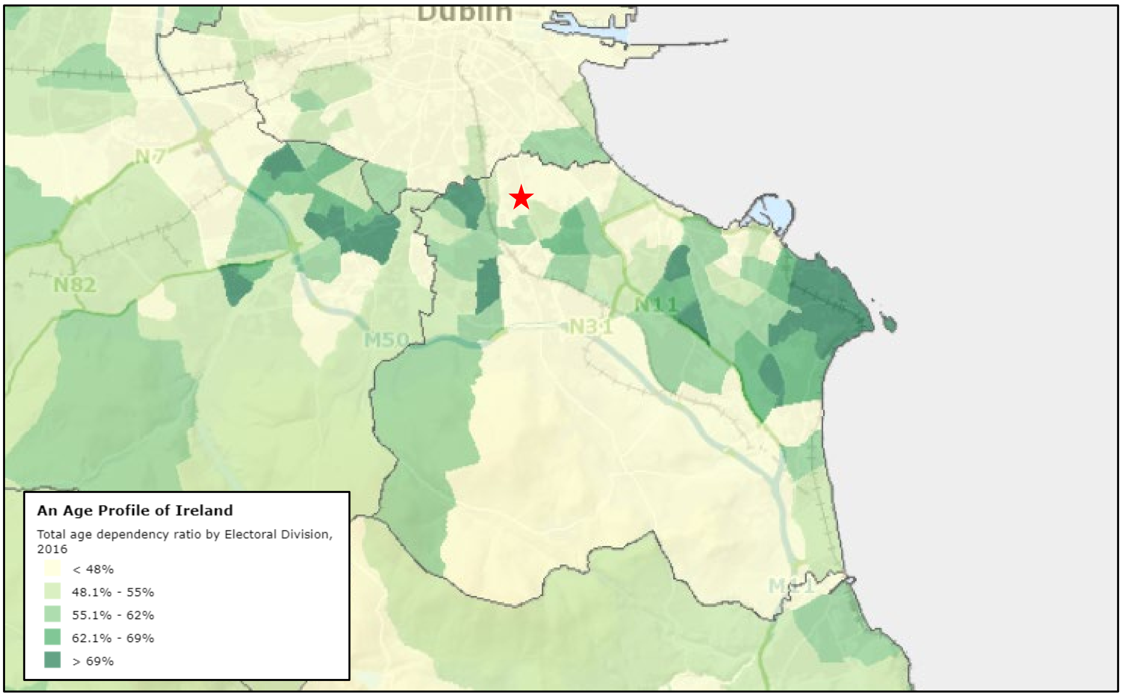

Figure 7.2: Extract of 'Age Dependency Ratio by Electoral Division, 2016' Map showing concentrations of older and younger populations within Dún Laoghaire-Rathdown. Location of proposed development indicated by red star. (Source: CSO, 2016).

7.3.1.3 Deprivation

Regarding the socio-economic status of local residents, the Pobal Deprivation Index utilises CSO statistics to analyse areas with high levels of affluence or disadvantage throughout the country. This Index draws on data from censuses and combines three dimensions of relative affluence and deprivation: Demographic Profile, Social Class Composition and Labour Market Situation. Figure 7.3 below shows a graphical representation of how the concepts of Demographic Growth, Social Class Composition and Labour Market Situation are measured by ten key socio-economic indicators from the Census of Population.

In this EIA Report, the Relative Index Score is considered as the measure for deprivation, as these Relative Index Scores are rescaled such that the mean is 0 and the standard deviation is 10 at each census wave. This allows for the provision of descriptive labels with the scores, which are grouped by standard deviation as seen in Table 7.8 below.

Figure 7.3 shows a graphical representation of how the concepts of Demographic Growth, Social Class Composition and Labour Market Situation are measured by ten key socio-economic indicators from the Census of Population.

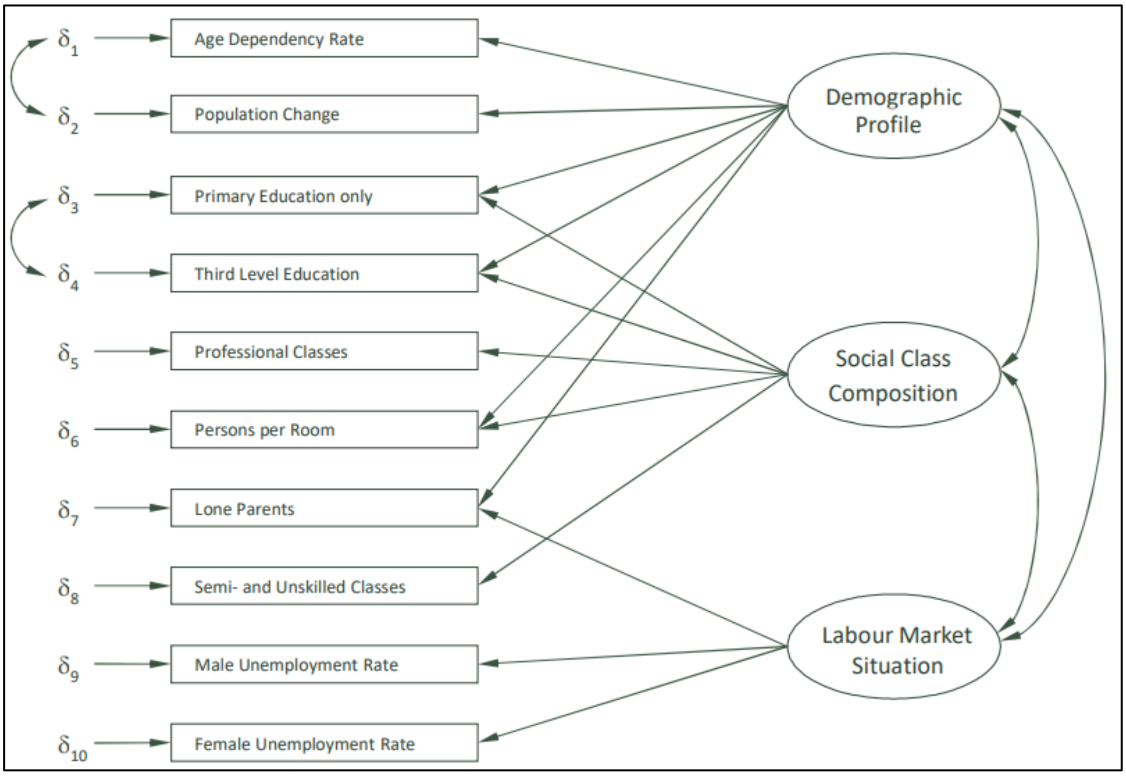

Figure 7.3: Basic Model of the Pobal HP Deprivation Index.

Table 7.3 Pobal HP Index Relevant Index Score labels (Source: Pobal HP Deprivation Index)		
Relative Index Score	**Standard Deviation**	**Label**
> 30	> 3	Extremely affluent
20 – 30	2 – 3	Very affluent
10 – 20	1 – 2	Affluent
0 – 10	0 – 1	Marginally above average
0 – -10	0 – -1	Marginally below average
-10 – -20	-1 – -2	Disadvantaged
-20 – -30	-2 – -3	Very disadvantaged
< -30	< -3	Extremely disadvantaged

The Clonskeagh-Windy Arbour Electoral District (including the subject site) was identified as an ‘affluent’ area in 2011 at 11.34 and most recently in 2016 at 11.55 by Pobal, values which represent much higher levels of affluence than the surrounding Local Development Company (LDC) area and county for the same period. We note that the deprivation index appears to have declined in the LDC area from 2011-2016, resulting in a downgraded rating from ‘affluent’ to ‘marginally above average’; however, both the county index and subject ED index have increased within their respective ranges.

Table 7.9: Deprivation Indices (Source: Pobal 2021, based on CSO 2011, 2016)		
Area Definition	**2011**	**2016**
Clonskeagh-Windy Arbour ED	+11.34 – Affluent	+11.55 – Affluent
Southside Partnership DLR Limited LDC	+10.63 – Affluent	+9.98 – Margin Above Avg

Co. Dublin (DCC, SDCC, FCC, DLRCC)	+3.74 –Margin Above Avg	+4.12 – Margin Above Avg

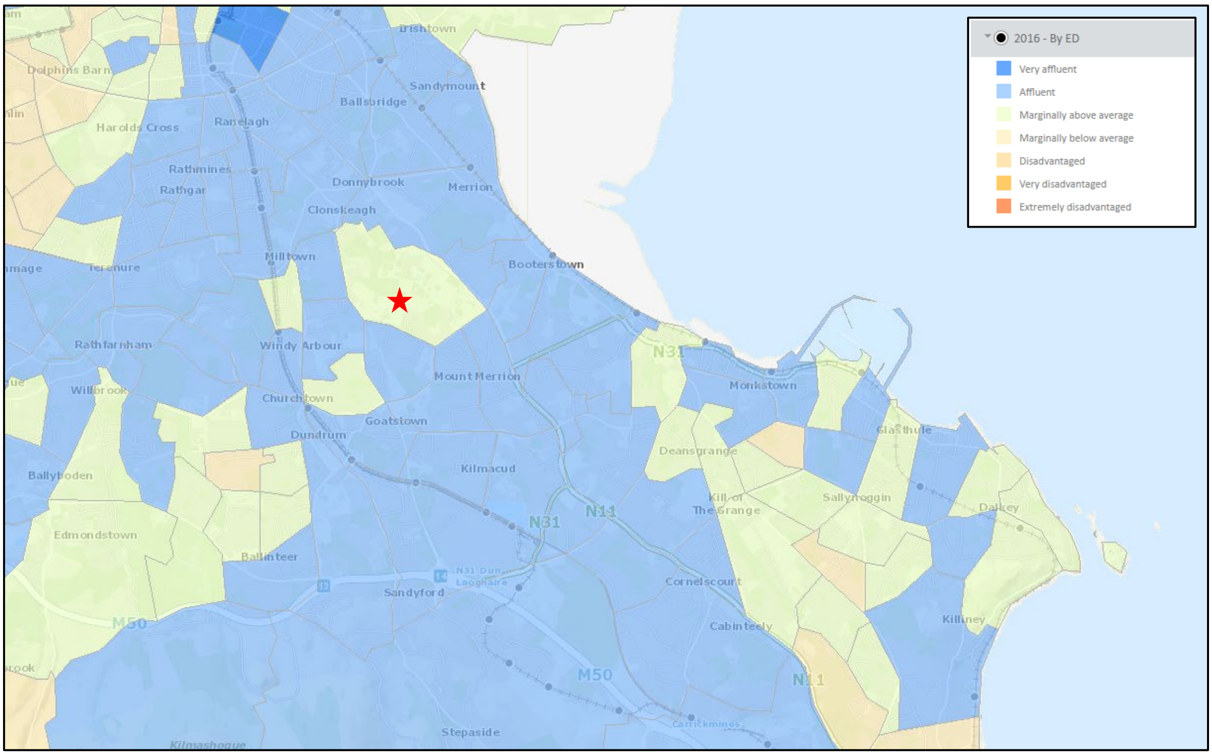

Figure 7.4: Extract of 'Deprivation Indices' Map showing 2016 deprivation index rates by Electoral District. Location of proposed development indicated by red star. (Source: Pobal 2021/CSO 2016).

7.3.1.4 Education

Census data presenting the highest level of education completed for key educational levels by people living in the Dún Laoghaire-Rathdown Municipal District and the study area surrounding the development site is presented in Table 7.10. The table presents key milestone education and ignores people undertaking other studies or where information was not stated.

Table 7.10: Highest level of education in the 2011 and 2016 (Source: www.cso.ie)

Area	No formal education	Primary education	Secondary[3]	Higher Education[4]	Undergraduate Degree[5]	Postgraduate Degree[6]	Total Persons
Highest level of education in 2011							
Dún Laoghaire-Rathdown Municipal District	**922**	**10,095**	**39,250**	**20,648**	**36,357**	**24,843**	**136,577**
Churchtown-Orwell	0	71	318	170	403	271	1,253
Churchtown-Woodlawn	1	43	213	108	310	221	917
Clonskeagh-Belfield	4	30	142	64	189	151	607
Clonskeagh-Farranboley	6	231	312	162	211	176	1,121

[3] Lower secondary and Upper secondary
[4] Higher Certificate, Advanced certificate/completed apprenticeship or Technical/vocational training
[5] Ordinary bachelor's degree, Honours bachelor's degree/professional qualification
[6] Postgraduate degree or Ph.D

Table 7.10: Highest level of education in the 2011 and 2016 (Source: www.cso.ie)							
Area	No formal education	Primary education	Secondary[3]	Higher Education[4]	Undergraduate Degree[5]	Postgraduate Degree[6]	Total Persons
Clonskeagh-Milltown	1	18	188	122	457	353	1,156
Clonskeagh-Roebuck	8	31	385	156	505	439	1,586
Clonskeagh-Windy Arbour	**8**	**144**	**448**	**199**	**419**	**328**	**1,631**
Dundrum-Kilmacud	8	70	492	286	765	493	2,147
Dundrum-Sweetmount	1	99	401	225	399	282	1,455
Dundrum-Taney	11	154	508	233	394	295	1,649
Highest level of education in 2016							
Dún Laoghaire-Rathdown Municipal District	**1,056**	**8,079**	**35,519**	**21,452**	**40,039**	**31,639**	**143,635**
Churchtown-Orwell	14	62	291	192	424	316	1,363
Churchtown-Woodlawn	0	19	195	115	313	294	993
Clonskeagh-Belfield	3	13	134	81	214	174	646
Clonskeagh-Farranboley	17	156	241	192	240	231	1,159
Clonskeagh-Milltown	1	8	166	123	453	446	1,232
Clonskeagh-Roebuck	6	36	345	184	542	549	1,709
Clonskeagh-Windy Arbour	**8**	**116**	**179**	**224**	**489**	**445**	**1,708**
Dundrum-Kilmacud	5	46	386	245	828	628	2,200
Dundrum-Sweetmount	3	71	348	220	473	390	1,523
Dundrum-Taney	14	112	412	158	437	375	1,625

7.3.2 Land Use and Settlement Patterns

With respect to land use patterns within the country, the latest Economic and Social Research Institute's (ESRI) *Quarterly Economic Commentary (Winter 2021)* notes that:

> *''In Q3 2021 there were 4,656 new residential completions,* ***a 7.7 per cent decline on the same period in the previous year.*** *These data are presented in Figure 7.5. Any* ***decline in housing completions is unwelcome given the ongoing issue of undersupply*** *in the market;* ***however the current quarter drop may be a timing issue and relate to the public health restrictions*** *which were in place earlier in the year. The overall drop* ***masks considerable variation in the type of dwelling as new apartment completions increased by nearly 40 per cent year-on-year while scheme house completions declined by 14 per cent****. ''[ESRI Economic Commentary (Winter 2021) -* ***Our emphasis****].*

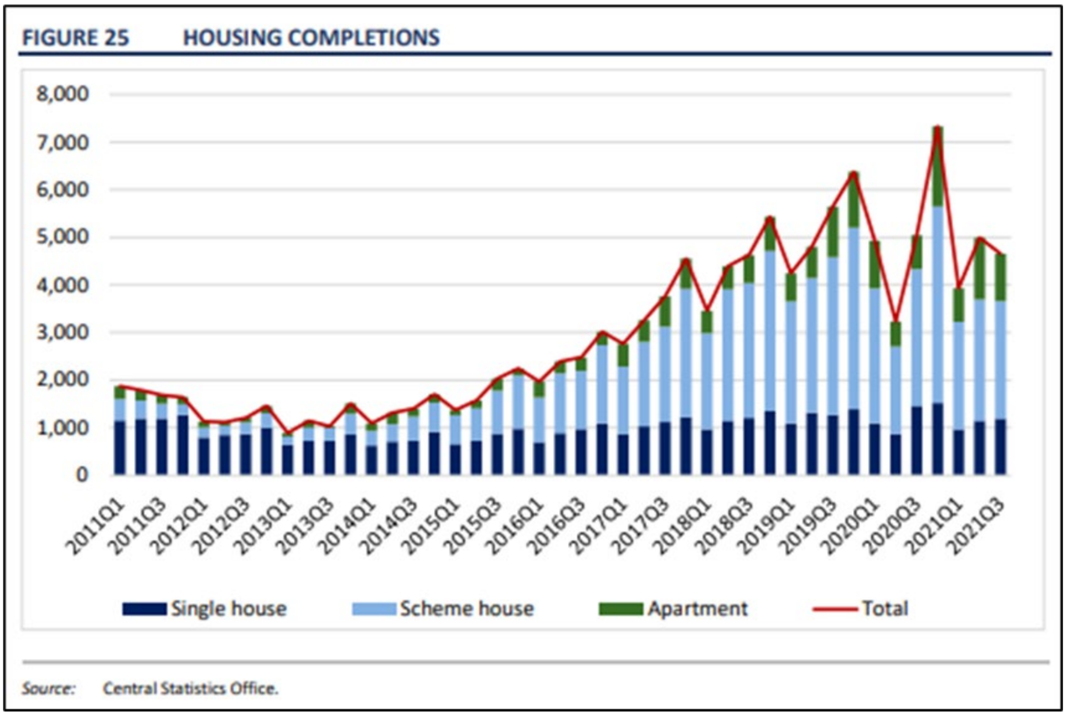

Figure 7.5: Housing Completions provided by ESRI Economic Commentary, Winter 2021. Source: ESRI.

The quarterly profile of commencements show a significant rise in the Q1 of 2021 but a sharp decline to Q3 of 2021 as seen in Figure 7.6 below. This is understood to be due to the COVID-19 lockdown early in 2021, a 'lower-than-expected' completions was seen. However, the ESRI Quarterly Economic Commentary (Winter 2021) expects number of new completions to have risen to 21,000 units by 2021 and forecasts a rise to 26,000 in the following year.

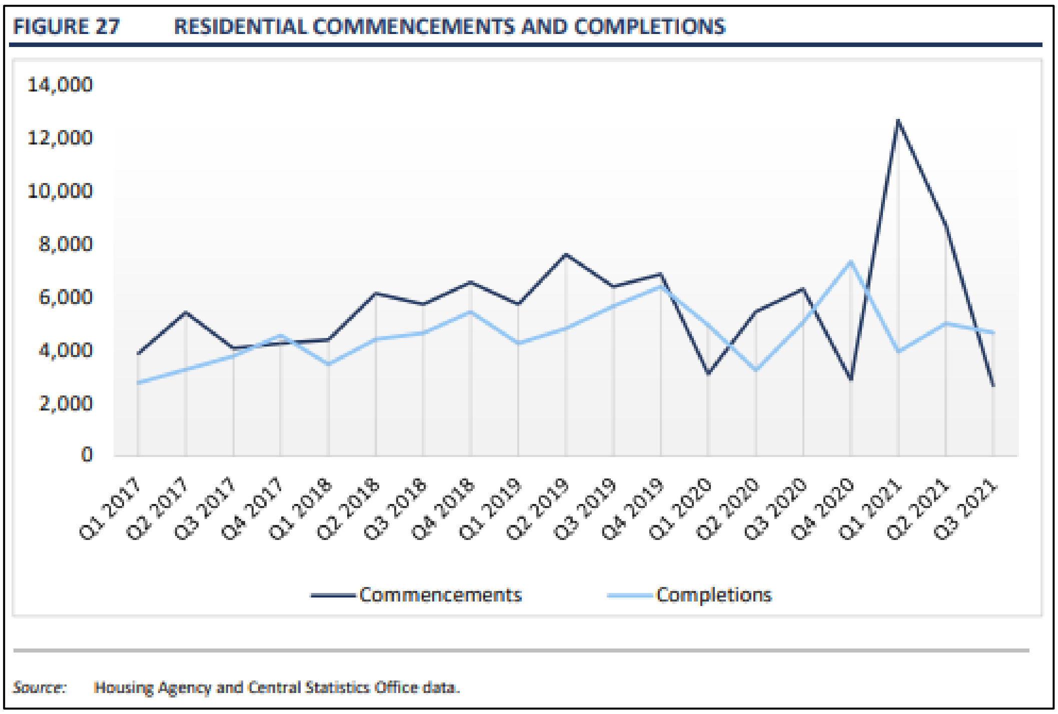

Figure 7.6: Quarterly Residential Commencements and Completions provided by ESRI Economic Commentary, Winter 2021. Source: ESRI.

At the local level, we note that the total permanent private housing stock recorded for the local ED study area was 9,376 No. units in 2016, of which some 1,140 No. units were located within the Clonskeagh Windy-Arbour Electoral Division (incl. the subject development site). The vacancy rate for the study area was much lower (5.2%) than the national average of 12.3% in 2016, with only 64 No. housing units identified as vacant within Clonskeagh Windy-Arbour (see Table 7.11).

Table 7.11: Change in Total Permanent Private Housing Stock (CSO 2011-2016)						
Year	**2011**			**2016**		
Study Area	**Total Stock[7]**	**Vacant Stock[8]**	**Vacancy Rate**	**Total Stock**	**Vacant Stock**	**Vacancy Rate**
Clonskeagh – Windy Arbour	1,116	-	-	1,140	64	5.6%
ED Study Area	9,238	-	-	9,376	485	5.2%
Dún Laoghaire-Rathdown	85,896	6,616	7.7%	86,962	4,788	5.5%
Ireland	1,994,845	289,451	14.5%	2,003,645	245,460	12.3%

The most recent Census figures for the area also indicate that housing completions in Dublin 14, where the subject site is located, have declined since the peak in 2018, with only 92 No. dwellings completed in the area in 2021 (see Figure 7.7 and Table 7.12). However, the average number of dwelling completions within Dublin 14 was higher at 185 No. units per annum from 2016-2021 compared to the average c.122 No. units per annum from 2012-2021.

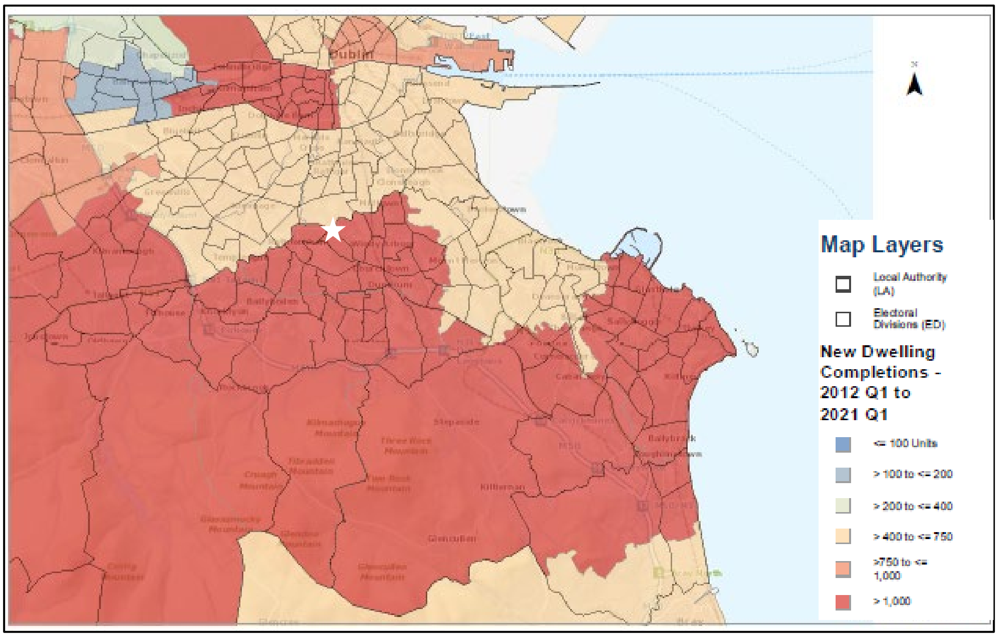

Figure 7.7: Extract of 'Dublin Housing Observatory' Map showing dwelling completions within Dún Laoghaire-Rathdown from Q1.2012 to Q1.2021. Location of proposed development site indicated by white star. (Source: AIRO, 2021).

[7] The housing stock is defined as the total number of permanent residential dwellings that were available for occupancy at the time of census enumeration. In this report, the housing stock consists of permanent private households (inhabited by both usual residents and visitors), holiday homes, vacant houses or apartments along with dwellings where all the occupants were temporarily absent on Census Night. However, communal establishments, temporary private households (e.g., caravans and mobile homes), along with dwellings categorised by the enumerators as being derelict, commercial only, or under construction are excluded from this definition. Applies to both 2011 and 2016 figures.

[8] Includes vacant houses, apartments and holiday homes. Applies to both 2011 and 2016 figures.

Table 7.12: New Dwelling Completions by Eircode Output and Year (Source: CSO)										
Area	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Dublin 14	5	10	28	67	152	206	272	253	133	92	1,140
DLR	91	208	466	295	974	1,187	1,284	114	823	1,360	7,832

A total of 7,675 No. commuters were recorded as resident within the ED Study Area in 2016, in contrast to the 11,743 No. commuters which enter the area for work, school or college each day. This net outflow points to the nature of the area as a feeder site for employment hubs in Dublin City Centre to the north and Sandyford to the south, aided in part by the site's proximity to the LUAS Green Line.

Table 7.13: Commuting Patterns of Local Residents, 2016. (Source: CSO 2016).			
Local Electoral Divisions	**Commuters Out**	**Commuters In**	**Net Flow into ED**
Churchtown-Orwell	624	175	-449
Churchtown-Woodlawn	500	224	-276
Clonskeagh-Belfield	289	7,673	7,384
Clonskeagh-Farranboley	568	101	-467
Clonskeagh-Milltown	748	135	-613
Clonskeagh-Roebuck	962	102	-860
Clonskeagh-Windy Arbour	957	1,661	704
Dundrum-Kilmacud	1,401	1,238	-163
Dundrum-Sweetmount	797	248	-549
Dundrum-Taney	829	186	-643
Cumulative ED Study Area	**7,675**	**11,743**	**-4,068**

Within the ED Study Area, the majority of residents travel to work by private car (41%) as a driver or passenger, followed closely by pedestrians (22%) and commuter rail including train, DART and LUAS (14%). Figures for the rest of Dún Laoghaire-Rathdown indicated a higher percentage of private car users (49%), followed by pedestrians and rail users at 13% respectively. We note a higher proportion of commuters within the county use bus, minibus or coach services (11%) than within the local ED area (5%), which benefits from a close proximity to the LUAS green line to the west.

Table 7.14: Means of Travel for Population Aged 5+ Years (Source: CSO 2016).				
Transport Mode	**ED Study Area**		**Dún Laoghaire-Rathdown**	
	No. Persons	**% Mode share**	**No. Persons**	**% Mode share**
On foot	7,190	**22%**	19,212	**13%**
Bicycle	3,510	**11%**	9,017	**6%**
Bus, minibus or coach	1,662	**5%**	15,257	**11%**
Train, DART or LUAS	4,426	**14%**	18,932	**13%**
Motorcycle or scooter	192	**<1%**	855	**<1%**

Car driver	9,202	**29%**	49,933	**35%**
Car passenger	3,922	**12%**	20,662	**14%**
Van	390	**1%**	2,294	**2%**
Other (incl. lorry)	28	**<1%**	182	**<1%**
Work mainly at or from home	824	**3%**	4,009	**3%**
Not stated	822	**3%**	4,110	**3%**
Total	**32,168**	**100%**	**144,463**	**100%**

7.3.3 Economic and Employment Activity

The Economic and Social Research Institute's (ESRI) *Quarterly Economic Commentary (Winter 2021)* suggests that the combination of robust economic activity coupled with decreased levels of unemployment indicated that COVID-19 related pressures on public finances have 'eased considerably'. However, the increase in infections in Q4 of 2021 have increased the possibility of public health restrictions in early 2022 which creates uncertainty for those operating in the sectors of the economy most affected. Additionally, the possibility of 'significant' disruption in the EU-UK trade will have a negative impact on the Irish Economy. It is now anticipated that the Gross Domestic Product (GDP) will have increased by 13.6% in 2021, whereas only a 7% increase is expected in 2022, with unemployment peaking at c. 26% in Q1 before falling to c.7% in the final quarter.

A strong recovery in the domestic economy is also anticipated, with consumption forecast to have increased by c. 7.5%, whereas investments will have decreased by c. 50% in in 2021. Although the export sector is also likely to have continued to perform strongly in 2021, 'Brexit disruptions in trade deal' and Brexit Article 16 and a potential trade war' both greatly increase the costs and trade uncertainty. However, the costs related to the COVID restrictions will have a lasting but improving impact on public finances, with a deficit of nearly €10 billion expected in 2021, equivalent to c. 42.3% of the GDP.

With respect to national employment figures, the ESRI Commentary anticipates that the national unemployment rate as a percentage of the total labour force is expected to fall to 5.8% in 2022 from 16.1% recorded in 2021[9]. The report further states that,

> *''Unemployment, which had averaged over 26 per cent in the first quarter of this year is now set to finish the year at 7 per cent in the final quarter.* ***The fall in unemployment will continue into 2022 and is expected to be at a pre-pandemic low of 5 per cent by Q4 2022.****''*
>
> *[**Our Emphasis**, ESRI Quarterly Economic Commentary, Winter 2021]*

At the local level, unemployed persons comprised c. 3% of the working population (aged 15+ years) within the ED Study Area in 2016, compared to the national average of c. 7%.

More recent unemployment figures are provided by the CSO Labour Force Survey[10], which was last released for Q4. 2021 and adjusted to account for the impact of COVID-19 on the national economy. This survey identified a standard unemployment rate of 4.9% nationally in

[9] *ESRI (Winter 2021) Quarterly Economic Commentary*
[10] Source: www.cso.ie/en/releasesandpublications/ep/p-lfs/labourforcesurveyquarter42021/summaryresults/

Q4.2021 for persons aged 15-74 years within the labour force, adjusted to 7.4% with respect to COVID-19 estimates.

Table 7.15: Socio-Economic Status of Population Aged 15+ (Source: CSO 2016).

Economic Status	ED Study Area	% Total	Ireland	% Total
At work	19,168	**48%**	2,006,641	**53%**
Looking for first regular job	234	**<1%**	31,434	**<1%**
Unemployed	1,132	**3%**	265,962	**7%**
Student	9,708	**24%**	427,128	**11%**
Looking after home/family	2,580	**7%**	305,556	**8%**
Retired	5,988	**15%**	545,407	**15%**
Unable to Work	768	**2%**	158,348	**4%**
Other	114	**<2%**	14,837	**<1%**
Total	**39,692**	**100%**	**3,755,313**	**100%**

The CSO Live Register is a monthly measurement of the numbers of people (with some exceptions) registering for Jobseekers Benefit (JB) or Jobseekers Allowance (JA) or for various other statutory entitlements at local offices of the Department of Employment Affairs and Social Protection (DEASP). This data source, whilst not an unemployment register, can provide a general indication of recent employment trends and economic activity in the local area.

Live Register figures are available at a national, county or local level, with respect to the jurisdiction of DEASP welfare offices. We note that the number of people on the register decreased at all levels in the recent 3-month period, but less significantly within Dún Laoghaire-Rathdown (4% decrease) than the rest of the country (7 to 10% decrease)

Table 7.16: **Persons on Live Register by Month and Area, 2020-2021 (Source: CSO[11]).**

Area Definition	2020.10	2020.11	2020.12	2021.01	1-mo. trend	3-mo. trend
DEASP Offices - DLR[12]	6,035	5,923	5,847	5,807	-1%	-4%
Ireland – Unadjusted	203,172	194,058	189,860	188,543	-1%	-7%
Ireland – Seas. Adjusted	210,700	203,100	194,700	190,500	-2%	-10%

The below data in Table 7.17 is obtained from CSO PxStat (CIA02), this demonstrates the levels of total income and disposable income per person in County Dublin is 16% higher over the study years than those for the State.

A similar pattern of income distribution is observed in data on disposable income per person, with a light adjustment for the higher cost of living in the area with disposable income being 12% to 14% higher than that for the state).

[11] Live Register, Selected from CSO PxStat Table LRM02 and LRM07.
[12] Combined figures from the Nutgrove and Dún Laoghaire-Rathdown DEASP Offices.

Table 7.17 Income per Person (Source: CSO PxStat CIA02)				
Area	**Income**	**2017**	**2018**	**2019**
State	Total Income per Person (€)	29,607	30,575	31,812
	Disposable Income per Person (€)	20,567	21,153	22,032
Dublin	Total Income per Person (€)	35,777	37,406	38,903
	Disposable Income per Person (€)	23,394	24,399	25,696

7.3.4 Social Infrastructure

Social infrastructure covers a range of services and facilities that meet local and strategic needs and contribute towards a good quality of life. In this context it includes local business, residential areas, education, health facilities, emergency services, places of worship, and green infrastructure.

The *Dún Laoghaire-Rathdown County Development Plan 2016–2022 and the 2022-2028 Draft Development Plan set* out a framework for the sustainable spatial and physical development of The Dún Laoghaire-Rathdown municipal district while considering the conservation and protection of the built and natural environment. It also aims to carefully consider all the needs of society, its individuals and groups.

The subject lands are comprised of zoned *'A' – to protect and/or improve residential amenity* land which adjoins the Dundrum Road (R117) and is currently in use as the Central Mental Hospital for the state, providing forensic mental health and associated facilities for patients. The site is located c. 1km north of Dundrum Village (as the crow flies) and within c. 450m of the LUAS Green Line station at Windy Arbour to the west by road.

A social infrastructure audit was undertaken for the proposed development site within a c. 2km radius, which identified more than 250 No. relevant social infrastructure facilities in the vicinity of the subject proposal, comprised of education and training facilities, childcare services, community and cultural facilities, religious and burial sites, healthcare services, open space and recreation facilities and retail centres, as summarised in Figure 7.8.

The site is served by an existing schools' network of 14 No. primary schools and 14 No. post-primary schools, as well as 32 No. existing childcare facilities within a c. 2km radius of the proposed development (see Figure 7.9 overleaf) which held an estimated 22% capacity for new enrolments at the time of the survey.

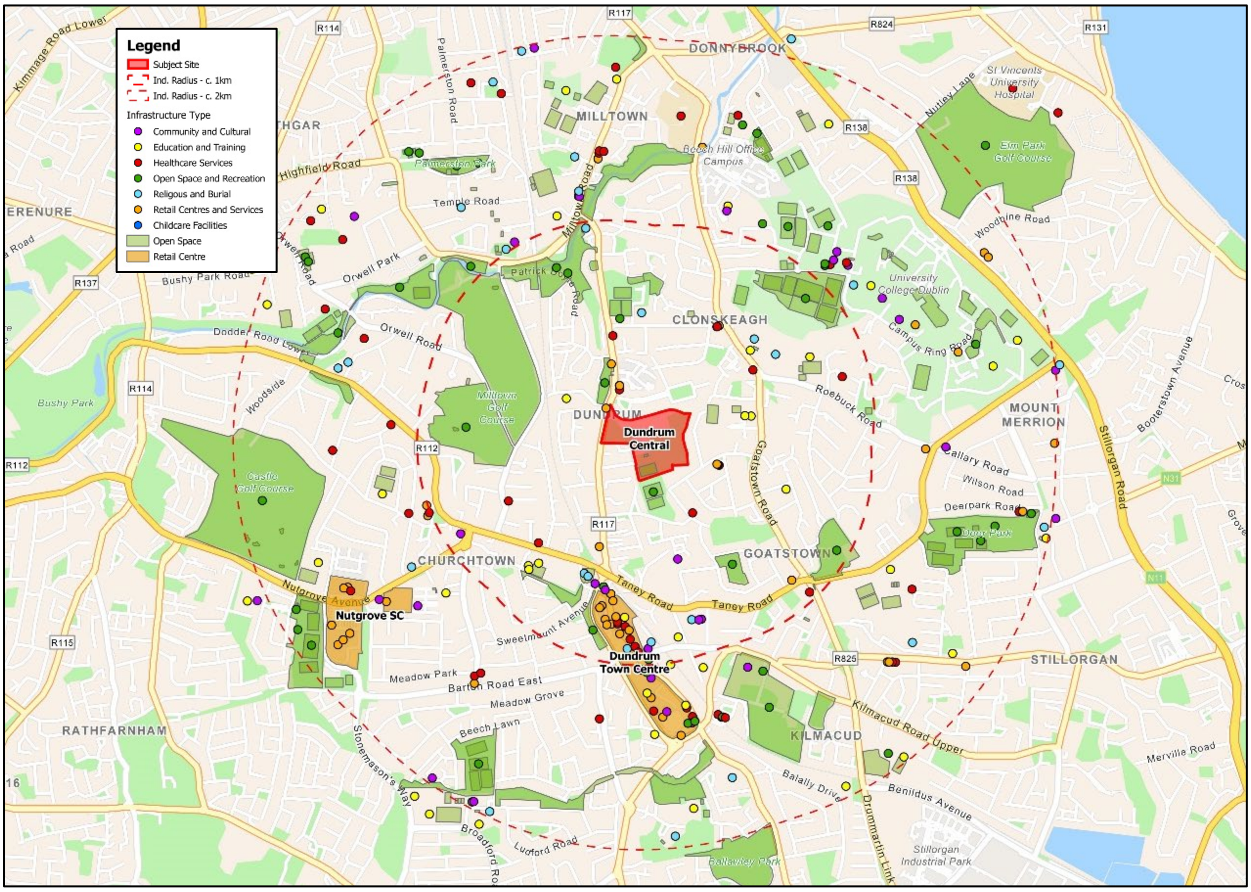

Figure 7.8: Indicative location of 250+ No. social infrastructure facilities identified in the vicinity of subject site. Indicative 1km and 2km radius from subject site provided in red dash. Source: TPA, 2021.

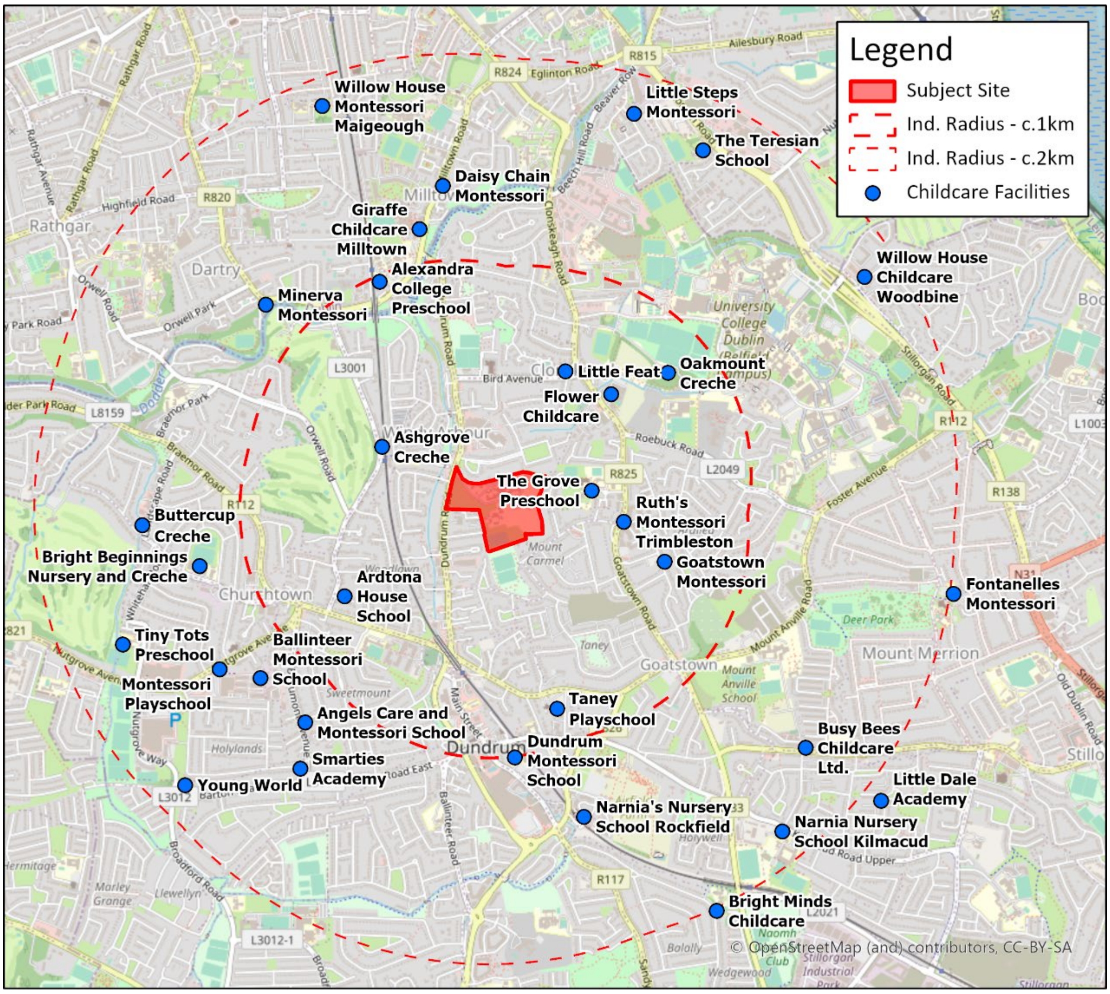

Figure 7.9: Location of existing childcare facilities (shown in blue) within study area. Indicative 1km and 2km radius from subject site provided in red dash. Source: TUSLA/TPA, 2021.

7.3.6 Human Health

The Department of Health's latest policy report *Health in Ireland: Key Trends 2021* provides statistical analysis on health in Ireland over the last 10 years and deals specifically with issues such as life expectancy, mortality and other health indicators within the country.

The World Health Organisations definition of Health is *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."*

7.3.6.1 Health of the Population

The average life expectancy is continuing to increase in Ireland, with estimates of 84.7 years for women and over 80.8 years for men as of 2019. Both of these figures are higher than the average estimates for their EU counterparts, as shown in Figure 7.10 and 7.11. Male life expectancy has increased by 3 years and female life expectancy by almost 2 years since 2009, while the gap between the life expectancy of men and women continues to narrow. The greatest gains in life expectancy have been achieved in the older age groups, due to decreasing mortality rates from major diseases.

7.3.6.2 Health and Safety

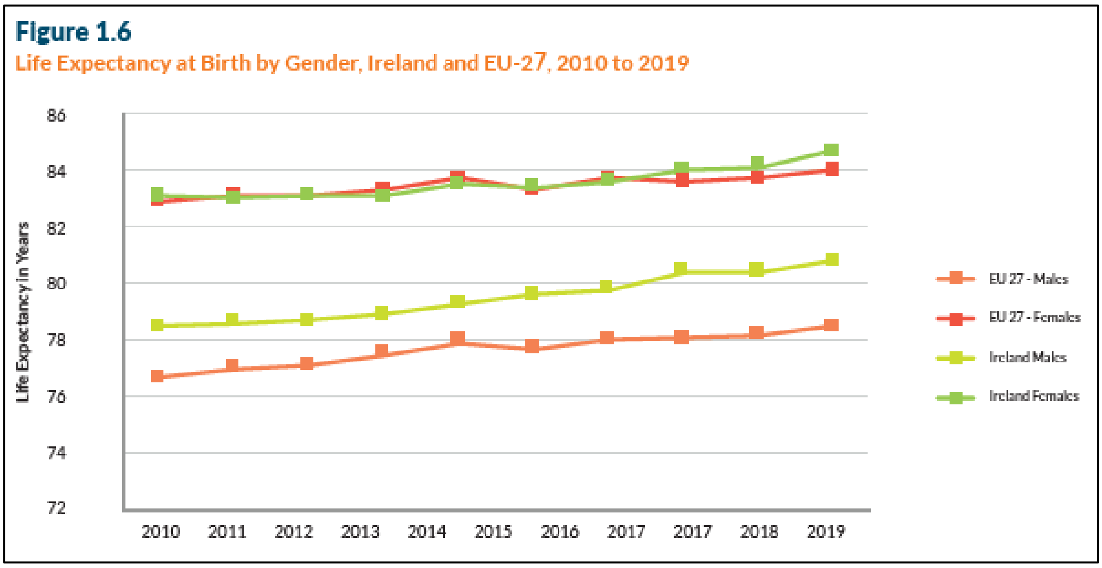

Figure 7.10: Extract from *Health in Ireland: Key Trends 2021,* Figure 1.6 showing Life Expectancy at Birth by Gender. Source: Department of Health, 2021.

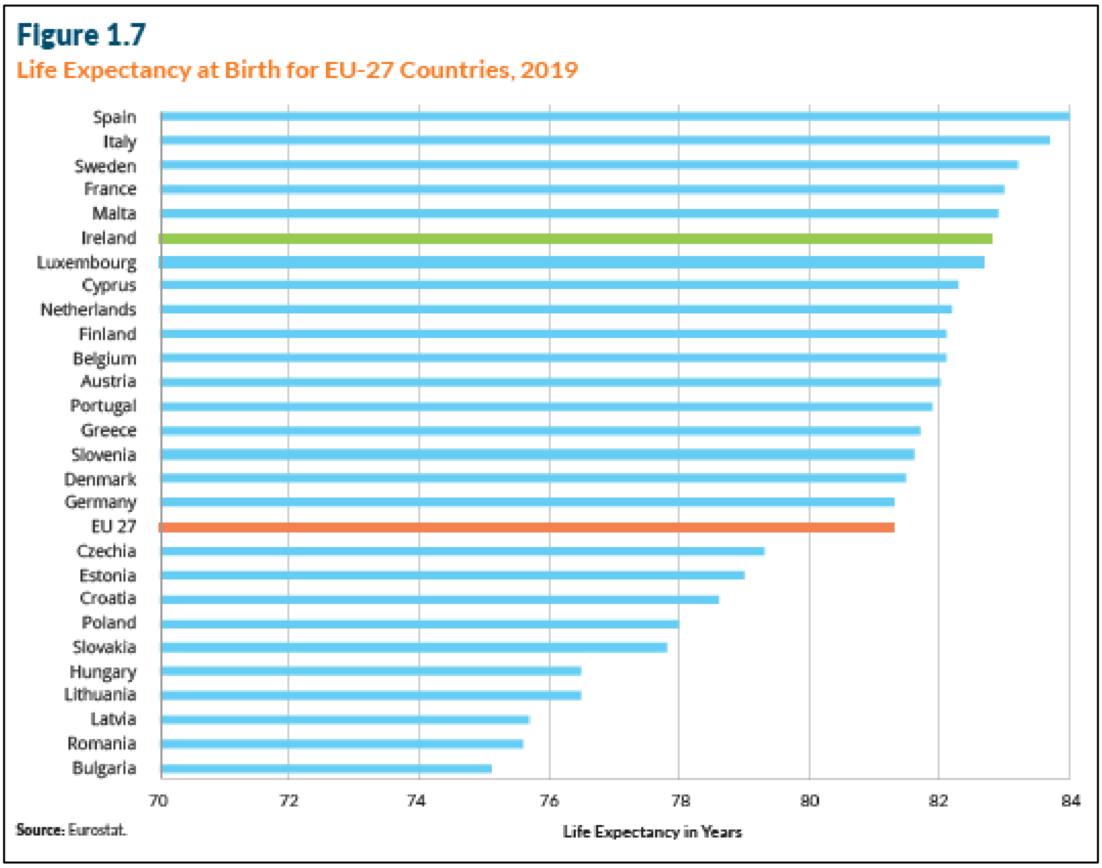

Figure 7.11: Extract from *Health in Ireland: Key Trends 2021,* Figure 1.7 showing Life Expectancy at Birth for EU28 Countries, 2019. Source: Department of Health, 2021.

National health figures show that there has been in improvement in overall mortality rates and a rise in life expectancy in the country over the last ten years; however, these figures may be impacted in the medium-term by the COVID-19 pandemic and its effect on the healthcare system.

The *Health in Ireland* report also states:

> *"Table 2.4 shows that age-standardised mortality rates have declined for all causes over the past decade by 16%. This decrease is particularly strong for mortality rates from suicide (-41.6%), pneumonia (-49.4%) and stroke (-44.9%). Infant mortality, measured as deaths per 1,000 live births, has also decreased by 22.2% since 2010 and remains below the EU average (Figure 2.10)."*
>
> *[Dept. of Health, Health in Ireland: Key Trends 2021]*

With respect to the particular causes of death within the population, the report identifies strong decreases in the mortality rates for suicide (-38.6%), pneumonia (-49.4%) and stroke (-23.5%), as shown in Figure 7.12. Infant mortality rates within the country have also declined to below 3% since 2010 and remain lower than the EU average for the same period.

Table 2.4

Principal causes of death: numbers and age-standardised death rates per 100,000 population, 2011-2020

						% change	
		2011	2015	2019	2020	2011-2020	2019-2020
All Causes	Number	28,456	30,127	31,184	31,765	11.6	1.9
	Rate	1041.8	1008.9	886.8	879.0	-15.6	-0.9
Diseases of the circulatory system							
All Circulatory System Diseases:	Number	9,236	9,371	8,928	8,744	-5.3	-2.1
	Rate	360.4	330.0	258.9	247.7	-31.3	-4.4
Ischaemic Heart Disease:	Number	4,707	4,492	4,132	4,142	-12.0	0.2
	Rate	181.8	154.6	117.0	116.0	-36.2	-0.9
Stroke:	Number	1,993	1,920	1,618	1,524	-23.5	-5.8
	Rate	78.7	68.7	46.3	43.4	-44.9	-6.3
Cancer							
All Malignant Neoplasms:	Number	8,666	8,877	9,574	9,356	8.0	-2.3
	Rate	301.4	277.6	259.6	250.8	-16.8	-3.4
Cancer of the Trachea, Bronchus and Lung:	Number	1,907	1,885	2,014	1,961	2.8	-2.6
	Rate	65.9	58.4	53.0	52.2	-20.7	-1.4
Cancer of the Female Breast:	Number	697	680	697	750	7.6	7.6
	Rate	23.6	20.5	17.4	19.4	-17.7	11.7
Diseases of the Respiratory system*							
All Respiratory System Diseases:	Number	3,438	3,865	3,930	3,404	-1.0	-13.4
	Rate	138.6	138.9	114.1	97.3	-29.8	-14.7
Chronic Lower Respiratory Disease	Number	1,504	1,701	1,803	1,601	6.4	-11.2
	Rate	58.1	59.0	51.0	45.4	-21.8	-10.9
Pneumonia	Number	1,057	1,165	1,004	792	-25.1	-21.1
	Rate	45.6	44.3	29.0	23.1	-49.4	-20.4
External causes of injury and poisoning							
All Deaths from External Causes:	Number	1,693	1,316	1,324	1,276	-24.6	-3.6
	Rate	43.8	33.5	29.9	29.8	-31.9	-0.4
Transport Accidents:	Number	189	124	78	72	-61.9	-7.7
	Rate	4.4	2.9	1.4	1.6	-63.5	15.9
Suicide:	Number	554	425	390	340	-38.6	-12.8
	Rate	12.1	9.5	7.4	7.1	-41.6	-4.2

Source: Central Statistics Office, Public Health Information System (PHIS) - Department of Health.

Notes:
(i) (p) The figures for 2020 are provisional. They should be treated with caution as they refer to deaths registered in these years and may be incomplete.
(ii) The rates provided in the table are age-standardised to the European standard population and are presented as rates per 100,000 population except for infant mortality rates which are expressed as deaths per 1,000 live births.
(iii) *Excludes cancer of the trachea, bronchus and lung.

Figure 7.12: Extract from *Health in Ireland: Key Trends 2021,* Table 2.4 showing Principal Causes of Death and Infant Mortality Rate: Numbers and Age Standardised Death Rates Per 100,000 Population 2011 to 2020. Source: Department of Health, 2021.

At the national level, the Health in Ireland report identified that 45.6% of the male population and 43% of the female population in Ireland held a self-perceived health status of 'Very Good' in 2017, compared to only 22.2% for the male population and 19.0% of the female population within the greater EU28 population. Ireland also topped the list of EU28 countries in this area in 2019 as shown in Figure 7.13, with over 80% of the population rating their health as good or very good. However, health status varies in respect of income inequality, with fewer low-income earners reporting good health both in Ireland and across the EU.

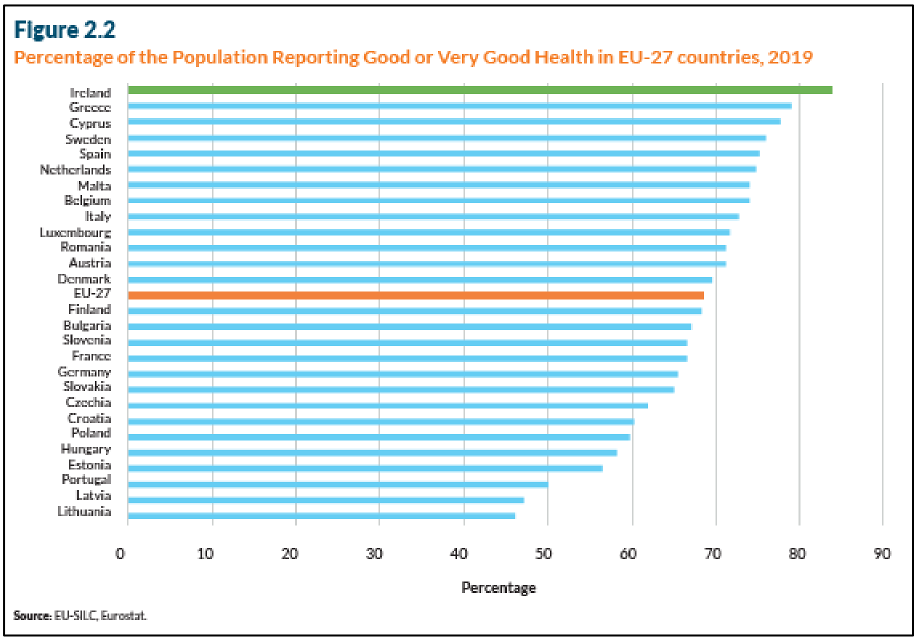

Figure 7.13: Extract from *Health in Ireland: Key Trends 2021,* Figure 2.3 showing Percentage of the Population Reporting Good or Very Good Health in EU-28 Countries, 2019. Source: Department of Health, 2021.

At the local level, c. 90% of people living in Dún Laoghaire-Rathdown reported their health to be "Good" or "Very Good" accounting for 196,089 people within the area. This makes Dún Laoghaire-Rathdown the healthiest county in Ireland in 2016, according to self-reported figures. These figures are mirrored within the ED Study Area, which also reported c. 91% of the population as having 'Good' or 'Very Good' health in 2016.

Table 7.18: Population by general health status – self reported (Source: CSO, 2016).

General Health	ED Study Area		Dún Laoghaire-Rathdown	
	No. Persons	% Total	No. Persons	% Total
Very good	32,010	**68%**	142,996	**66%**
Good	11,002	**23%**	53,093	**24%**
Fair	2,654	**6%**	13,879	**6%**
Bad	426	**<1%**	2,173	**1%**
Very bad	88	**<1%**	533	**<1%**
Not stated	970	**2%**	5,344	**3%**
Total	47,150	**100%**	218,018	**100%**

The location of the proposed development site is such that the noise climate is dominated by road traffic. Two unattended noise surveys were undertaken in order to obtain long term measurements. Four attended monitoring locations were undertaken in the close vicinity of the proposed site, representative of the existing noise environment at the closest NSLs. Existing noise levels have been found to be typical of a suburban area, which demonstrates that the proposed site has ambient noise levels suitable for the proposed use and is in keeping with residential areas within the local environs.

7.3.7 Landscape Amenity and Tourism

There are no listed or scenic views, no landscape or amenity designations or protected trees pertaining to the site. Three buildings, which are not within the SHD application area, are protected structures listed on the National Inventory of Architectural Heritage (NIAH). They are the main hospital building, rated as of 'National' importance by the NIAH; and the chapel and the infirmary building, both rated as 'Regional' importance by the NIAH. There are no national monuments within the proposed development site.

The primary area of landscape amenity in the immediate vicinity of the Proposed Development site is Dartry Park (1km to the north), which is a recreational park with various open areas located along the river Dodder. The closest primary amenity area is Milltown Golf Club is located c. 350 m to the west.

The Proposed Development site is not considered to be significant or sensitive from a natural landscape aspect due to it being in a built-up location. The lands are appropriately zoned in the Dublin City Development Plan 2016 – 2022 as *'A' – to protect and/or improve residential amenity.* The immediate surrounding area is contained within an environment of an established commercial and residential setting.

Landscape tourism is a minor industry in the immediate environs of the Proposed Development site; with Dartry Park being the only public attraction for tourists in the vicinity. There is also a very limited number of hotels close to the development with the closest being the Talbot Hotel in Stillorgan (c. 2.3km to the East of the site).

Retail tourism is however a large industry in the local environs Dundrum Town Centre is Irelands most popular shopping destination and is located c. 1.4km south of the proposed development. In 2017 as stated in an article by Don Nugent it employed 'over 5,500 people and attracts 18 million visits per annum'[13].

Section 3.1.2.14 of the Dún Laoghaire-Rathdown Development Plan lists a number of policies to promote and facilitate tourism in the area. DLRCC also intend to create a Dundrum Local Area Plan (LAP) by 2025. The LAP will set out a land use strategy for the proper planning and sustainable development of the area.

7.4 Potential Impacts of the Proposed Project

The impact of construction, commissioning and operation of the Proposed Development is considered below.

7.4.1 Construction Phase

7.4.1.1 Impacts on Social Patterns (Population)

During the construction phase of the proposed project, it is unlikely that there will be any significant impact upon social patterns in the surrounding area. The construction phase will

[13] https://www.dublineconomy.ie/insights/dundrum-town-centre-experiential-shopping-15836/

result in a number of workers at the site, however, it is not envisaged that their place of residence will change as a result of the development. For example, it is envisaged that construction workers would travel from their existing place of residence rather than moving, temporarily, to the area surrounding the site.

As a result, the impact on the local population during the construction phase is considered to be *neutral, not significant* and *temporary* in nature and therefore, no *significant* impacts are expected to arise in this regard.

Giving consideration to local residents, it is predicted that there may be some impacts which are likely to be associated with construction traffic, nuisance and disturbance. The predicted impacts are described in the noise, air and traffic sections dealt with separately and assessed elsewhere in the EIAR and are considered to be *short-term negative* impacts.

The level of impact predicted above is considered to align with the normal disturbance associated with the construction industry where a site is efficiently, sensitively and properly managed in the context of surrounding existing neighbouring development.

The *Construction and Environmental Management Plan,* prepared by Barrett Mahony Civil and Structural Consulting Engineers employs mitigation to address and minimise any potential impacts to nearby residents.

7.4.1.2 Impacts on Land Use and Settlement Patterns

In terms of land use, the proposed project broadly accords with the statutory land use zoning policies of the *Dún Laoghaire-Rathdown County Development Plan 2016-2022* and the *Draft Dún Laoghaire-Rathdown County Development Plan 2022-2028* (as outlined in the enclosed *Planning Statement of Consistency* and *Material Contravention Statement,* prepared by Tom Phillips + Associates.) In addition, the proposed development accords with the national and regional planning policies pertaining to the delivery of housing, the efficient use of currently underutilised land and compact growth.

The construction phase will comprise earthworks and construction works and will not result in any severance of land, loss of rights of way or amenities. However, given the nature of construction, this phase has the potential to result in *short-term negative* impact due to the *temporary* degradation of the visual environment. This is further discussed in Chapter 13 (Landscape and Visual) of this EIAR.

7.4.1.3 Impacts on Economic and Employment Activity

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are dealt with within the corresponding chapters of this EIA Report as follows:

- Chapter 11 – Air Quality and Climate
- Chapter 12 – Noise and Vibration
- Chapter 13 – Landscape and Visual Impact
- Chapter 17 – Material Assets Roads and Traffic

The construction arising from the proposed project is considered to give rise in a positive impact in terms of economic activity within the area. This is likely to include the construction sector and building services industries. The positive impact is expected to last for the duration of the construction phase.

In terms of extent of employment, it is predicted that there will a varying degree of staff on site on a typical day through the various stages of construction, however during peak construction periods this is expected to fluctuate up to 700 no. staff and contractors on site per day during Phase 3. It is anticipated that the key project managers and main contractor representatives will maintain a presence on site for the whole duration of the project and the labour workforce will be determined by the specialist contractors required on site.

Construction will have an indirect positive effect on support industries such as builder suppliers, construction material manufacture, maintenance contracts, equipment supply, landscaping and other local services. There will also be a need to bring in specialist workers on a regular basis that may increase the above estimated working population at times. Specialists are only likely to stay for shorter periods depending on the nature of the work. The construction phase, therefore, is considered to have the potential to have a ***moderate, short term*** *and* ***positive*** impact on the economy and employment of the local and wider area.

The completed development will also have a positive impact in the provision of additional capacity for residential units in the Santry area, the demand for which remains high due to the current nationwide housing crisis, which has been exacerbated by COVID-19.

7.4.1.4 Impacts on Tourism and Amenity

There are no listed or scenic views, no landscape or amenity designations or protected trees pertaining to the site. Three buildings, which are not within the SHD application area, are protected structures listed on the National Inventory of Architectural Heritage (NIAH). They are the main hospital building, rated as of ‘National’ importance by the NIAH; and the chapel and the infirmary building, both rated as ‘Regional’ importance by the NIAH. There are no national monuments within the proposed development site.

During construction and demolition works there will alter the boundary wall between the proposed development and Rosemount Green to the south, however there is no expected interruptions to the parks function.

Groundwater in the excavations will be pumped out. As noted, it is estimated that the required pumping rate will be low. It is envisaged that the water to be discharged will be clean groundwater as the areas to be excavated are not contaminated (based on site investigation information). It is therefore proposed that the water be discharged into the existing sewer network on the surrounding public roads under a discharge license regulated by Dún Laoghaire-Rathdown County Council / Irish Water, issued under the Water Pollution Act (Section 4 License).

7.4.1.5 Impacts from Additional Traffic

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 11.2.2. It can therefore be determined that the construction stage traffic will have an ***imperceptible***, ***neutral, localised*** and ***short-term*** impact on air quality.

7.4.1.6 Impacts on Health and Safety

The *EPA Draft Guidelines* (2017) sets out how human health should be considered through assessment environmental pathways through which health could be affected.

The relevant pathways in relation to human health during the construction phase are considered to be air quality, noise and vibration, water and soil.

The expected air quality effects are detailed in Chapter 11 along with proposed mitigation measures to ensure the protection of human health.

Similarly, the potential noise and vibration related impacts arising from the construction phase and associated mitigation measures are contained in Chapter 12.

While there is the potential for construction-related hazards, serious risks to human health and safety are not envisaged. Nuisances associated with construction activities such as noise, dust, vibration and traffic are potential factors for devaluation of amenity and may have health and safety impacts. During construction, the site will be managed in accordance with the following safety and health regulations and guidelines which will ensure a high standard of safety both for workers on site and the general public;

- *Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013)*
- *Safety, Health & Welfare at Work Act 2005;*
- *Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2020 (S.I. No. 2/2020).*

A *Health and Safety Plan* covering all aspects of the construction process will be prepared and implemented in advance of construction and will comprehensively deal with safety and health related issues. Impacts on residential amenity are also considered in greater detail both within this EIAR and in accompanying documentation.

The surrounding context consists of a mix of residential, employment, education, retail and institutional lands. It does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which might result in a risk to human health and safety. It is not within the consultation zone of a SEVESO Site as defined by the Health and Safety Authority.

As with all construction projects, there will be inherent health and safety risks at this stage of the development. In order to manage this, a *Construction and Environmental Management Plan,* prepared by Barrett Mahony Civil and Structural Consulting Engineers has been prepared for the project to ensure that the relevant health and safety legislation is complied with.

7.4.1.7 Impacts from Major Accidents and disasters

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

In this respect, taking cognisance of the other chapters contained within this EIAR document and other supporting documentation, the proposed development site does not present risks of major accidents or disasters, either caused by the scheme itself or from external man made or natural disasters. Chapter 10 (Hydrology – Surface Water) and the associated enclosed *Site Specific Flood Risk Assessment,* prepared by Barrett Mahony Civil and Structural Consulting Engineers sets out that;

> *"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."*

In addition, the appointed Contractor is to follow the latest Construction Industry Federation safety protocols for COVID-19 in relation to all activities on site. This includes guidance in relation to travel to and from the home to site for all staff, in relation to site visitors and in relation to any other relevant activities connected with the construction of the development.

In addition, a *'Good Neighbour Policy'* is to be established by the appointed Contractor. This and any necessary procedures will be adopted and be in place before any works are commenced on site. Accordingly, a Liaison Manager will be appointed by the Contractor. Further information in relation to this is outlined in the enclosed *Construction and Environmental Management Plan*, prepared by Barrett Mahony Civil and Structural Consulting Engineers.

There is a potential impact on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction phase. However, the implementation of the mitigation measures set out in Chapter 9 (Land, Soils, Geology and Hydrogeology) and Chapter 10 (Hydrology) of the EIA Report will ensure the risk of a minor/accident is low and that the residual effect on the environment is imperceptible.

7.4.1.8 Impact on Human Health from Air Quality

As outlined in Chapter 11 of this EIA Report (Air Quality and Climate), 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 based on the protection of the environment as well as the protection of human health. Additional factors such as natural background levels, environmental conditions and socio-economic factors are also considered in the limit values which are set (see Chapter 11, Table 11.1). The ambient air quality standards established are designed to minimise harmful effects to health.

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 11.5 in Chapter 11, PM_{10} emissions can occur within 25m of the site for a development of this scale. Therefore, in the absence of mitigation there is the potential for slight, negative and short-term impacts to human health as a result of the proposed development.

7.4.1.9 Impact on Human Health from Noise and Vibration

Noise and vibration impacts associated with the Proposed Development have been fully considered within Chapter 12 of this EIA Report. Commentary on the impact assessment and related noise levels are summarised below with respect to potential environmental health impacts.

As detailed in Chapter 12 (Noise and Vibration), in the absence of mitigation measures, there is potential for a significant impact from construction noise at the residential and clinical noise sensitive receptors at distances within 50m from the initial works stage and at distances within 15m to 20m from all other works and at residential noise sensitive receptors overlooking the R117 Dundrum Road, at distances within 30m from the initial works stage and at distances within 10m to 15m from all other works. It is expected in the absence of specific mitigation measures that there will be a negative, significant and short-term impact at the closest receptors.

In terms of potential construction vibration impacts, taking account of the distance to the nearest sensitive off-site buildings external to the Proposed Development and the protected structures on-site in the CMH Masterplan, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in BS 5228 and therefore it is not expected that significant impacts will occur.

7.4.2 Operational Phase

7.4.2.1 Impacts on Social Patterns (Population)

The proposed development will consist of 977 No. units, including 53 No. studio units, 423 No. 1-bedroom units, 357 No. 2-bedroom units and 144 No. units of 3-bedrooms or more, along with supporting residential amenities, including the adaptive reuse of the heritage buildings on site. Based on the number of units proposed, the project has the potential to yield approximately 1,754 no. persons[14]. This will result in a sizeable population addition to the local area but provide much needed homes in the Dublin City suburbs area. This will help contribute to the significant demand for housing within Dublin, as outlined within national, regional and local planning policy which is not being met at present.

Further to this, the introduction of additional residents to the local area will improve the vibrancy and support existing community and social infrastructure. In addition, 6 no. retail units, a restaurant, a café, a medical unit and a new community centre facility will be provided, which will also improve and support the existing community and social infrastructure.

[14] Calculation based on the person per unit assumptions set out in respect of Section 8.2.8.2 of the *Dún Laoghaire-Rathdown County Development Plan 2016-2022.*

In light of the above, it is considered that the proposed project will have a *positive, significant* and *permanent* impact on the local population.

7.4.2.2 Impacts on Land Use and Settlement Patterns

The subject lands are comprised of zoned *'A' – to protect and/or improve residential amenity* land which adjoins the Dundrum Road (R117) and is currently in use as the Central Mental Hospital for the state, providing forensic mental health and associated facilities for patients. The site is located c. 1.6km north of Dundrum shopping centre and within c. 450m of the LUAS Green Line station at Windy Arbour to the west by road.

The proposed development will introduce 977 no. residential units to the site, along with 6 no. retail units, a restaurant, a café, a medical unit and a new community centre facility. Which, in addition to bringing a currently underutilised site into active use, will provide a notable contribution to the delivery of much needed housing in the local area and wider Dublin City suburbs.

The proposed project also constitutes a continuation of existing adjacent residential development and associated social infrastructure. On this basis, it is considered that the proposed project will have no significant adverse impact upon land use or settlement patterns.

7.4.2.3 Impacts on Economic and Employment Activity

The operational phase of the development will result in 977 no. residential units and a 463 sq m childcare facility. In addition, 6 no. retail units, a restaurant, a café, a medical unit and a new community centre facility are proposed. Based on an average occupancy per unit, the development will yield up to 1,754 no. persons[15]. It is likely that the increase in persons residing in the local area will increase local spending and support a wide range of local businesses, services, transport infrastructure and employment opportunities.

The proposed commercial units and childcare facility will also generate a small number of employment opportunities.

The impact is therefore considered to be positive and have a medium to long term duration.

7.4.2.4 Impacts on Tourism and Amenity

Once operational the Proposed Development will have slightly significant and positive impact upon the availability and quality of local amenities. The proposed community Park will provide an important gateway and connection into Rosemount green. This park will be integrated with Rosemount Green, and seen as a natural extension of the green, encouraging greater use of both spaces by residents, the local community, and visitors.

Allowing access to other aspects of the development such as the walled garden, play areas, permeable cycle and pedestrian access, soft landscaping and open spaces add value to the surrounding suburban area.

[15] Calculation based on the person per unit assumptions set out in respect of Section 8.2.8.2 of the *Dún Laoghaire-Rathdown County Development Plan 2016-2022.*

The Proposed Development will provide increased childcare availability and space for commercial tenants, which will have slightly significant and positive impact on local amenities. Access to other amenities in the area will remain unaffected.

The impact of the proposed development on Tourism and Amenity in the operational stage is considered long-term, localised, and positive.

7.4.2.5 Impacts from Additional Traffic

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of NO_2 emissions for the opening and design years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined. The assessment was carried out at 4 no. high sensitivity residential receptors (R1 - R4) (see Figures 11.6, 11.7 and 11.8). The annual average concentration is in compliance with the limit value at the worst-case receptor in 2024 and 2039.

Concentrations of PM_{10} were modelled for the baseline year of 2024. The modelling showed that concentrations were in compliance with the annual limit value of 40 $\mu g/m^3$ at all receptors assessed, therefore, further modelling for the opening and design years was not required as per the UK Highways Agency guidance (2019a). Concentrations reached at most 0.79 $\mu g/m^3$ excluding background concentrations. When a background concentration of 13 $\mu g/m^3$ is included the overall impact is 35% of the annual limit value at the worst case receptors (R3 and R4).

The impact of the proposed development on ambient air quality due to traffic in the operational stage is considered long-term, localised, negative and imperceptible.

In particular, it is worth noting that the road network within the site and the associated connections to the existing network, have been designed in accordance with the *Design Manual for Urban Roads and Streets*. This is in combination with a *Road Safety Audit* of the proposed development, to ensure that the scheme is of the highest design and safety standards, once complete. Once operational, the proposed project will not result in any significant impact on human health and safety for existing, neighbouring populations or the future residents of the proposed development.

7.4.2.6 Impacts to Health and Safety

Given the nature of the proposed project, it is not likely that any significant impacts on health and safety will arise during the operational phase.

The development has been designed to provide a safe environment for future occupiers and visitors. The public realm, inclusive of pathways, roads and communal open spaces, have been designed in accordance with the best practice and relevant planning policy standards.

Similarly, the proposed residential units are all designed in accordance with the relevant guidelines and standards and are capable of meeting all relevant building standards and regulations. Having regard to the above, it is considered that the proposed project will result in a high standard of health and safety for all residents and visitors.

7.4.1.7 Major Accidents and disasters

The site has been assessed in relation to the following external natural disasters; landslides, seismic activity, volcanic activity and sea level rise/flooding as outlined below.

There is a negligible risk of landslides occurring at the site and in the immediate vicinity due to the topography and soil profile of the site and surrounding areas. There is no history of seismic activity in the vicinity of the site. There are no active volcanoes in Ireland so there is no risk of volcanic activity. The Proposed Development site is not located within the consultation distance of any COMAH establishment that is notified to the HSA.

The proposed water main layout is arranged such that all buildings are a maximum of 46m from a hydrant in accordance with the Department of the Environment's Building Regulations "Technical Guidance Document Part B Fire Safety". Hydrants are to be installed in accordance with Irish Water's Code of Practice and Standard Details. Final positions of hydrants will be agreed as part of the Fire Safety Certificate requirements.

During the operational phase of the proposed development, the operator will implement an Environmental Health and Safety (EH&S) Management System and associated procedures at throughout the development. Full training in the EH&S Management System and relevant procedures will be provided to all employees. The Operator will also implement any appropriate health and safety measures to safeguard residents' health and safety with regards to fires and slips, trip or Hazards.

In this respect, taking cognisance of the other chapters contained within this EIAR document, it is not considered that the proposed development site presents risks of major accidents or disasters, either caused by the scheme itself or from external man made or natural disasters.

7.4.2.8 Impacts on Human Health from Air Quality

Traffic related air emissions have the potential to impact human health if they do not comply with the ambient Air Quality Standards detailed in Table 9.1. Concentrations of PM_{10} were modelled for the baseline year of 2024 in Section 11.4.2.1 of this EIAR. The modelling showed that concentrations were in compliance with the annual limit value of 40 µg/m^3 at the receptor assessed, therefore, further modelling for the opening and design years was not required. Concentrations reached at most 0.79 µg/m^3. When a background concentration of 13 µg/m^3 is included the overall impact is 35% of the annual limit value at the worst case receptors.

The potential impact of the proposed development on ambient air quality in the operational stage is considered long-term, localised, negative and imperceptible and therefore, no mitigation is required.

7.4.2.9 Impact on Human Health from Noise and Vibration

As detailed in Chapter 12 Noise and Vibration, the main potential sources of outward noise from the development during the operational phase will be traffic flows to and from the development via public roads, mechanical and electrical plant used to service the buildings, deliveries, car parking on-site, childcare facilities (crèche) and patron noise from commercial outdoor areas. The worst case scenario noise emissions associated with these activities at the Proposed Development site should be compliant with the adopted noise limit values which are based with due consideration of the effect on human health.

The building services plant is a potential noise source within the development. As detailed in Section 12.4.2.2, the location and type of building services plant has not yet been established therefore it is not possible calculate potential noise levels. Suitable mitigation measures will be included at the detailed design stage to ensure noise emissions are within adopted limit values.

Another potential noise source comes from children playing in the outdoor area of the crèche. Due to the location of the outdoor play area, it is considered there will be no impact on locations outside of the Proposed Development. In the absence of mitigation measures, it can be determined that on facades within the proposed development (detailed in Section 12.4.2.5) the impact on human health in relation to noise generated from children playing outdoors can be negative, local, long-term and not significant.

Any change in noise levels associated with other potential sources of noise in the vicinity of the Proposed Development is expected to be not significant. In essence, the noise levels that are encountered at the nearest noise sensitive locations are predicated to be within relevant noise criteria that have been adopted here for the operation of the Proposed Development and associated infrastructure. These criteria have been selected with due consideration to human health, therefore, will not result in a significant impact on human health.

The Proposed Development will not generate any perceptible levels of vibration during operation and therefore there will be no impact from vibrations on human health.

7.5 Mitigation Measures

7.5.1 Construction Phase

Prior to the commencement of construction, the appointed contractor will be required to obtain formal agreement from the Local Authority on pollution prevention measures as well the overall approach and emergency procedures for all construction stages. All demolition works are to be in accordance with the following guidelines:

- BS 6187:2000 '*Code of practice for demolition*'
- Health and Safety Executive Guidance Notes GS 29 / 1, 2, 3 & 4.
- S.I. 504 Safety, Health & Welfare at Work (Construction) regulations 2013
- Air Pollution Act 1987
- Environmental Protection Agency Act 1992
- BS 5228:2009 Part 1 '*Noise Control on Construction & Open Sites*'.

Prior to the works commencing, detailed photograph surveys (condition schedules) of adjoining walls, roads, footpaths, grass verges etc. is to be prepared. Copies of the relevant parts are to be made available to adjoining owners and Dún Laoghaire-Rathdown County Council. This record will form the basis of assessing repairs to adjoining areas in the future should a dispute arise as to their cause.

Roadways are to be kept clean of muck and other debris. A road sweeping truck is to be provided if necessary to ensure that this is so.

The Contractor will be responsible for the security of the site during each phase. The Contractor will be required to:

- Operate a site induction process for all site staff.
- Ensure all site staff shall have current 'safe pass' cards.
- Install adequate site hoarding to the site boundary.
- Maintain site security staff at all times.
- Separate pedestrian access from construction at the main site entrance off the Dundrum Road and provide a safe walkway for pedestrians along the main access road in to the site.
- Ensure restricted access is maintained to the works.

The existing 4 to 5metre high perimeter wall forms a safe/secure site perimeter. A 2.4m minimum high plywood painted timber hoarding will be provided along the long-term boundaries of each phase of the works within the site and at other areas around the site where the perimeter wall is removed as part of the works. Heras type fencing will be used on short term site boundaries where appropriate to suit the works. The hoarding alignment and specification are to be confirmed by the appointed Contractor prior to commencement

Controlled access points to the site, in the form of gates or doors/turnstiles, will be kept locked for any time that these areas are not monitored (e.g. outside working hours).

During working hours, a gateman will control traffic movements and deliveries at any active site access to ensure safe access and egress to & from site onto the public roads. All personnel working on site must have a valid Safe Pass card and be inducted by the Main Contractor with regard to site specific information.

A Traffic Management Plan will be prepared by the contractor and agreed with Dún Laoghaire Rathdown County Council's Transportation Department & An Garda Siochana, to mitigate any impact of construction on the surrounding road network.

As detailed in Chapter 9 Soil & Land, Geology and Hydrogeology of this EIAR, there is no evidence of a significant soil hazard on site. No groundwater is expected to ingress to the excavation area. However, it is expected during the excavation works that localised dewatering of the subsoils will be required to address localised perched groundwater.

Chapter 7 Hydrology of this EIAR states that, 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. In order to reduce impacts on the hydrological environment, a number of mitigation measures contained in the CEMP will be adopted as part of the construction works on site.

The potential impacts upon human environment relate to other environmental aspects such as air quality, noise and vibration and traffic. Where required, the related mitigation measures are dealt with in the corresponding chapters of this EIAR. Other than this, no significant adverse effects will arise in respect of the population during the construction or operational phase of this development.

Otherwise, all of the proposed mitigation measures contained within the *Construction and Environmental Management Plan,* prepared by Barrett Mahony Civil and Structural Consulting Engineers will be implemented in respect to potential impacts arising from the construction phase.

Mitigation measures outlined in Chapter 11 including the watering of any road that has the potential to give rise to fugitive dust, the restriction of speed for all on site vehicles and the inspection and cleaning of outside public roads are proposed for the construction phase of the proposed development. These measures focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short-term, localised and imperceptible with respect to human health.

Provided that the noise mitigation measures detailed in Chapter 12 are put in place, such as selection of quiet plant, noise control at source, screening, liaison with the public, project programme and best practice noise and vibration control measures will be employed by the contractor during the construction phase, the likelihood of a significant impact will be reduced sufficiently.

7.5.2 Operational Phase

The operational phase is likely to have positive impacts on human beings as a result of the provision of additional residential units, amenity spaces and a childcare facility. The development will contribute to the delivery of additional housing and related facilities for the growing population, in line with national, regional and local planning policy objectives, including the residential zoning objective for the site.

There have been no significant risks to the population and human health identified in respect of the operational phase of the proposed project. The proposed project is considered to have a positive and significant impact and as a result, no further mitigation measures are proposed.

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.

Provided that the best practice noise mitigation measures detailed in Chapter 12 are put in place, such as general operational phase site activity, designing building services and plant within suitable noise criterion and enhancing glazing to the western facades of Block 10, the likelihood of a significant impact will be reduced sufficiently.

7.6 Residual Impacts

7.6.1 Construction Stage

Residual Impacts on Business and Residences

Taking into account the mitigation measures outlined in Section 7.5.1 it is predicted that there will be no likely significant effect with regard to the construction phase on business and residences.

Residual Impacts on Human Health from Air Quality

The greatest residual impact on air quality during the demolition and construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. Taking into account the mitigation measures in Section 11.5.1 (and Appendix 11.3 'Dust Management Plan' of this EIAR), there will be no residual impact to human health arising from air quality impact.

Residual Impacts on Human Health from Noise & Vibration

Taking into account the mitigation measures and design recommendations outlined in Section 12.6.1 of Chapter 12 of this EIAR, there will be no residual impact to human health arising from noise and vibration impact.

Residual Impacts on Local Amenities and Tourism

It is predicted that there will be no likely significant effect of the residual impacts of the construction of the Proposed Development on local amenities and tourism.

Residual Impacts from Additional Traffic

Traffic movements during the construction phase have been assessed in the Transportation Assessment Report submitted as part of this planning application and discussed in Chapter 14 of this EIAR, as it has been deemed that it will have no likely significant effect.

7.6.2 Operational Stage

As noted above, the proposed provision of residential accommodation will likely result in significant positive effects for the local area.

Residual Impacts on Businesses and Residences

Taking into account the mitigation measures outlined in Section 7.5.2 the predicted residual impacts with regard to the operational phase on business and residences is concluded to be ***positive*** and ***significant.***

Residual Impacts on Human Health from Air Quality

It is predicted that there will be no likely significant effect of the residual impact of air quality on Human Health.

Residual Impacts on Human Health from Noise & Vibration

Taking into account the mitigation measures and design recommendations outlined in section 12.6.2 of Chapter 12 of this EIAR, there will be no residual impact to human health arising from noise and vibration impact.

Residual Impacts on Local Amenities and Tourism

It is predicted the residual impacts with regard to the operational phase on local amenities and tourism is concluded to be positive, long term and localised.

Residual Impacts from Additional Traffic

Taking into account the conclusions of the Transport and Traffic Assessment Report, there will be no residual impact to human health arising from noise and vibration impact.

7.7 Monitoring

In the context of the impact upon Population and Human Health, it is considered that the monitoring measures set out in relation to the other environmental topics assessed within this EIAR are sufficient to address monitoring requirements.

As outlined in the *Construction and Environmental Management Plan,* prepared by Barrett Mahony Civil and Structural Consulting Engineers, site specific health and safety requirements will be implemented.

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.

During the construction phase, noise and vibration monitoring will be undertaken by the Contractor at the nearest sensitive locations to ensure construction noise and vibration limits outlined in BS 5228 Parts 1 and 2 are not exceeded. Noise monitoring will be conducted in accordance with the International Standard ISO 1996: *Acoustics – Description, measurement and assessment of environmental noise Part 1 (2016) and Part 2 (2017).* The selection of monitoring locations will be based on the nearest sensitive buildings to the working areas.

It is recommended that noise control audits are conducted at regular intervals throughout the construction programme in conjunction with noise monitoring. The purpose of the audits will be to ensure that all appropriate steps are being taken to control construction noise emissions and to identify opportunities for improvement, where required.

7.8 Interactions

There are a number of inter-related environmental topics assessed as part of the EIAR which are of relevance to human health. These have been addressed in greater detail in the relevant Chapters. The key interactions are considered to be:

- Land, Soils, Geology and Hydrogeology (potential health effects arising mainly through the potential for soil and ground contamination);
- Air Quality and Climate (potential effects arising from dust soiling and possible exposure to air quality pollutants);
- Noise and Vibration (potential effects on human health arising from noise/ vibration emissions form the construction phase);
- Landscape and Visual (potential effects arising from visual effects upon surrounding existing dwellings);
- Traffic and Transportation (potential effects on human health arising from increased traffic volumes at construction and operational phase).

Material Assets (Potential *for public (human) health issues to arise due to the contamination of the surrounding water service networks due to the construction works, and potential for disruption to services due to accidents on site during the construction process.)*

- Waste (potential effects arising from the generation of waste at construction and operational phase).

Subject to adherence to the proposed mitigation measures, no significant adverse impacts are anticipated on Population and Human Health in respect of the above identified interactions. Refer to the relevant Chapters for full details of mitigation measures.

7.9 Cumulative Impacts

The potential cumulative impacts of the proposed development on Human Health and Population have been considered in conjunction with other applicable projects in the surrounding area. We outline the status of each project and the expected cumulative impacts associated with this proposed development.

Table 7.19: List of Cumulative Projects in the Area of the Proposed Development.

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
D16A/0818	Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14	11th Sept 2017	• Demolition c. 425 sq m • 120 no. apartments • 120 car parking spaces • 144 bicycle spaces

ABP31013821	Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14	25th Aug 2021	• SHD • Demolition 2,913.8 sq m • 231 no. residential units • After school childcare facility 161 sq m • Café 83 sq m • 118 no, car parking spaces • 462 no. cycle spaces • 4 no. motorcycle spaces
D19A/0162	Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14	8th August 2019	• Demolition • 43 no. residential units • 47 no. car parking spaces • 92 no. cycle parking spaces
ABP30835320	The car sales premises currently known as Vector Motors (formerly known as Victor Motors), Goatstown Road, Dublin 14, D14FD23	3rd Feb 2021	• SHD (Student accommodation) • 960 sq m demolition • 239 no. bed spaces • 6 no car parking spaces
D20A/0328	University College Dublin, Belfield, Dublin 4	21st Jan 2021	• Extension to the existing car park to provide 239 no. additional car parking spaces, resulting in a total permanent surface car park comprising 300 no. car-parking spaces (61 no. existing spaces plus 239 no. new additional spaces). • The proposed development also seeks a modification of the Athletics Track development permitted under Dun Laoghaire Rathdown County Council Reg. Ref. D19A/0001, to omit 185 no. permitted temporary car parking spaces, resulting in a total of 70 no. temporary car parking spaces being delivered as part of

			the permitted Athletics track development.
ABP30943021	2.12 ha at Our Lady's Grove, Goatstown Road, Dublin 14	3rd June 2021	• SHD • Student Accommodation • 698 no. bed spaces • 9 no. car parking • 4 no. motorcycle • 860 no. cycle parking
ABP31128721	c.0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14	20th Dec 2021	• SHD • 115 no. residential units • 80 sq m creche
Planned Projects The below projects are planned projects that are at various stages of the planning process. They key distinction from the projects listed above is that they do not have planning permission at the time of writing.			
DLRCC/ ABP Reg. Ref.	**Address**	**Lodgement Date/ Status**	• **Overview of Development**
ABP31182621	Lands at Knockrabo, Mount Anville Road,, Goatstown, Dublin 14	Lodged on 1st Nov 2021 as a SHD with ABP. Decision due 28th Feb 2022.	• SHD (Amendment to Phase 2 permitted) • 227 no. units (134 no. additional units from permitted SHD) • 178 no. car parking spaces • 519 no. bicycle spaces
ABP312935	Sommerville House, Dundrum Road, Dublin 14.	Lodged on 7th March 2022 as a SHD with ABP. Decision due 27th June 2022	• SHD • 111 No. units • 39 no car parking spaces • 164 no. bicycle spaces
TC06D.311553	Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14	Lodged as a SHD Pre-Application Consultation Request with ABP. ABP feedback provided on 14th Jan 2022.	• SHD (Consultation) • 884 no. apartments • Creche •
N/A	Lands at Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14	Pre-application engagement commenced with DLRCC. Planning application due to be lodged with DLRCC when the SHD (the proposed project) has been decided.	• 3,540 sq m demolition • 71 no. residential units • 5,566 sq m non-residential floorspace • 60 no. car parking spaces

7.9.1 Construction Phase

Potential Cumulative Impacts on Business and Residences

The potential impacts during the construction phase on businesses and residences at the immediate locality of the site are noise, air quality and traffic. The potential for these short-term nuisances during the construction stage of the proposed development will be managed with the mitigation measures set out in the EIAR and CEMP. The staff welfare facilities on site will be serviced by temporary water, electricity and foul drainage facilities. There will be no planned emissions to surface water during construction, there are no drinking water supply areas or boreholes in the immediate environs. The implementation of these mitigation measures will ensure that there are **no significant negative impacts** to businesses and or residences thus the potential for cumulative impacts is unlikely.

Potential Cumulative Impacts on Human Health from Air Quality

There is the potential for cumulative dust emissions from the proposed Development and the simultaneous construction of permitted or proposed developments within 350m of the site, according to the IAQM guidance (IAQM 2014).

A review of the planned projects within the vicinity of the site set out in Table 7.19 of this EIAR Report has identified the only projects that may be capable of combining with the proposed development is the strategic housing development c. 160m east of proposed development which will principally consist of: the construction of a Student Accommodation at Our Lady's Grove, Goatstown Road, Dublin 14 under Reg. Ref: ABP30943021 and future phases of the CMH S34 development. In the event that construction activities are taking place at the above-mentioned site concurrently with the construction of the proposed development, there is potential for cumulative Air (Dust) impacts to occur. However, provided the mitigation measures outlined in Chapter 11 and Appendix 11.3 are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted

While the above mentioned IAQM guidance provides a worst-case scenario for 350m ZOI (zone of influence) from the site, the project specific detailed analysis performed in the Air Quality chapter (Chapter 11) has predicted that the proposed development will in fact only have an imperceptible impact on air quality during the construction phase once the mitigation measures outlined in chapter 11 and Appendix 11.2 are implemented. The mitigation includes best practice dust control measures to prevent significant dust emissions occurring. Provided these measures are in place for the duration of the construction phase of the cumulative construction dust impacts combined with the proposed development construction dust impacts are still predicted to be imperceptible.

The proposed development is predicted to have an imperceptible impact on air quality during the construction phase once the mitigation measures outlined in chapter 11 and Appendix 11.3 are implemented. There is no potential for significant cumulative impacts to air quality or climate predicted for the construction phase.

All remaining projects outlined in Table 7.19 above are beyond the maximum worst-case scenario ZOI for construction related impacts to air and as such there is no potential for cumulative impacts to human health associated with these remaining projects.

Potential Cumulative Impacts on Human Health from Noise & Vibration

Due to the proximity and nature of construction works associated with the proposed development, noise levels from the proposed development will dominate the noise environment when occurring in proximity to the noise sensitive locations along its immediate boundary. The contribution from other sites will therefore be relative and will have at most only a slight impact (i.e. will be at least 10 dB below those associated with the proposed development) such that the construction noise levels discussed in Section 12.4.1 will remain a representation of a worst case analysis.

A review of the planned projects within the vicinity of the site set out in Table 7.19 of this EIAR Report has identified the only projects that may be capable of combining with the proposed development are the two development sites with planning permission granted /proposed for development nearby to the proposed development:

1.0 SHD and Student accommodation development at Our Lady's Grove, Goatstown Road, Dublin 14 (granted project under ABP30943021) with a distance between site boundaries of 110m approximately along Friarsland Road.

2.0 Residential development at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14 (proposed project under ABP31128721) with the distance between site boundaries greater than 210m approx.

In the event that construction activities are taking place at the above-mentioned sites concurrently with the construction of the proposed development, there is potential for cumulative noise impacts to occur. Of the all the projects listed in Table 7.19 only the two developments in bulletpoint above are going to have a potential cumulative impact as demonstrated by the noise modelling results presented in Chapter 12 (Noise and Vibration). Cumulative construction noise impacts are expected to be ***negative, moderate to significant and short-term.***

All remaining projects outlined in Table 7.19 above are beyond the maximum worst-case scenario ZOI for construction related impacts to noise and as such there is no potential for cumulative impacts to human health associated with these remaining projects.

Potential Cumulative Impacts on Local Amenities and Tourism

A review of the proposed and planned projects within the vicinity of the site set out in Table 7.19 of this EIAR Report, and the surrounding land uses, as discussed in section 7.3.7 has been undertaken. There are no projects within the vicinity of the site that may be capable of combining with the proposed development would result in significant negative impacts on local amenities and tourism. There is no planned closure of local amenity lands during construction thus there is no potential for cumulative impact with other planned developments on local amenities and tourism. The potential for air (dust) impacts and Noise and vibration Impacts have been addressed in the section above.

Potential Cumulative Impacts on Human Health from Traffic

The noise impact chapter and the air quality chapter have modelled the impacts of the proposed development in conjunction with the traffic related impacts of the other cumulative developments during the construction phase and has shown there will be a nonsignificant impact on air or Noise.

Therefore, there is limited potential for cumulative impacts with any of the other proposed and planned projects within the vicinity of the site set out in table 7.19.
Further detail on the potential for cumulative air (dust) impacts and Noise and vibration Impacts as a result of increased traffic been addressed in the section above.

A Construction Traffic Management Plan will be put in place and agreed with the planning authority which will minimise the traffic impact during construction stage. This will be coordinated with the wider Construction Environmental Management Plan to minimise cumulative impacts in relation to Noise, Air Quality and Human Health impacts.

7.9.2 Operational Phase

Cumulative Impacts on Business and Residences

The site will be serviced by Irish Water mains supply and by the public sewer network, there are no planned emissions to surface water during operation, there are no drinking water supply areas or boreholes in the immediate environs. During the operational phase as such any cumulative development will not have a significant effect on Businesses and Residences.

Cumulative Impacts on Human Health from Air Quality

Due to the nature of the development, there are no emissions during operation that would impact on Air Quality and thus, there is no opportunity for cumulative impacts associated with the operational phase. Cumulative emissions from increased traffic have been taken into account below in the traffic section.

Cumulative Impacts on Human Health from Noise & Vibration

Due to the nature of the proposed development the change in noise level during general operation of the site is predicted to be neutral, not significant and long-term. During the operational phase any cumulative impacts will be due to an increase in road traffic noise. However, given the insignificant levels of noise increase as a result of the traffic associated with this proposed development, it is predicted that traffic generated by cumulative developments will not increase by any significant margin and will not result in any cumulative impacts to human health.

Cumulative Impacts on Local Amenities and Tourism

Due to the nature of the proposed development as residential accommodation it is compatible with the zoning and intended use of the land. The Proposed Development, along with permitted developments, will create additional long-term employment and public amenity space during operation. There is no potential for significant negative cumulative impacts as a result of the proposed development

Cumulative Impacts on Human Health from Traffic

The traffic model used is intended to predict and assess future growth in the area and is not a static model. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The cumulative traffic impact of the development and two other permitted SHD developments; ABP31013821 & ABP31128721 along Dundrum Road were also assessed and included in the TTA. This showed that these would have a very marginal increase in overall traffic in the vicinity of the proposed development. The impact is predicted to be **long-term**, **negative** and **imperceptible** with regards to air quality and climate.

All remaining projects outlined in Table 7.19 above are beyond the maximum worst-case scenario ZOI for operational impacts to traffic and as such there is no potential for cumulative impacts to human health associated with these remaining projects.

7.10 'Do-Nothing' Effect

Given the scale and residential zoning of the lands, the do-nothing approach is not considered to be a valid approach. The lands are capable of accommodating a significant residential development together with the associated infrastructure.

In the event that the proposed project does not proceed, in combination with consideration that the Central Mental Hospital facility is due to relocate to the purpose-built National Forensic Mental Health Service in Portrane, Co. Dublin, it is likely that the site will remain as an underutilised, former institutional use, until an alternative redevelopment proposal is granted planning permission.

7.11 Difficulties in Compiling the Chapter

No significant difficulties were encountered during the drafting of this chapter.

7.12 Conclusion

This chapter of the EIAR has provided an assessment of the likely impact of the proposed development on population and human health. As set out above, the proposed development is not likely to result in any significant adverse long-term effects on population and human health, and will result in several positive impacts, some of which are significant. These include inter alia a significant positive economic impact during both the construction and operational phases of the proposed development, along with positive impacts on the land use and settlement patterns, employment, landscape and visual impact, and social patterns.

7.13 References

- EPA (2017) Draft Guidelines on information to be contained in the Environmental Impact Assessment Report, Environmental Protection Agency, August 2017;
- EPA (2015) Draft Advice Notes for preparing Environmental Impact Statements Environmental Protection Agency.
- EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements.
- Environmental Protection Agency EPA (2003) Advice notes on current practice in the preparation of Environmental Impact Statements, Environmental Protection Agency.

- Barrett Mahony Consulting Engineers, Infrastructure Report, 2022. Project: 20.170 Dundrum Central.
- Site Investigation Report, Dundrum Central Development. Site Investigations Ltd, November 2021;
- Site Specific Flood Risk Assessment, Dundrum Central. BMCE, January 2022;
- Construction & Environmental Management Plan, Dundrum Central. BMCE, January 2022;
- National Planning Framework 2018
- Regional Spatial and Economic Strategy for the EMRA, 2019
- Dun Laoghaire Rathdown County Development Plan 2016-2022
- 2021 Labour Force Survey Q4 – www.cso.ie
- ESRI Quarterly Economic Commentary, Summer 2020
- ESRI Quarterly Economic Commentary, Spring 2020
- Central Statistics Office (2021) – Census 2016, Census 2011, Census 2006
- Central Statistics Office (2021) – CSO PxStat
- ESRI (2021) - Quarterly Economic Commentary, Winter 2021
- DoHPLG (2017) - Rebuilding Ireland – Action Plan for Housing and Homelessness
- Childcare Act (1991) - (Early Years Services) Regulations 2016
- Tusla Early Years Inspectorate Reports (2021) – Registered Childcare Facilities
- Department of Health (2021) – Health in Ireland, 2021
- Health Safety Authority (2021) – www.hsa.ie
- HSE Service Records (2021) – www.hse.ie
- ECAD (2021) – Eircode Address Database
- Google Maps and Places (2021)
- International Standard ISO 1996: Acoustics – Description, measurement, and assessment of environmental noise Part 1 (2016) and Part 2 (2017).

8.0 BIODIVERSITY

8.1 Introduction

This section of the Environmental Impact Assessment report (EIAR) was carried out by Altemar Ltd. It assesses the biodiversity value of the proposed development area and the potential impacts of the development on the ecology of the surrounding area within the potential Zone of Influence (ZOI). It also outlines the standard construction, operational, and monitoring measures that are proposed to minimise potential impacts and to improve the biodiversity potential of the proposed development site.

Desk studies were carried out to obtain relevant existing biodiversity information within the ZOI. The assessment extends beyond the immediate development area to include those species and habitats that are likely to be impacted upon by the project. Details of the proposed development are seen in Chapter 5 of the EIAR.

The programme of work in relation to biodiversity aspects of the EIAR have been designed to identify and describe the existing ecology of the area and detail sites, habitats or species of conservation interest. It also assesses the significance of the likely impacts of the scheme on the biodiversity elements and outlines measures to alleviate identified impacts. Residual impacts are also identified.

A separate Appropriate Assessment Screening and Natura Impact Statement – Information for a Stage 1 (AA Screening) and Stage 2 (Natura Impact Statement) AA, in accordance with the requirements of Article 6(3) of the EU Habitats Directive, has been produced. It was determined that:

> '*Following the implementation of the mitigation measures outlined, the construction and presence of this development would not be deemed to have a significant impact. No significant impacts are likely on Natura 2000 sites, alone in combination with other plans and projects based on the implementation of mitigation measures.*
>
> *No significant effects are likely on Natura 2000 sites, their features of interest or conservation objectives. The proposed project will not will adversely affect the integrity of European sites*.'

8.2 Methodology

A pre-survey data search was carried out. This included examining records and data from the National Parks and Wildlife Service, National Biological Data Centre, the Environmental Protection Agency, in addition to aerial, 6 inch maps and historic satellite imagery. A detailed desktop review and field surveys were carried out, initially in April 2020 and continued through 2021 and into 2022. All terrestrial ecological elements were carried out by Bryan Deegan MCIEEM. Bryan Deegan is the managing director of Altemar. Bryan is an environmental scientist, aquatic biologist and marine biologist with 27 years' experience working in Irish terrestrial and aquatic environments, providing ecological services to the State, Semi-State and industry. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic

Science and a NCEA National Certificate in Science (Aquaculture). The Wintering Bird Assessment 2020/2021 was carried out by MKO (Appendix 8.1). This wintering bird assessment report was been prepared by Kathryn Sheridan (M.Sc.), an Ornithologist with MKO, Patrick Manley (B.Sc.), a Project Ornithologist with MKO and Project Director, Dervla O'Dowd (B.Sc. Env.). The field surveys were undertaken in the 2020/2021 winter season by Donnacha Woods and Kathryn Sheridan, both of whom are competent experts in bird surveying. Kathryn Sheridan is an Ornithologist at MKO who took up her position in December 2020. Kathryn holds a M. Sc., Wildlife Conservation and Management and a BA Natural Science: Zoology. She has experience of working on a wide range of bird species, beginning with her M. SC. thesis on breeding hen harrier. From this, Kathryn has gone on to work as Curlew Champion as part of the Curlew Conservation Programme, and Swift fieldworker with BirdWatch Ireland. As a subconsultant, Kathryn has completed wintering wildfowl surveys across Ireland, as well as completing bat and mammal surveys.

Patrick Manley is a Project Ornithologist at MKO. He attended University College Dublin where he completed a BSc (Hons) in Geology. Patrick has over five years' experience working with MKO in designing and executing ornithological surveys, primarily within the renewables sector. Patrick has also worked on ornithological chapters of Environmental Impact Assessment Report (EIAR) to accompany planning applications. Prior to joining the company Patrick worked as part of the conservation team in BirdWatch Ireland, on projects such as the Dublin bay birds project, Kilcoole Little Tern conservation project and the results based agri-environmental scheme for breeding waders. He has extensive experience surveying birds through other projects such as the Irish wetlands bird survey, the Inishmurray all-island breeding birds survey, the national Hen Harrier survey and the countryside bird survey.

Dervla O'Dowd is Project Director with MKO's Ornithology Team with fourteen years of experience in environmental consultancy as a Senior Ecologist and Project Manager. Dervla graduated with a first-class honours B.Sc. in Environmental Science from NUI, Galway in 2005 and joined Keville O'Sullivan Associates in the same year. Dervla has gained extensive experience in the project management and ecological assessment of the impacts of various infrastructural projects including wind energy projects, water supply schemes, road schemes and housing developments. Dervla holds full membership of the Chartered Institute of Ecology and Environmental Management.

The Wintering Bird Assessment in 2021/2022 was carried out by Flynn Furney (Appendix 8.2). The 2021/2022 survey work was carried out by Eric Dempsey. Eric has around 40 years' experience in ornithology and is a leading authority on Irish birds. He is the author of 8 books on Irish birds including the Complete Field Guide to Irish Birds. He is a listed Heritage Expert with The Heritage Council. The report was written by Billy Flynn. Billy is a Chartered Environmental Scientist and Ecologist with over 20 years' experience. He has worked on a wide range of projects including national infrastructure such as motorway and rail projects. He is Lead Ecologist on a number of ongoing survey projects including greenways, lakes and sites of heritage significance.

Table 8.1: Survey Details.

Survey	Surveyor	Date
Habitat	Bryan Deegan (MCIEEM)	13th August 2020, 21st August 2020 & 10th August 2021
Flora	Bryan Deegan (MCIEEM)	13th August 2020, 15th September 2021, 10th August 2021 & 12th October 2021
Bat Surveys (inspections, static detector and emergent)	Bryan Deegan (MCIEEM)	13th August 2020 & 21st August 2020 10th August 2021 & 12th October 2021
Mammal	Bryan Deegan (MCIEEM)	23rd February 2021
Wintering Bird 2020/2021	Kathryn Sheridan and Donnacha Woods	12 surveys from September 2020 to the March 2021.
Wintering Bird 2021/2022	Billy Flynn and Eric Dempsey	7 surveys between 24th November 2021 and 28th February 2022.

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

Designated conservation sites within 15km of the subject site were studied. This included sites of National importance (National Heritage Areas (NHA), proposed National Heritage Areas (pNHA) and Ramsar sites), in addition to Natura 2000 sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA). There is no direct or indirect pathway to designated sites beyond 15km.

Up to date GIS data (National Parks and Wildlife (NPWS) WMS data in addition to shapefiles) were acquired and plotted against 1km, 5km, 10km, and 15km buffers from the subject site. The potential zone of influence (ZOI) was set at a radius of 2km from the proposed Project. Where there was a potential for the ZOI to be influenced by natural biodiversity corridors *e.g.* surface water drains, rivers or woodland these were also take into account and assessment extended. It should be noted that an open surface drain is present within the centre of the site and flows to the eastern boundary. This drain has a direct pathway to Dublin Bay. A data search of rare and threatened species within 5km of the Site was provided by NPWS. Additional information on rare and threatened species was researched through the National Biodiversity Data Centre maps data search and previous planning applications in the vicinity.

Habitats, Flora and Avian Ecology

A pre-survey data search was carried out. This included a literature review to identify and collate relevant published information and ecological studies previously conducted and comprised of information from the following sources: the National Parks and Wildlife Service (NPWS), NPWS Rare and Protected Species Database, National Biodiversity Data Centre, in addition to aerial, 6 inch, satellite imagery. Following a desktop survey, a walk-over of the site were carried out on 13th August 2020, 21st August 2020 and the 21st August 2021. Habitat mapping was carried out according to Fossitt (2000) using ArcGIS 10.5 and displayed on Bing satellite imagery. Flora and habitat assessments were carried out on 10th August 2021. Any rare or protected species were noted. Additional observations were noted on species and habitats. A survey for mammals was carried out (23rd February 2021) by means of a thorough search within the study area. The presence of mammals is indicated principally by their signs, such as resting areas, feeding signs or droppings – though direct observations are also occasionally made. The survey also included search for habitats suitable for amphibians and reptiles.

The nature and type of habitats present are also indicative of the species likely to be present; the habitats present were assessed in general accordance with techniques adopted for the Badger and Habitat Survey of Ireland (Smal, 1995) and habitats listed by Fossitt (2000). The field survey was supplemented by an evaluation of relevant literature and existing information. Survey for mammals was conducted on 23rd February 2021 within the appropriate season for badger *Meles meles* surveys. Badger surveys are best conducted in winter (December to April, with optimum period mid-January to April).

Bat Fauna

Bat assessments were undertaken on the 13th August 2020, 21st August 2020, 10th August 2021 and 12th October 2021 by Bryan Deegan within the optimal survey period. In addition three static bat monitors were installed. The onsite habitats and buildings were visually assessed for their favourability for bats and the site survey was supplemented by a review of Bat Conservation Ireland's (BCIreland) Bat Records Database. Onsite trees were assessed for their bat roosting potential. The bat assessment was undertaken within the active bat period (March – October) when detector surveys are possible. Temperatures were greater than 10°C after sunset on all surveys. Winds were light and there was no rainfall during the handheld detector surveys.

Invasive Species

On the 13th August 2020 and the 10th August 2021 the proposed development site was surveyed and an assessment carried out for the presence of invasive species that are listed under the European legislation, the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011) , Section 49(2) which prohibits the introduction and dispersal of species listed in the Third Schedule whereby '*any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence*.'

8.3 Baseline Environment

Proximity to Designated Conservation Sites and Habitats or Species of Conservation Interest

As can be seen from Figures 8.1 – 8.8., there are a number of conservation sites located in close proximity to the proposed development site, namely, South Dublin Bay SAC (2.8 km), South Dublin Bay and River Tolka Estuary SPA (2.8 km), South Dublin Bay pNHA (2.8 km), and Sandymount Strand/Tolka Estuary Ramsar site (2.9 km). There is a direct hydrological pathway to these conservation sites via the proposed surface water drainage strategy and the existing drain that runs through the site (Figure 8.9 and 8.10). Out of an abundance of caution, it is considered that this direct hydrological pathway has the potential to significantly effect the conservational objectives of the above sites in addition to North Dublin Bay (SAC & pNHA) and North Bull Island (SPA & Ramsar site).

The distance and details of the Natura 2000 sites (SAC & SPA) within 15km are seen in Table 8.2 and NHA (including pNHAs) and Ramsar sites within 15km of the proposed development are seen in Table.8.3.

Table 8.2: Proximity to Natura 2000 sites.

Site Code	NATURA 2000 Site	Distance
Special Areas of Conservation		
IE0000210	South Dublin Bay SAC	2.8 km
IE0002122	Wicklow Mountains SAC	7.1 km
IE0000206	North Dublin Bay SAC	7.5 km
IE0001209	Glenasmole Valley SAC	9.2 km
IE0000725	Knocksink Wood SAC	9.7 km
IE0003000	Rockabill to Dalkey Island SAC	9.9 km
IE0000713	Ballyman Glen SAC	11.1 km
IE0000202	Howth Head SAC	12.1 km
IE0000199	Baldoyle Bay SAC	13 km
Special Protection Areas		
IE0004024	South Dublin Bay and River Tolka Estuary SPA	2.8 km
IE0004040	Wicklow Mountains SPA	7.4 km
IE0004006	North Bull Island SPA	7.5 km
IE0004172	Dalkey Islands SPA	9.8 km
IE0004016	Baldoyle Bay SPA	12.9 km
IE0004113	Howth Head Coast SPA	14.1 km

Table 8.3: Proximity to pNHA and Ramsar sites.

Conservation Site	Distance
proposed National Heritage Area (pNHA)	
South Dublin Bay	2.8 km
Booterstown Marsh	2.8 km
Fitzsimon's Wood	3.1 km
Grand Canal	3.1 km
Royal Canal	5.1 km
Dolphins, Dublin Docks	5.3 km
Dodder Valley	5.7 km
North Dublin Bay	6.1 km
Dalkey Coastal Zone and Killiney Hill	7.3 km
Dingle Glen	7.4 km
Santry Demesne	7.5 km
Ballybetagh Bog	8.4 km
Loughlinstown Woods	9 km
Liffey valley	9.1 km
Glenasmole Valley	9.3 km
Knocksink Wood	9.7 km
Ballyman Glen	11.1 km
Lugmore Glen	11.1 km
Howth Head	12.1 km
Powerscourt Woodland	12.2 km
Glencree Valley	12.2 km

Baldoyle Bay	12.9 km
Slade of Saggart and Crooksling Glen	13.7 km
Dargle River Valley	13.7 km
Great Sugar Loaf	14.4 km
Sluice River Marsh	14.6 km
Ramsar sites	
Sandymount Strand/Tolka Estuary	2.9 km
North Bull Island	7.6 km
Baldoyle Bay	13 km

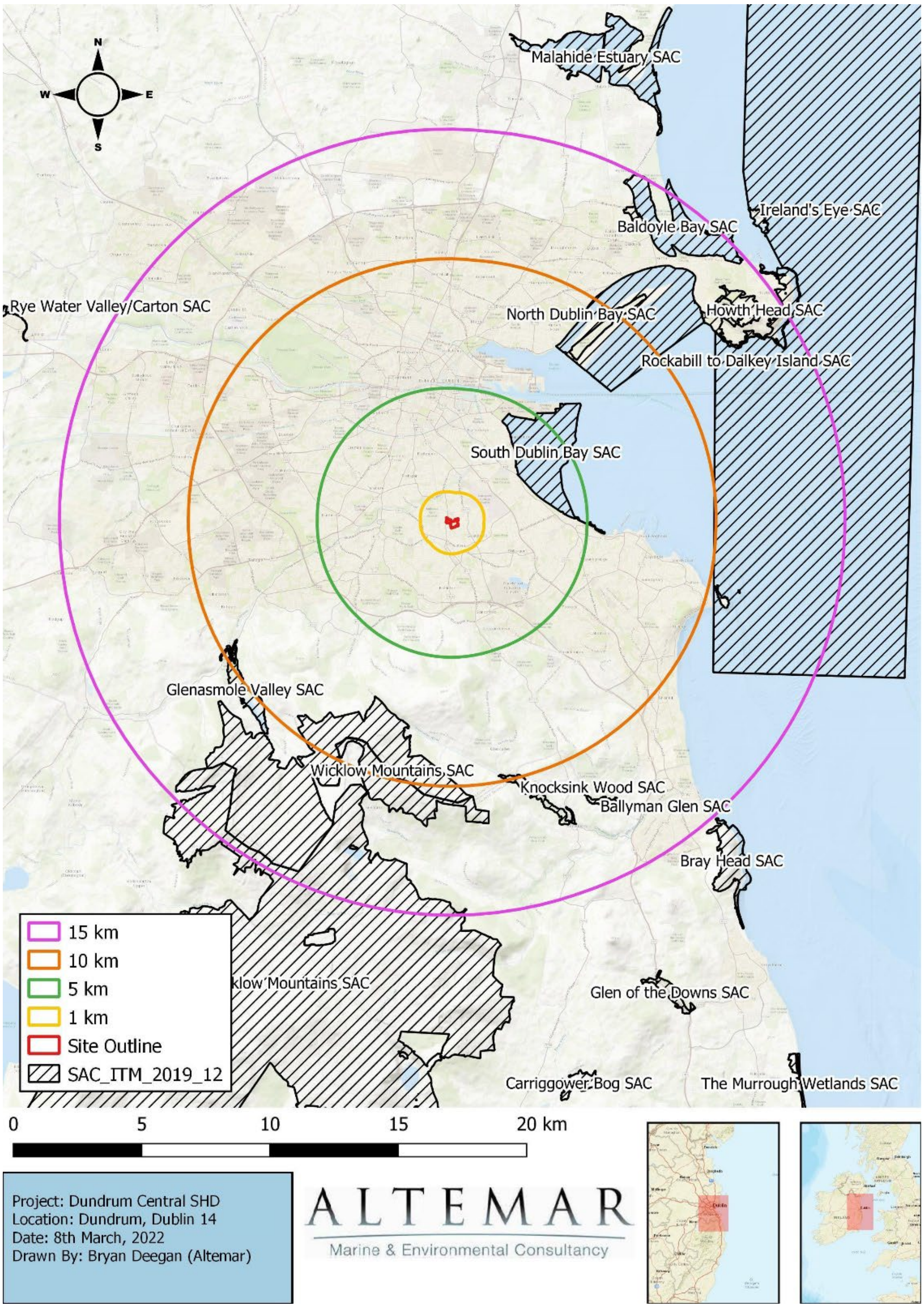

Figure 8.1: Special Areas of Conservation (SAC) within 15km of subject site.

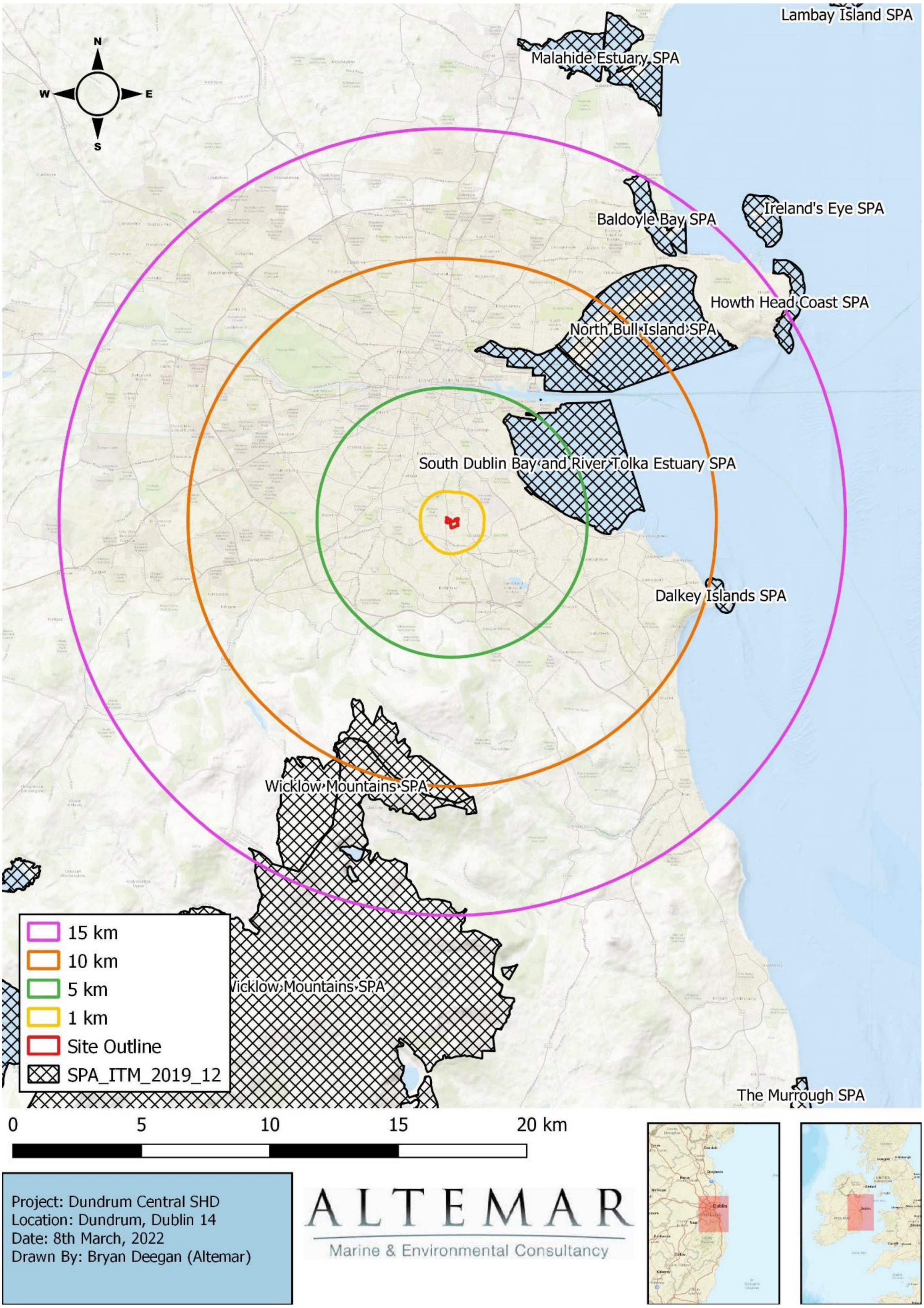

Figure 8.2: Special Protection Areas (SPA) within 15km of subject site.

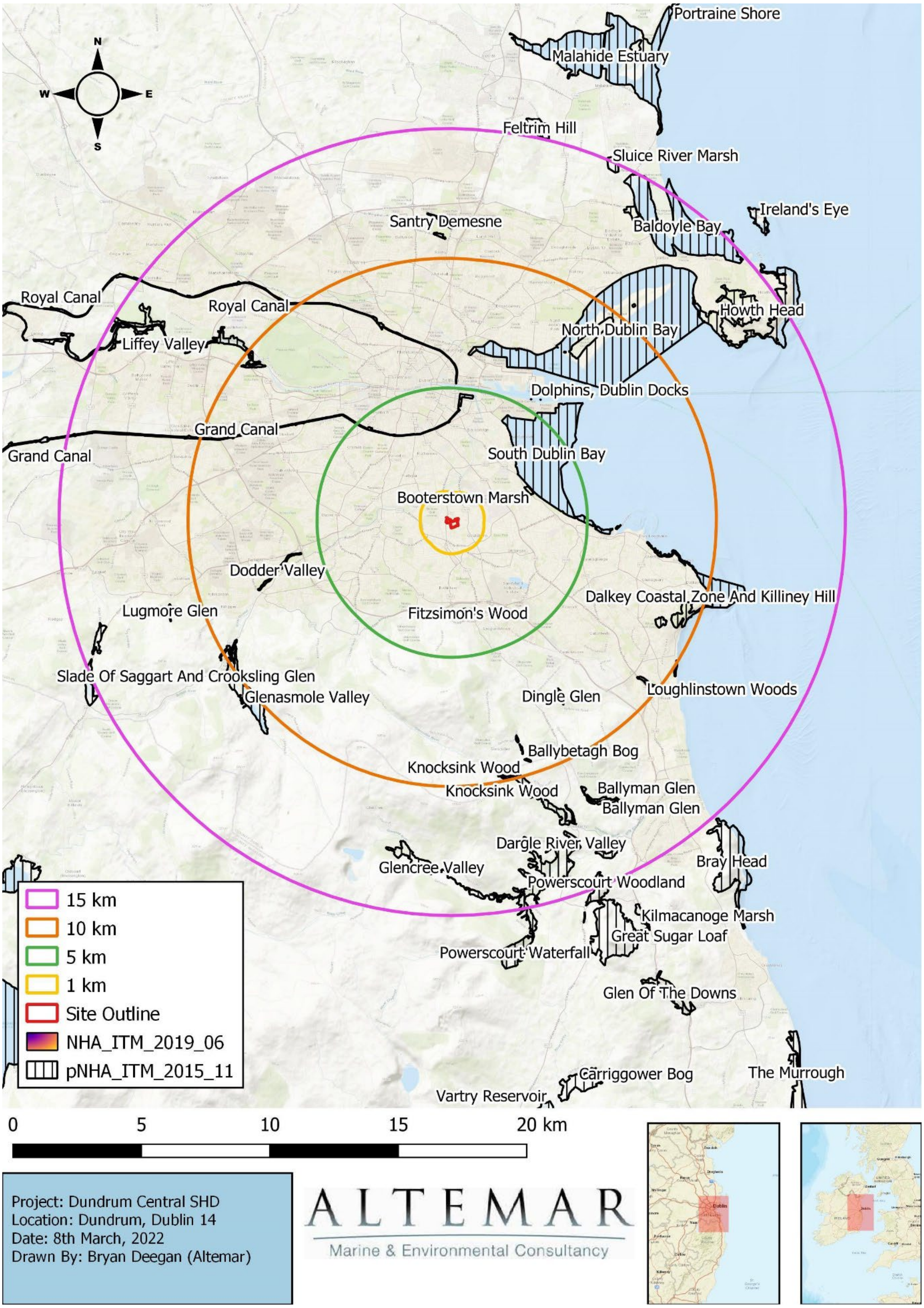

Figure 8.3: Proposed National Heritage Areas (pNHA) within 15km of subject site.

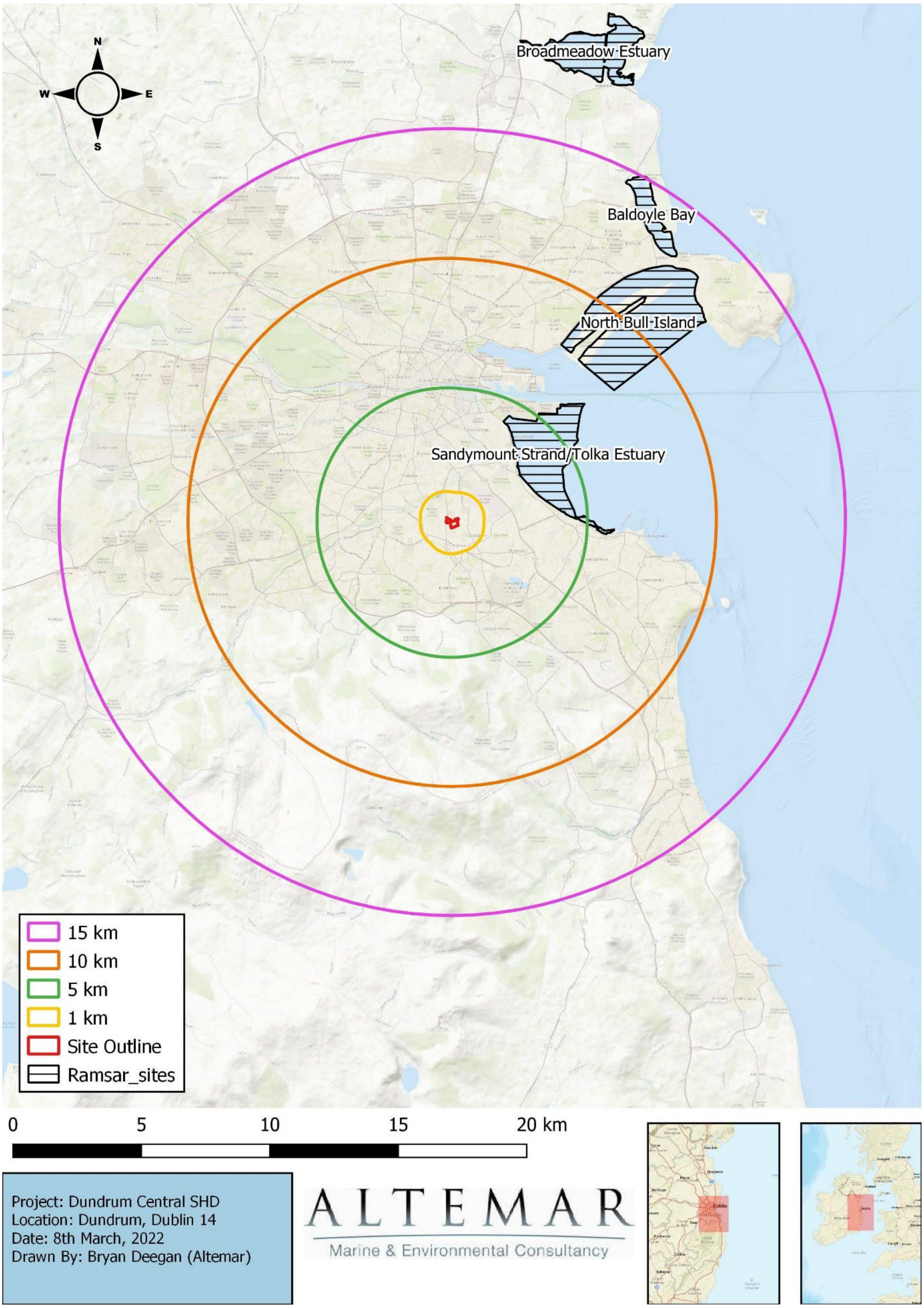

Figure 8.4: Ramsar sites within 15km of subject site.

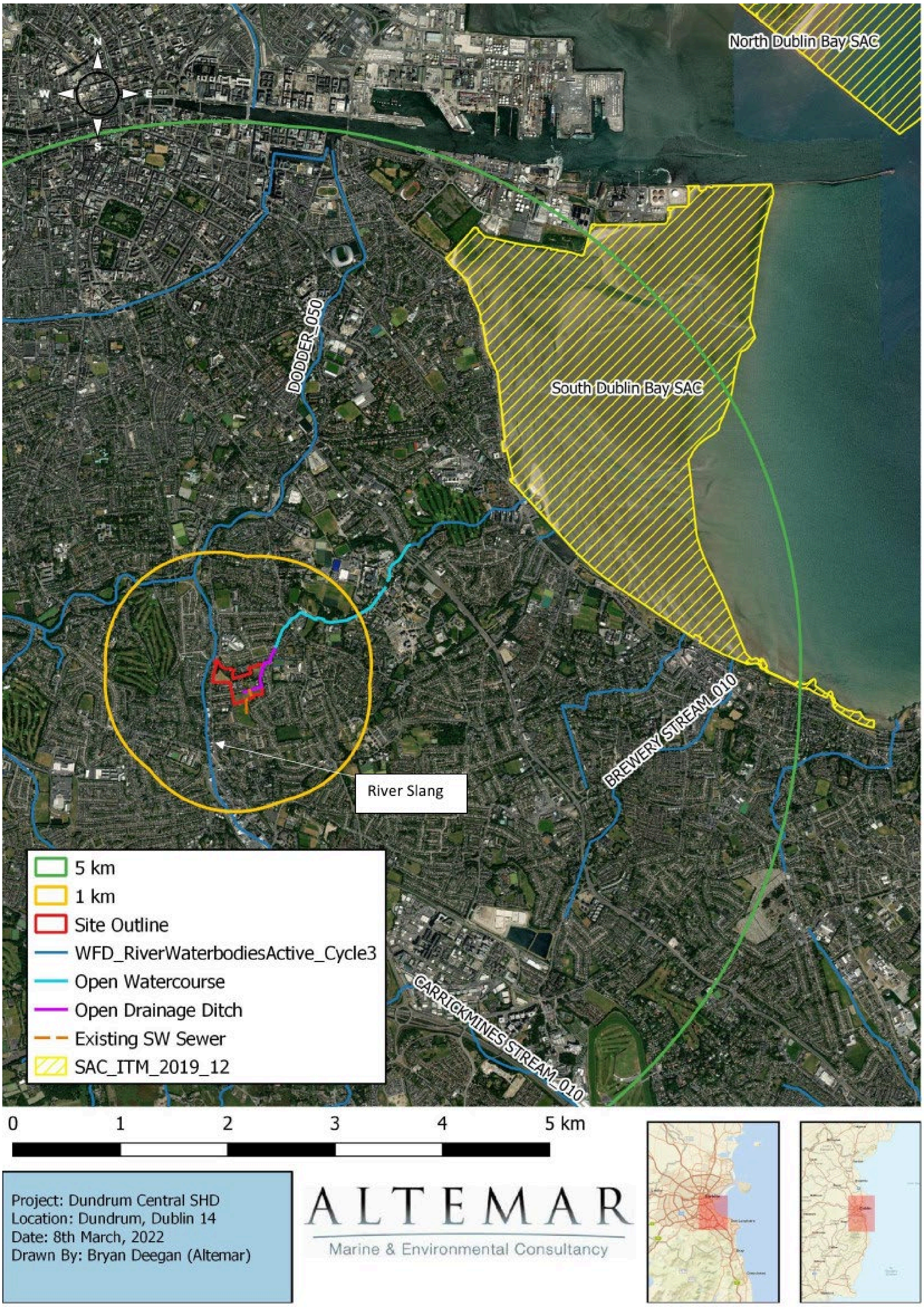

Figure 8.5: Waterbodies and SAC's in close proximity to subject site.

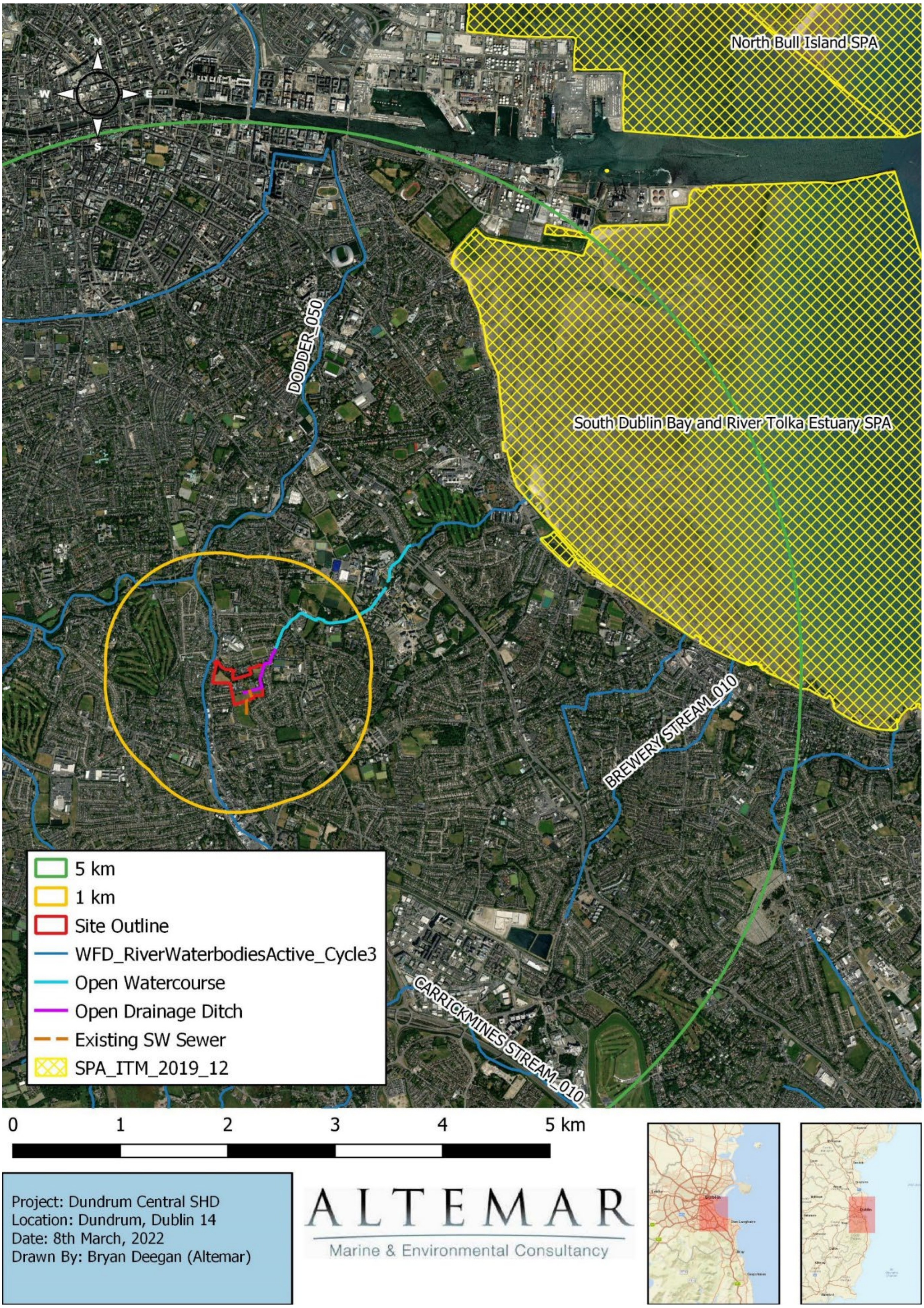

Figure 8.6: Waterbodies and SPAs in close proximity to subject site.

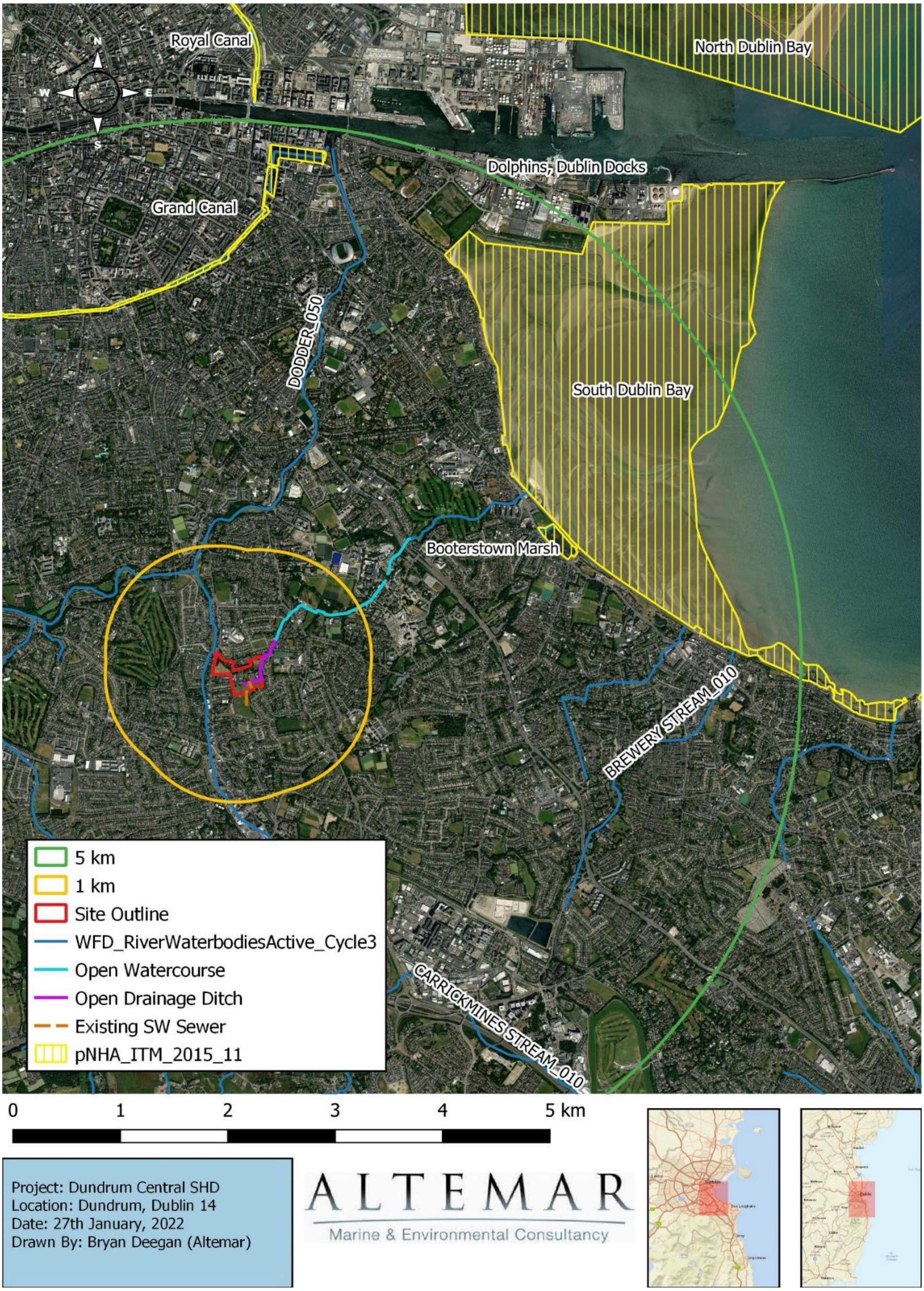

Figure 8.7. Waterbodies and pNHAs in close proximity to subject site.

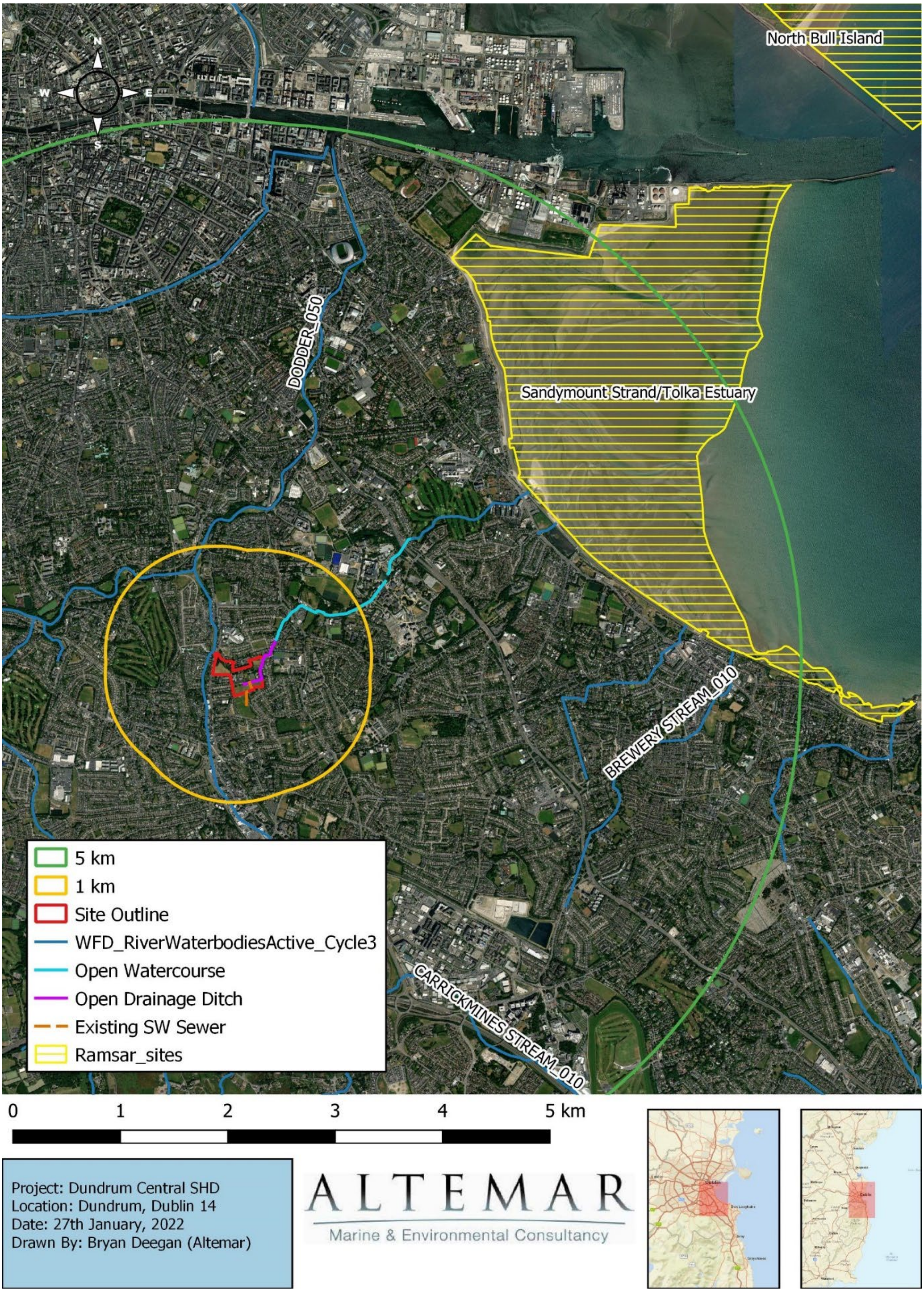

Figure 8.8: Waterbodies and Ramsar sites in close proximity to subject site.

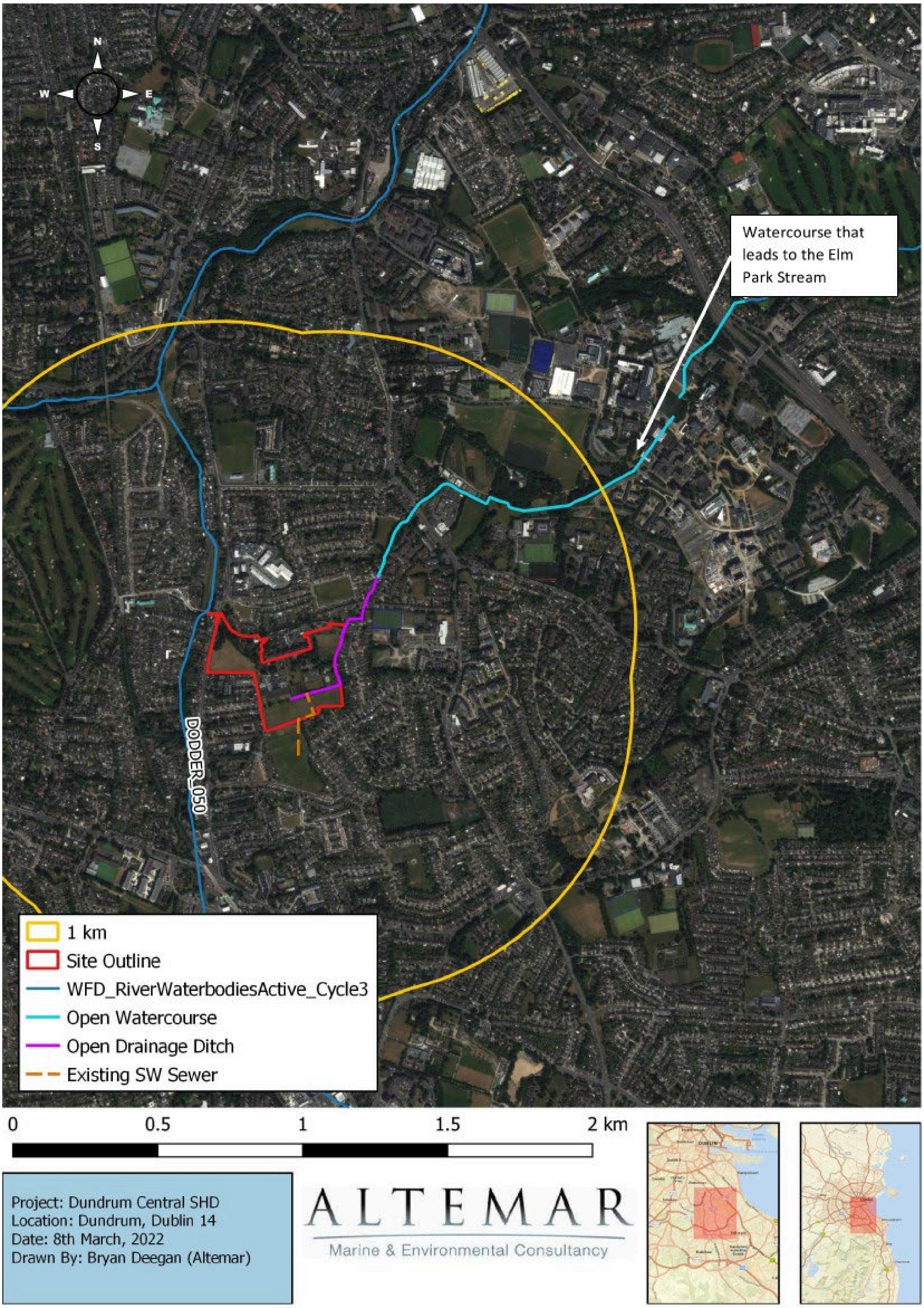

Figure 8.9: Location of hydrological connection to Elm Park Stream.

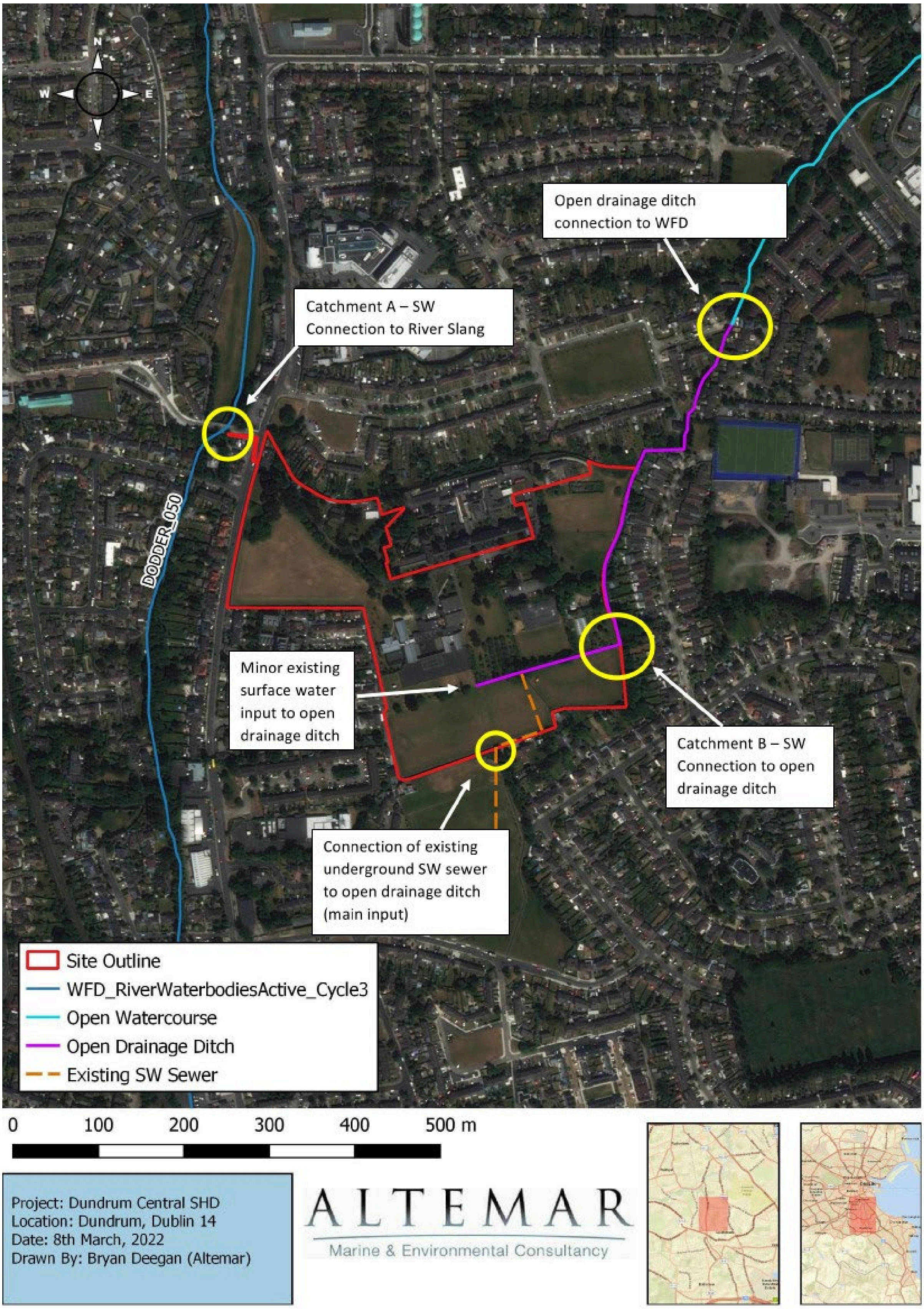

Figure 8.10: Outline of hydrological connections between waterbodies.

Biodiversity Records

The National Biodiversity Data Centre's online viewer was consulted to determine the extent of biodiversity and / or species of interest in the area. An assessment of the site specific area was carried out and it recorded no species of interest within the site area. Following this, a 2km^2 grid was assessed (O12U). Table 8.4 provides a list of all species of interest recorded in the 2km^2 grid area.

Table 8.4: List Of All Species of Interest Recorded in the 2km^2 Grid Area	
Barn Swallow (*Hirundo rustica*) Black-headed Gull (*Larus ridibundus*) Common Kingfisher (*Alcedo atthis*) Common Starling (*Sturnus vulgaris*) Common Wood Pigeon (*Columba palumbus*) Eurasian Oystercatcher (*Haematopus ostralegus*) Herring Gull (*Larus argentatus*) House Sparrow (*Passer domesticus*) Mallard (*Anas platyrhynchos*) Mute Swan (*Cygnus olor*) Sand Martin (*Riparia riparia*) Tufted Duck (*Aythya fuligula*) Indian Balsam (*Impatiens glandulifera*) *Donacia semicuprea* Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*) Brown Rat (*Rattus norvegicus*) European Otter (*Lutra lutra*) Lesser Noctule (*Nyctalus leisleri*) Soprano Pipistrelle (*Pipistrellus pygmaeus*)	Common Frog (*Rana temporaria*) Common Kestrel (*Falco tinnunculus*) Common Pheasant (*Phasianus colchicus*) Common Swift (*Apus apus*) Eurasian Curlew (*Numenius arquata*) Great Cormorant (*Phalacrocorax carbo*) House Martin (*Delichon urbicum*) Lesser Black-backed Gull (*Larus fuscus*) Mew Gull (*Larus canus*) Rock Pigeon (*Columba livia*) Snowy Owl (*Bubo scandiaca*) Butterfly-bush (*Buddleja davidii*) Japanese Knotweed (*Fallopia japonica*) *Limnebius nitidus* Sand Feather-moss (*Brachythecium mildeanum*) Eastern Grey Squirrel (*Sciurus carolinensis*) Eurasian Badger (*Meles meles*) House Mouse (*Mus musculus*) Pipistrelle (*Pipistrellus pipistrellus sensu lato*) West European Hedgehog (*Erinaceus europaeus*) Himalayan Honeysuckle (*Leycesteria formosa*)

An assessment of files received from the NPWS (Code No. 2020_185) which contains records of rare and protected species and grid references for sightings of these species. There are recorded sightings of West European Hedgehog (*Erinaceus europaeus*) within a 1km^2 grid that includes a southern portion of the subject site. The Common Frog (*Rana temporaria*) and the Otter (*Lutra lutra*) were noted by NPWS within the area of the subject site. No species of conservation importance were noted by NBDC within or in the vicinity of the site.

Terrestrial Habitats, Flora and Avian Ecology

The proposed development area was surveyed 13th August 2020, 21st August 2020, 23rd February 2021, 10th August 2021, 15th September 2021 and 12th October 2021. Additional surveys were carried out for wintering birds in 2020, 2021 and in 2022. Habitats encountered were classified according to Fossitt (2000) and are seen in Figure 8.11, based on the site visit in August 2021. Distinct habitats were noted and species detailed. It should be noted that the site is maintained to a high standard with full time gardeners on site. There is evidence of herbicide use and regular mowing. As a result, biodiversity is greater in the more neglected areas of the site. However, these areas make up very little of the site. The following habitats were noted:

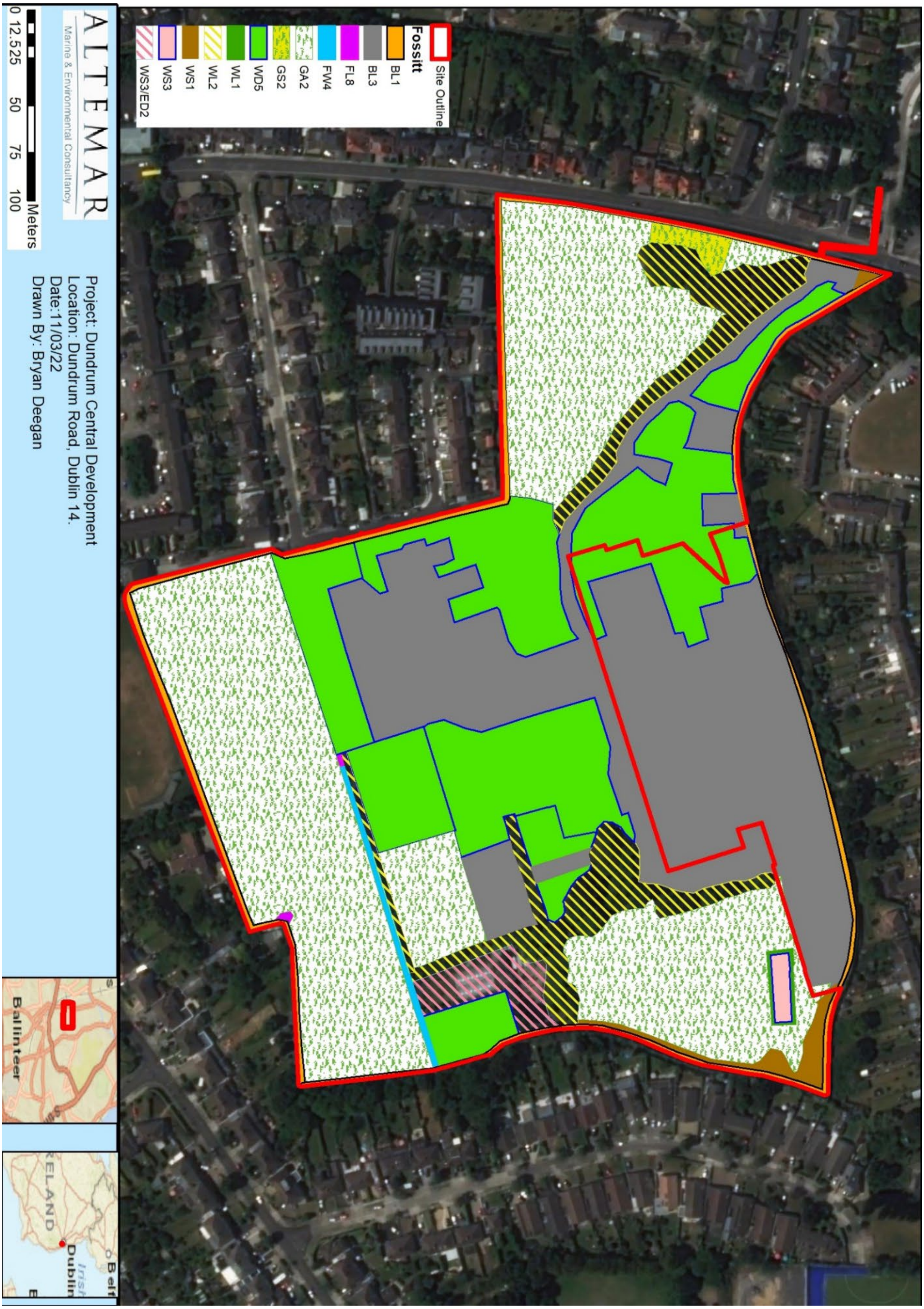

Figure 8.11: Fossitt Habitat Map.

Plate 8.1: GA2- Amenity grassland (improved).

GA2- Amenity grassland (improved).

Much of the open space on site consists of mown amenity grassland. Three large areas are noted on site. The first it to the south of the main treelined entrance, the second borders the southern boundary wall and the third is an area to the east of the main Central Mental Hospital building in the vicinity of some outbuildings. All areas were regularly mown and were poor in species diversity. Species included clovers (*Trifolium spp*.), plantains (*Plantago spp*.), thistles (*Cirsium arvense & C. vulgare*), creeping buttercup (*Ranunculus repens*), ivy (*Hedera helix*), common birds-foot-trefoil (*Lotus corniculatus*), docks (*Rumex spp*.), bramble *(Rubus fruticosus agg*.), daisy (*Bellis perennis*), and nettle (*Urtica dioica*).

Plate 8.2: WD5-Scattered Trees and Parkland.

Plate 8.3: WD5-Scattered Trees and Parkland (Orchard).

WD5-Scattered Trees and Parkland.

The grassland extends into significant areas of the site where scattered trees are noted. Similar flora are noted in these areas as was noted in the Amenity Grassland areas. However, tree species included Copper Beech (Fagus sylvatica 'Purpurea'), Norway Maple (Acer platanoides), Atlas Cedar (Cedrus atlantica), Atlas Cedar (*Cedrus atlantica*), Holly cv. (Ilex aquifolium), Sycamore cv. *(Acer pseudoplatanus*), White Flowering Cherry (*Prunus Sp*.), Monkey Puzzle (*Araucaria Araucana*), Douglas Fir (Pseudotsuga menziesii), Deodar Cedar (*Cedrus deodara*), Monterey Pine (*Pinus radiata*). Of note is the orchard on site which is located on the central area of the site proximate to the drainage ditch. Here the grass was less maintained the amenity grassland included white clover (*Trifolium repens*), red clover (*Trifolium pratense*), daisy (*Bellis perennis*), plantains (*Plantago spp*.), thistles (*Cirsium* sp.), creeping buttercup (*Ranunculus repens*), docks (*Rumex spp*.), cat's-ear (*Hypochaeris radicata*), nettle (*Urtica dioica*), dandelion (*Taraxacum spp*.), cow parsley (*Anthriscus sylvestris*), lesser trefoil (*Trifolium dubium*, bramble (*Rubus fruticosus*), hedge bindweed (*Calystegia sepium*), ground-elder (*Aegopodium podagraria*). Herbicide use on site was noted around trees and along paths.

GS2- Dry meadows and Grassy Verges

Dry meadows and grassy verges were noted in areas where the grass was left unmown. Species included meadow buttercup (*Ranunculus acris*), ragwort (*Senecio jacobaea*), thistles (*Cirsium* sp.), wild carrot (*Daucus carota*), rape (*Brassica napus*), kidney vetch (*Anthyllis vulnerary*), field bindweed (*Convolvulus arvensis*), cow parsley (*Anthriscus sylvestris*), clovers (*Trifolium spp*.), cleavers (*Galium aparine*), creeping cinquefoil (*Potentilla reptans*) and nettle (*Urtica dioica*).

Plate 8.4: WS1- Scrub.

WS1- Scrub

Several areas on site were unmaintained and were let "go wild". This was particularly evident on the north east corner of the site along the boundary wall. Species in this area included thistles (*Cirsium sp*.), creeping buttercup (*Ranunculus repens*), common ragwort (*Senecio jacobaea*), colt's Foot (*Tussilago farfara*), winter heliotrope (*Petasites pyrenaicus*), hoary willowherb (*Epilobium parviflorum*), blackcurrant (*Ribes nigrum*), wild teasel (*Dipsacus fullonum*), butterfly-bush (*Buddleja davidii*), rosebay willowherb (*Chamaenerion angustifolium*), hedge bindweed (*Calystegia sepium*), ivy (Hedera helix), honeysuckle (*Lonicera periclymenum*), cleavers (*Galium aparine*), great willowherb (*Epilobium hirsutum*), common vetch (*Vicia sativa ssp. Segetalis*), bramble (*Rubus fruticosus agg*.), field forget-me-not (*Myosotis arvensis*), rape (*Brassica napus*), meadowsweet (*Filipendula ulmaria*), common mallow (*Malva sylvestris*), great mullein (*Verbascum thapsus*) and traveller's-joy (*Clematis vitalba*). It is important to note that an area of Indian Balsam (*Impatiens glandulifera*) was noted in a small area of damp ground in the north east corner of the site. This is an invasive species that is listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011) which makes it an offence under Regulation 49 to plant, disperse, allow or cause to grow this plant.

WL2- Treelines & Hedgerows WL1

Large mature treelines dominate the site particularly along the entrance driveway and to the south east of the main building. Combined with the scattered trees and parkland they provide a mature sylvian dominated landscape. Species include Corsican pine (*Pinus nigra sub sp*.), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), red oak (*Quercus rubra*), lime (*Tilia sp*.), birch (*Betula sp*.), blue cedar (*Cedrus Atlantica* 'Glauca'), copper beech (*Fagus sylvatica 'Purpurea'*), horse chestnut (*Aesculus hippocastanum*). As seen in Figure 8-11 a Leisler's bat roost was noted in a horse chestnut tree (0401) to the east of the main building.
Hedgerows are present on site but these are made up primarily of non native ornamental species including Leyland Cypress (*Cupressocyparis x leylandii*), Contoneaster sp., Griselinia (*Griselinia littorals*), privet (*Ligustrum sp.*), Pittosporum sp., laurel (*Laurus nobilis*) and cherry laurel (*Prunus laurocerasus*). However, some native species were noted including Hawthorn (*Crataegus monogyna*), Holly (Ilex aquifolium), yew (*Taxus baccata*), and elder (*Sambucus nigra*) were noted.

Plate 8.5: Brightly lit buildings on site. All buildings were inspected for bat use (inset).

BL-Built Land

As previously stated, the proposed development site is maintained to a high level with the use of herbicide evident across the site. As seen in Appendix 8.3 the buildings on site were inspected for bat presence and use. As stated in Appendix 8.3, no evidence of bat use was noted within the buildings on site. It should be noted that the buildings on site are brightly lit with halogen lamps overnight and this would deter bats from using the buildings on site.

Evaluation of Species and Habitats on-site

Evaluation of Habitats

The site is relatively poor in biodiversity value. Much of the site is highly maintained with a strong management regime. No rare or protected habitats were noted. However, the treelines and mature trees within the scattered trees and parkland habitats would be deemed to be of local biodiversity importance primarily as a result of being a foraging and roosting habitat for both birds and bats.

Plant Species

The plant species encountered at the various locations on-site are detailed above. No protected species were noted. Records of rare and threatened species from NPWS were examined. No rare or threatened plant species were recorded in the vicinity of the Site. A small stand of Himalayan balsam (invasive species listed under S.I. 477) is noted on site.

Fauna

As outlined in the Mammal survey "The survey yielded few signs of mammals other than foxes (*Vulpes vulpes)*. Fox signs (droppings) were found at several locations on site and were observed freely roaming on site. Also noted were signs of brown rat Rattus norvegicus and fieldmouse *Apodemus sylvaticus*. Other species that will be present include the hedgehog *Erinaceous europaeus* and pygmy shrew *Sorex minutus*. The house mouse *Mus musculus* is likely to be present. The Irish hare Lepus *timidus hibernicus* was not observed on site. No signs of squirrels were seen. Red squirrel *Sciurus vulgaris* are not likely to occur on site given the lack of suitable habitat. Other fauna of interest that might occur on site include common frogs *Rana temporaria* and common lizards *Lacerta vivipara*. Frogs are to be expected on site as they are common in rank grasslands which provide good foraging habitat. However, only one very small pool was seen on site and no frog spawn was present at time of survey. The common or viviparous lizard occurs in many habitats in Ireland and is potentially present on site.

Bat fauna

A bat survey was carried out which included a bat emergent and detector survey (Appendix 8.3). The survey also carried out an inspection of the buildings on site and static detector s were placed on site. As outlined Appendix 8.3 "*No evidence of bat activity was noted in the buildings on site. No bats emerging onsite buildings were noted. However, a single Leisler's bat was observed bat was emerging from a Horse Chestnut (Tree 0401) on the eastern section of* *the site. Foraging activity was also noted of a common pipistrelle (to the south of the drain on site and around the farm buildings to the north east of the site*." The removal of the trees on site will result in a loss of foraging areas and a loss in potential bat roosts.

Avian Fauna

Wintering bird assessments are seen in Appendix 8.1 and Appendix 8.2. As outlined in Appendix 8.1 "Black-headed gull flocks of county importance (>90 birds; 1% of the county population) were observed on one occasion commuting over the proposed development site. Brent goose flocks of county importance (>84 birds; 1% of the county population) were observed on one occasion commuting over the proposed development site and curlew flocks of county importance (>29 birds; 1% of the county population) were observed on two occasions commuting over the proposed development site. Flocks of importance relative to the local population (1% of the Dublin Bay I-WeBS site population) were recorded for black-headed gull on fifteen occasions, brent goose on one occasion and curlew on four occasions." "On the 4th of January, curlew were observed using an area of amenity grassland within the proposed development site for foraging. Herring gull, black-head gull, lesser black-backed gull and common gull were frequently observed using the proposed development site for foraging and roosting. Black-headed gull and herring gull were observed regularly commuting over the proposed development. Curlew and brent geese were observed commuting over the proposed development site infrequently." The updated wintering bird assessment relating to the 2021/2022 season (Appendix 8.2) noted that "Of the target species of the bird survey, only one SCI species listed for the Special Protection Areas within the ZOI of the proposed development was recorded. This was Black-headed Gull. This species was also recorded in the previous survey by MKO (2021). Two other SCI species recorded in the previous survey (Curlew and Brent Goose) were not recorded within the survey period of this present survey."

In addition to the birds noted in Appendices 8.1 & 8.2, the following birds were noted on site:

Table 8.5: Bird species noted on site.

Common Name	***Scientific Name***
Woodpigeon	*Columba palumbus*
Wren	*Troglodytes troglodytes*
Robin	*Erithacus rubecula*
Blackbird	*Turdus merula*
Blue tit	*Parus caeruleus*
Starling	*Sturnus vulgaris*
Great tit	*Parus major*
Rook	*Corvus frugilegus*
Song Thrush	*Turdus philomelos*
Dunnock	*Prunella modularis*
Goldfinch	*Carduelis carduelis*
Hooded Crow	*Corvus cornix*
Herring gull (on roof possibly nesting)	*Larus argentatus*
Magpie	*Pica pica*
Great tit	*Corvus monedula*

Invasive Species

Himalayan balsam (*Impatiens glandulifera*) was noted on site. No other invasive plant or animal species listed under the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) Section 49, the Third Schedule: Part 1 Plants, Third Schedule: Part 2A Animals were noted on site.

8.4 Potential Impacts of the Proposed Project

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

Quality of Potential Impacts on Biodiversity

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

Significance of Impacts

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

Duration of Impact

Duration of Impact	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day

Duration of Impact	Description
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Probability of Effects	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Extent of Effects	Description
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.

8.4.1 Construction Phase

The proposed construction of a residential development could potentially impact on the existing ecology of the site and the surrounding area. These potential construction impacts would include impacts that may arise during the site clearance, re-profiling of the site and the building phases of the proposed development. Potential Impacts are assessed below for each of the ecological components:

Designated Conservation sites

There is an intact biodiversity corridor/pathway from the proposed development site to the Dublin Bay Designated sites via the drain on site and the Elm Park stream and via the surface water drainage to the River Slang. Impacts could arise from runoff during site re-profiling, installation of attenuation tanks and ground works, that could impact on the watercourses, with downstream impacts to the designated sites within Dublin. Construction and operational mitigation measures will be in place to ensure compliance with the Water Pollution Acts. In addition, the project has to comply with SUDS, County Council requirements and the provision of additional measures such as petrochemical interceptors and silt interception. With the implementation of mitigation to comply with Water Pollution Acts in relation on site works, no impact is foreseen in relation to designated conservation sites. An AA Screening and NIS has been submitted with this planning application. It concluded that “Following the implementation of the mitigation measures outlined, the construction and presence of this development would not be deemed to have a significant impact. No significant impacts are likely on Natura 2000 sites, alone in combination with other plans and projects based on the implementation of mitigation measures.”

‘*No significant effects are likely on Natura 2000 sites, their features of interest or conservation objectives. The proposed project will not will adversely affect the integrity of European sites.*’

Impacts: Neutral/Imperceptible/Temporary/localised/unlikely. Standard controls are required.

Aquatic Ecology / Invasive Species

Due to the salmonid nature of the River Dodder and the presence of Atlantic salmon (*Salmo salar*) and European eel (*Anguilla Anguilla*) and the indirect pathway via the public surface water network, in addition to the direct pathway to the Elm Park stream, mitigation measures should be in place to ensure compliance with Water Pollution Acts. Invasive species were noted on-site and as a result, the construction works would need to address the presence of invasive species on-site. Movement of soil or lack of treatment of the Himalayan balsam could lead to downstream impacts.

Impacts in the absence of mitigation: Negative/Slight/Short-term, unlikely, localised. Mitigation is required.

Habitats, Botany and Avian Ecology

The impact of the development during construction phase will be a loss of habitats and species in the vicinity of the treelines, scattered trees and parkland, the onsite drain and grassland. It would be expected that the avian fauna associated with these habitats would also be displaced. No flora or habitats of conservation importance were noted during the surveys.

During the site visits no bird species of conservation importance as listed on Annex I of the EU Birds Directive were recorded. The most significant impact to birds will be during the construction phase with the permanent removal of any grassland, trees and to a lesser extent the levelling of the land to accommodate the houses.
Impact: Negative/ Slight to Moderate/ Short-term to long term, localised, unlikely. *Mitigation is required*.

Terrestrial Fauna

Protected Terrestrial Mammals

No signs of protected species of mammals were observed on site. There are no records of protected mammals on site. The site is isolated with limited access and surrounded by a wall on all sides. A pre construction inspection is required.

Impacts in the absence of mitigation: Negative; Slight; permanent, localised, not significant. Mitigation is required.

Bat Fauna

As outlined in Appendix 8.3, "No bats emerging onsite buildings were observed. No evidence of bat activity was noted within the buildings on site. The site is brightly lit with security lighting and construction lighting could reduce foraging on site. Trees on site have the potential for bat roosting and a bat roost was noted within one tree. The removal of large trees on site will result in the loss of at least one bat roost in addition to reducing the sites foraging potential. However, in proximity to the existing buildings on site lighting will be reduced from current levels of floodlighting and it would be expected that bats would continue to forage on site particularly in the darker open space areas." The removal of single bat roost within a tree would be a Negative; Slight; permanent, localised, not significant impact. However, mitigation is required.

Impacts in the absence of mitigation: Negative; Slight; permanent, localised, not significant. Mitigation is required.

Amphibians and reptiles

Frogs and newts may occur on site on site. There is no loss of habitat on site as the drain will be maintained on site and a detention basin will be created. Common lizard is also protected and was not noted on site. There would be some initial disturbance of adjacent habitats during construction which could potentially impact on amphibians. A pre construction inspection should be carried out.
Impacts in the absence of mitigation: Minor Negative/Slight. Mitigation is required.

Potential impacts on surrounding areas

The proposed development site is isolated from surrounding areas by the presence of a tall wall surrounding the site. This in effect isolates the site with the exception of avian fauna and the drain that passes through the site. The drain on site will be maintained. The majority of treelines will be maintained. As a result, the proposed development would not be expected to fragment biodiversity corridors as the site is already isolated from surrounding areas. There will be a loss of some vegetation on site but this is not expected to impact significantly on surrounding areas. Works on site could lead to localised hydrological, noise and light impacts but these are not expected to impact significantly outside the site outline. In relation to the volume of water supplying the drain on site, several discussions too place in relation to ensuring that the volume of water within this system is maintained. It was concluded that the vast majority of the water that is contained within the drain enters the site via an underground culvert and it is not proposed to alter the supply to the drain. However, works on site in the absence of mitigation could potentially lead to downstream impacts as a result of contaminated surface runoff or pollution. Without the implementation of standard construction phase controls including silt interception, there could be impacts on aquatic species downstream. Mitigation is required.

Impacts in the absence of mitigation: Negative; Slight; permanent, localised, not significant. Mitigation is required.

8.4.2 Operational Phase

Impacts of Landscaping

It is proposed to retain a significant portion of the treelines and a portion of the scattered trees and parkland areas. Lighting has the potential to impact on bat foraging. Following construction of the housing and associated roads the planting of trees and landscaping will also be carried out. In May 2021 discussions took place between the architects, lighting specialists and Altemar to improve the biodiversity value of the site and reduce light spill. The lighting plan has been modified to take into account bat foraging and reduce the level of spill into dark areas of the site Ecological supervision is required to ensure compliance with landscaping, lighting and the accompanying Habitat management Plan.

Impacts in the absence of mitigation: Negative; Slight; Temporary, localised. Mitigation required.

Designated Conservation sites within 15km

During operation of the development foul water will be discharged to online mains services. Runoff from the development and roads will have to comply County Council and SUDS requirements and will be attenuated and discharged at greenfield rates to the public surface water network. No significant impacts on biodiversity as a result in changes in hydrology or hydrogeology are foreseen. The waterflow will be maintained in the drain on site and no significant loss in water or deterioration in water quality is foreseen. As a result no negative impact on conservation sites is foreseen. No significant impacts on designated sites are likely.

Impacts in the absence of mitigation: None foreseen

Aquatic Ecology / Invasive Species

Petrochemical runoff from the site and road could potentially negatively directly or indirectly impact the aquatic ecology. Runoff from the development and roads will have to comply with County Council requirements and will require petrochemical interception and will be attenuated and discharged at greenfield rates to the public surface water network. The drainage connections and the installations in relation to petrochemical interception should be inspected by the project ecologist.

Impacts in the absence of mitigation: Negative, Slight, localised, unlikely Permanent. Mitigation required.

Habitats, Botany and Avian Ecology

During the operational phase of the development there will be an increase in disturbance including noise and light that could potentially impact on birds on site. As the landscaping elements improve with maturity it would be expected that the biodiversity value of the site to birds and flora would also increase. Landscape, light spill and habitat management will be important to overall impact of the operational phase. Ecological supervision of the elements of the accompanying Habitat management Plan are required.

Impacts in the absence of mitigation: Neutral (positive and negative), localised, Slight to Moderate; Permanent. Mitigation is required.

Terrestrial Fauna

Protected Terrestrial Mammals

No protected terrestrial mammal species were noted on site. Impacts may be considered as neutral on species of conservation importance in the immediate locality as no terrestrial mammals of conservation importance were noted on site. However, common species are, of course, widespread and ubiquitous and the overall impact on common species may be considered as Not Significant.

Impacts in the absence of mitigation: Negative, Slight; Permanent, localised, unlikely. Mitigation required.

Bat Fauna

Loss of foraging sites and commuting habitat may temporarily displace certain species. Artificial light creates a barrier to bats so lighting of treelines should be avoided where possible. Low impact lighting has been chosen in the vicinity of the retained treeline (See 1 lux lighting contour on lighting plan.). The proposed lighting plan should not significantly impact the bat species that will utilise the retained treelines. Mitigation is required in the form of a post construction light spill assessment.

Impacts in the absence of mitigation: Negative; Slight; Temporary, localised. Mitigation required.

Amphibians and reptiles

New ponds and water features are proposed that would encourage frogs within the area.
Operational Impact: Neutral-positive, localised, Permanent Mitigation is required

8.5 Mitigation Measures

Mitigation measures will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the ZOI. These measures are outlined below in sequence and incorporate elements outlined elsewhere in this EIAR.
As the main potential vector for impacts would be seen to be via the pathway to Dublin Bay via the public surface water connection to the River Slang and the drain to the Elm Park stream mitigation will be in place to protect the biodiversity within the watercourses and downstream of the watercourses. No additional mitigation measures are required besides those outlined within the Hydrology and the Air Quality and Climate Chapters of the EIAR. These measures are deemed sufficient to deal with Hydrology and the Air Quality and Climate elements that could potentially impact on biodiversity. In relation to specific biodiversity mitigation measures the following will be implemented.

8.5.1 Construction Phase

Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) in relation to the removal of trees and timing of nesting birds will be followed e.g. do not remove trees or shrubs during the nesting season (1st March to 31st August).

- A pre-construction inspection for terrestrial mammals will be carried out.
- Removal of deciduous trees. Should any mature broadleaved tree be scheduled for removal as part of the development plans, it should first be surveyed for bat presence by a suitably experienced specialist. If bats are found, an application for a derogation licence should be made to the National Parks and Wildlife Service to

allow its legal removal. Such trees should ideally be felled in the period late August to late October, or early November, in order to avoid disturbance of any roosting bats as per National Roads Authority guidelines (NRA 2006a and 2006b) and also to avoid the bird breeding seasons. Tree felling should be completed by mid-November at the latest as bats roosting in trees are very vulnerable to disturbance during their hibernation period (November – April). Trees may be removed at other times but the likelihood of encountering bats during works will be higher. Trees with ivy-cover, once felled, should be left intact onsite for 24 hours prior to disposal to allow any bats beneath foliage to escape overnight.

- Trees to be retained. Several species of bats roost in trees. Where possible, treelines and mature trees that are located immediately adjacent to planned construction areas or are not directly impacted should be avoided and retained intact. Retained trees will be protected from root damage by machinery by an exclusion zone of at least 5 metres or equivalent to canopy height. Such protected trees should be fenced off by adequate temporary fencing prior to other works commencing.
- A pre-construction bat assessment will be carried out on all buildings to be demolished.
- Native species will be chosen in all landscaping schemes. Planting schemes should attempt to link in with existing wildlife corridors (hedgerows and treelines), both onsite and off, to provide continuity of wildlife corridors. Retention of boundary hedgerows and treelines will also serve to screen the development.
- Lighting restrictions. In general, artificial light creates a barrier to bats so lighting should be avoided where possible. Where lighting is required, directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) will be used to prevent overspill during construction. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. Mature trees should not be directly lit during construction or operation of the proposed development.
- 45 bird boxes and 10 bat boxes will be placed on site as an enhancement and mitigation measure. The position of these boxes will be carried out in consultation with an ecologist.
- Control measures will be carried out on the Himalayan balsam on site as outlined in the CEMP.

8.5.2 Operational Phase

- A post construction bat survey will be carried out and lighting on site will be assessed by an ecologist post construction.
- A post construction inspection of drainage connections to the onsite drain will be carried out by the project ecologist to ensure that the petrochemical interceptor is in place and working.

8.6 Residual Impacts

Based on the implementation of the mitigation measures above and in particular the Hydrology Chapter of the EIAR, no designated sites will be impacted by the proposed development. The successful implementation of the CEMP and additional measures outlined in the EIAR will be essential to the successful mitigation/offsetting of the loss of biodiversity on site.

The proposed development has satisfactorily addressed the current ecology on site into its design so that application of the mitigation measures outlined in this EIAR will help reduce its impact on the local ecology to an adequate level. Where possible biodiversity enhancement measures have been retained and implemented into design to enhance the overall biodiversity value of the site. As a result of the loss of certain biodiversity features on site and the introduction of new buildings and increased human disturbance in addition to the implementation of a sensitive landscaping strategy, with biodiversity enhancement measures it is considered that the overall impact on the ecology of the proposed development will result in a long term neutral residual impact on the existing ecology of the site and locality overall. This is primarily as a result of the loss of terrestrial habitats on site, supported by the creation of additional terrestrial biodiversity features, mitigation measures and a sensitive lighting strategy.

8.7 Monitoring

Pre-construction surveys will be carried out for terrestrial mammals and bats. During construction an Ecologist will monitor the site from pre-construction surveys, during Construction Phases and Post Construction. The drain on site will be monitored daily for turbidity for the length of the construction period.

8.8 Reinstatement

No reinstatement works are required for ecological features. The proposed development would be managed on site in accordance with the Habitat Management Plan.

8.9 Interactions

The biodiversity elements of this EIAR have involved consultation with a wide section of the Project Team particularly in relation to the Construction Management, design, drainage, lighting and landscape elements of the proposed Project. There are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to the biodiversity chapter. The biodiversity chapter of the EIAR involves interactions with the Land, Soils, Geology and Hydrogeology, Hydrology, Air Quality and Climate, Noise and Vibration, Traffic and Transport, Waste Management and Site Services. Following the implementation of mitigation measures outlined in the EIAR the following interactions are noted.

8.9.1 Land, Soils, Geology & Hydrogeology

During the construction phase, excavated soil, stone, clay and made ground (c. 56,677 m^3) will be generated from the excavations required to facilitate site levelling and construction of the new foundations. It is estimated that c. 49,478 m^3 of excavated material will need to be removed off-site. However, it is envisaged that c. 7,199 m^3 material will be reused on-site as fill. Where material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. As such, there is the potential for impacts on local biodiversity via the proposed excavation and re-profiling works. There will be a loss of some vegetation on site, but this is not expected to impact significantly on surrounding areas Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 9, the predicted effects on biodiversity are ***short to long term, imperceptible,*** and ***neutral.*** The biodiversity of the subject site is likely to improve following the completion of landscaping works.

8.9.2 Hydrology

During the construction and operational phases of development, there is the potential for downstream impacts on the on-site drainage ditches, proximate watercourses, and designated conservation sites via contaminated surface water runoff. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 10, the predicted effects on biodiversity are ***short term, imperceptible,*** and ***neutral.***

8.9.3 Air Quality and Climate

During the construction phase of development, given the nature and scale of the proposed works, there is the potential for dust and materials to enter the existing surface water sewer, drainage ditches, and proximate watercourses during site clearance and re-profiling works with the potential for downstream impacts on biodiversity and designated conservation sites. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 11, the predicted effects on biodiversity are ***short term, imperceptible,*** and ***neutral.***

8.9.4 Noise and Vibration

During the operational phase of the development, there will be an increase in disturbance including noise and vibration that could potentially impact on birds on site. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 12, the predicted effects are ***short term, slight imperceptible,*** and ***neutral*** *outside the proposed development site.*

8.9.5 Traffic and Transport

During the construction phase of development, heightened traffic within and immediately surrounding the subject site (resulting from the transport of construction materials and the commuting of workers to the site) has the potential to impact on local biodiversity through increased disturbance. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 16, the predicted effects on biodiversity are ***short and long term, imperceptible,*** and ***neutral.***

8.9.6 Waste Management

There is the potential for impacts on local biodiversity and the potential for downstream impacts on proximate watercourses and designated sites via the storage and transportation of waste and pollution from the subject site during the construction phase of development. Following the implementation of mitigation measures designed 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 as outlined in Chapter 8 and Chapter 17, the predicted effects on biodiversity are ***short long term, imperceptible,*** and ***neutral.***

8.9.7 Site Services

During the construction phase of development, there is the potential for impacts on local biodiversity and downstream impacts on proximate watercourses and designated sites via excavation and installation works during the proposed implementation of infrastructure throughout the site. During the operational phase of development, there is a direct hydrological pathway to designated conservation sites located within Dublin Bay via surface water drainage. There is an indirect hydrological pathway to designated conservation sites located within Dublin Bay via the proposed outfall of foul wastewater drainage to Ringsend WwTP. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 18, the predicted effects on biodiversity are ***short and long term, imperceptible,*** and ***neutral.***

8.9.8 Interactions – Overall

There is potential for interaction between the biodiversity and other chapters outlined in the EIAR, during construction and operation. The mitigation measures that will be put in place for the proposed development will ensure that the impact on biodiversity would be negligible following the implementation of mitigation measures.

8.10 Cumulative Impacts

There are several proposed developments located in the area immediately surrounding the subject site. The following is a list of planning applications in close proximity to the subject site as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal[16],:

The below projects have been granted planning permission by Dún Laoghaire-Rathdown County Council (DLRCC) or An Bord Pleanála (ABP).

Table 8.6: Projects granted permission by Dún Laoghaire-Rathdown County Council (DLRCC) or An Bord Pleanála (ABP).

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
D16A/0818	Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14	11th Sept 2017	• Demolition c. 425 sq m • 120 no. apartments • 120 car parking spaces • 144 bicycle spaces
ABP31013821	Mount Saint Mary's and Saint Joseph's, Dundrum	25th Aug 2021	• SHD • Demolition 2,913.8 sq m • 231 no. residential units

[16] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
	Road, Dundrum, Dublin 14		• After school childcare facility 161 sq m • Café 83 sq m • 118 no, car parking spaces • 462 no. cycle spaces • 4 no. motorcycle spaces
D19A/0162	Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14	8th August 2019	• Demolition • 43 no. residential units • 47 no. car parking spaces • 92 no. cycle parking spaces
ABP30835320	The car sales premises currently known as Vector Motors (formerly known as Victor Motors), Goatstown Road, Dublin 14, D14FD23	3rd Feb 2021	• SHD (Student accommodation) • 960 sq m demolition • 239 no. bed spaces • 6 no car parking spaces
D20A/0328	University College Dublin, Belfield, Dublin 4	21st Jan 2021	• Extension to the existing car park to provide 239 no. additional car parking spaces, resulting in a total permanent surface car park comprising 300 no. car-parking spaces (61 no. existing spaces plus 239 no. new additional spaces). • The proposed development also seeks a modification of the Athletics Track development permitted under Dun Laoghaire Rathdown County Council Reg. Ref. D19A/0001, to omit 185 no. permitted temporary car parking spaces, resulting in a total of 70 no. temporary car parking spaces being delivered as part of the permitted Athletics track development.
ABP30943021	2.12 ha at Our Lady's Grove, Goatstown Road, Dublin 14	3rd June 2021	• SHD • Student Accommodation • 698 no. bed spaces • 9 no. car parking • 4 no. motorcycle • 860 no. cycle parking
ABP31128721	c.0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort	20th Dec 2021	• SHD • 115 no. residential units • 80 sq m creche

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
	Lodge (D14C9P2), Old Frankfort, Dublin 14		

Planned Projects

The below projects are planned projects that are at various stages of the planning process. They key distinction from the projects listed above is that they do not have planning permission at the time of writing.

Table 8.7: Planned projects at various stages of the planning process.

DLRCC/ ABP Reg. Ref.	Address	Lodgement Date/ Status	Overview of Development
ABP31182621	Lands at Knockrabo, Mount Anville Road,, Goatstown, Dublin 14	Lodged on 1st Nov 2021 as a SHD with ABP. Decision due 28th Feb 2022. (At the time of writing, ABP had confirmed a delay surrounding the determination of this application)	• SHD (Amendment to permitted Phase 2) • 227 no. units (134 no. additional units from permitted SHD) • 178 no. car parking spaces • 519 no. bicycle spaces
ABP312935	Sommerville House, Dundrum Road, Dublin 14.	Lodged on 7th March 2022 as a SHD with ABP. Decision due 27th June 2022	SHD 111 No. units 39 no car parking spaces 164 no. bicycle spaces
TC06D.311553	Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14	Lodged as a SHD Pre-Application Consultation Request with ABP. ABP feedback provided on 14th Jan 2022.	• SHD (Consultation) • 884 no. apartments • Creche
N/A	Lands at Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14	Pre-application engagement commenced with DLRCC. Planning application due to be lodged with DLRCC when the SHD (the proposed project) has been decided.	• 3,540 sq m demolition • 71 no. residential units • 5,566 sq m non-residential floorspace • 60 no. car parking spaces

The site is an existing enclosed area with limited connectivity to habitats outside the development area. However, the drain on site leads outside the wall of the site and downstream to Natura 2000 sites. However, no Potential Cumulative Impacts are foreseen.

The development will have incorporate measures to protect water quality in compliance with legislative standards for receiving water quality (European Communities Environmental

Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019). Given the isolated nature of the proposed development site no fragmentation of habitats would be foreseen. An additional Section 34 application will be submitted in relation to the development of the main Central Mental Hospital building, in addition to other works. The assessment on site also included an evaluation of this area of the site (Figure 8.11). No sensitive habitats or species were noted within the proposed Section 34 development area. The proposed Section 34 works would not be seen to have a cumulative impact on biodiversity.

Given this, it is considered that in combination effects with other existing and proposed developments in proximity to the application area would be unlikely, neutral, not significant and localised. It is concluded that no significant effects on conservation sites will be seen as a result of the proposed development in combination with other projects. No in combination effects are foreseen.

No projects in the vicinity of the proposed development would be seen to have a significant in combination effect on conservation sites.

8.11 'Do-Nothing' Effect

It would be expected that should the Site remain undeveloped and that there would be a natural succession to scrub once maintenance ceases. The biodiversity value of the site would increase as a result of neglect or a reduction in maintenance on site. However, the site has been identified for development within the Local Area Plan and it would be expected that these lands will be developed at some stage and that the impacts of any development would be broadly similar to those of proposed Project.

8.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in the preparation of the Biodiversity Chapter of this EIAR. Several fieldwork dates were within in the initial stages of the Covid-19 pandemic. The Site surveys were carried out on-site by a single outdoor fieldworker with no contact with any other person.

8.13 Conclusion

The Biodiversity Chapter of the EIAR involved extensive surveys and interactions within the project team being carried out over several years. The flora, fauna and habitats within the proposed development area are outlined in detail and the potential impacts on biodiversity and designated sites were assessed. Detailed mitigation measures have been outlined and will be carried out during the construction and operational phases of the development. In conclusion, the proposed development has satisfactorily addressed the potential impacts on biodiversity on site and within the potential zone of influence. It is considered that the overall impact on the biodiversity of the proposed development is a long term neutral residual impact on the existing biodiversity. However, the implementation of the proposed landscaping and Habitat Management Plan will provide significant on site biodiversity enhancement features and provide long term positive benefits to the biodiversity on site.

8.14 References

Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities March 2010.

Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government 2009; http://www.npws.ie/publications/archive/NPWS_2009_AA_Guidance.pdf

Managing NATURA 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC, European Commission 2000; http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/provision_of_art6_en.pdf

Assessment of Plans and Projects Significantly Affecting NATURA 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC; http://ec.europa.eu/environment/nature/Natura2000management/docs/art6/Natura_2000_assess_en.pdf

Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC https://ec.europa.eu/environment/nature/natura2000/management/pdf/methodological-guidance_2021-10/EN.pdf

Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission; http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/guidance_art6_4_en.pdf

Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging; http://ec.europa.eu/environment/nature/Natura2000/management/docs/guidance_doc.pdf

The Status of EU Protected Habitats and Species in Ireland. http://www.npws.ie/publications/euconservationstatus/NPWS_2007_Conservation_Status_Report.pdf

NPWS (2013) Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2012) Conservation Objectives: Baldoyle Bay SAC 000199. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2016) Conservation Objectives: Howth Head SAC 000202. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2017) Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2021) Conservation Objectives: Glenasmole Valley SAC 001209. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage .

NPWS (2021) Conservation Objectives: Knocksink Wood SAC 000725. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage .

NPWS (2019) Conservation Objectives: Ballyman Glen SAC 000713. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: Baldoyle Bay SPA 004016. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2022) Conservation objectives for Dalkey Islands SPA [004172]. Generic Version 9.0. Department of Housing, Local Government and Heritage.

NPWS (2022) Conservation objectives for Howth Head Coast SPA [004113]. Generic Version 9.0. Department of Housing, Local Government and Heritage.

APPENDIX 8.1 – WINTERING BIRDS SURVEY 2020/2021

APPENDIX 8.2 – WINTERING BIRDS SURVEY 2021/2022

APPENDIX 8.3 – BAT SURVEY

See Volume 2 – Appendices

9.0 LAND, SOILS, GEOLOGY AND HYDROGEOLOGY

9.1 Introduction

This chapter of the EIAR assesses the impacts of the proposed Strategic Housing Development (SHD) at the lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14. This chapter of the EIAR should be read in conjunction with the architectural and engineering drawings submitted as part of this planning application.

This chapter has been prepared by John Considine, BE, MIStructE, MIEI, CEng, FConsEIM, Chartered Engineer of Barrett Mahony Consulting Engineers. John is a Chartered Civil/Structural Engineer and a Fellow of the Association of Consulting Engineers of Ireland. He has over 33 years' experience as a consulting engineer covering civil engineering design and structural engineering design, principally in Ireland & the UK where he has been involved in many high-profile projects. He has been involved in the preparation of EIAR documents for over ten years and is particularly familiar with the area in and around Dublin where many of his projects are located.

Paul Stephenson - BE, MIEI, CEng, Chartered Engineer also inputted into the chapter. Paul is a Chartered Civil Engineer and Geotechnical specialist with over 12 years' experience of the Irish and UK markets, both in consultancy and site roles. His experience includes scheduling and supervising site investigations, interpretation of ground investigation data and production of geotechnical reports. He has carried out a wide range of geotechnical designs for soft ground and peat, soil stabilisation and earthworks, basements, retaining structures and deep excavations, piled and shallow foundations and slope stabilisation.

Figure 9.1: Site Location.

9.2 Methodology

The assessment of the potential impact of the proposed development on the water bodies 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 Statement (EPA 2002 and 2017 (Draft)), the EIA Directive, Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003), Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003), Development Management Guidelines (DoEHLG, 2007) and Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessments August 2018.

The following sources of information were used in the completion of this assessment:

- Site Visit
- Geotechnical Site Investigation Report
- Civil Engineering Drawings Prepared by Barrett Mahony Consulting Engineers
- Geological Survey of Ireland (GSI) online maps and databases
- Eastern CFRAMS Flood Mapping from OPW
- EPA online maps and databases
- Topographical Survey
- Teagasc soil and sub-soil data.

9.3 Baseline Environment

9.3.1 Existing Site

The subject site is c9.6 ha and is currently occupied by the Central Mental Hospital. There are other ancillary buildings on the site which are proposed to be demolished as part of the works, these include a swimming pool/sports hall, 2-storey red-brick building and temporary structures including portacabins.

The site is bounded on all sides by a boundary wall. The main point of access to the site will be via the Dundrum Road (R117) to the west. There is a general slope down from the high point of the southern side (+45.21m) to the northern end of the site (+39.31m). Please refer to figure 9.2 which is a summarised topographical survey.

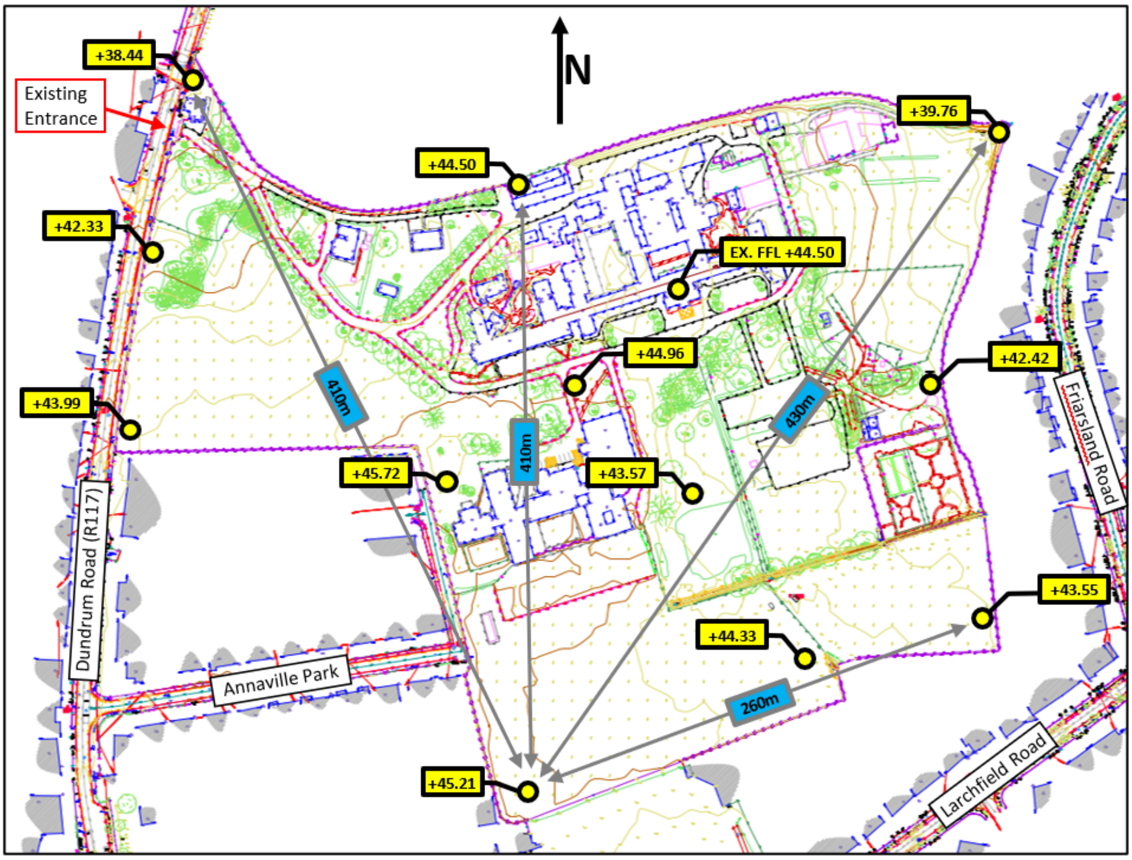

Figure 9.2: Summary of the Existing Site Topography Superimposed on Topographical Survey Drawing (Ordnance Datum Levels).

9.3.2 Site Investigation Works

A site investigation was carried out in November 2021 by Site Investigations Ltd, which is included in Appendix 9.1 of this chapter. The site investigation consisted of cable percussive boreholes, trial pits, soakaway tests, foundations pits, slit trenches and California Bearing Ratio (CBR) tests. All fieldworks were carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. Below is a breakdown of the works carried out:

- 16 no. Cable Percussive Boreholes
- 35 no. Trial Pits
- 4 no. Soakaway Tests
- 7 no. Foundation Inspection Pits
- 3 no. Slit Trenches
- 6 no. CBR Tests

Refer to table 9.1 and table 9.2 for the borehole log extract and summary table.

There was a total of 16no. boreholes were put down in a minimum diameter of 200mm through soils and rock strata to their completion depths by a combination of methods, including light percussion boring using a Dando 150 rig.

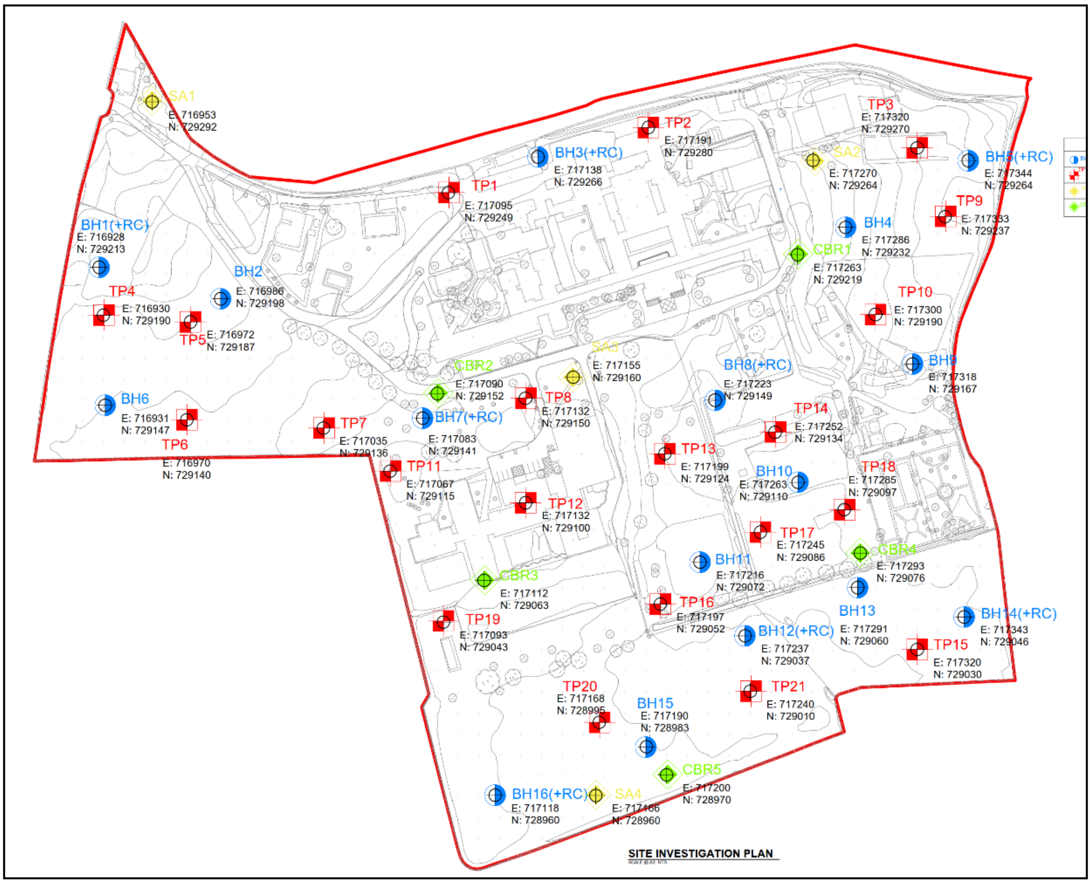

Figure 9.3: Site Investigation Works Plan.

Table 9.1: Borehole Log Extract.

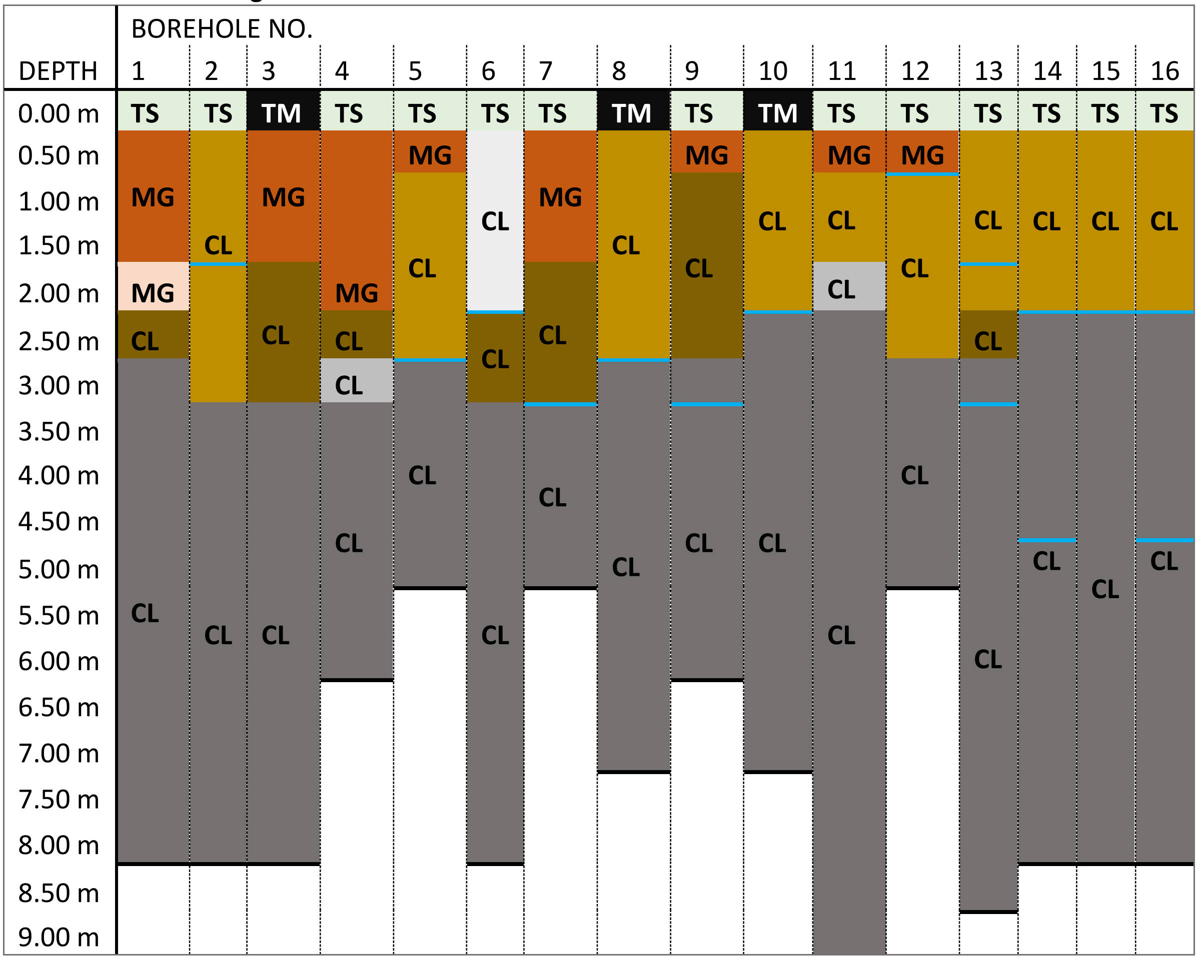

Table 9.2: Borehole Log Extract Legend.

TS	Topsoil
TM	Tarmacadam: Grey Silty Sandy Gravel
MG	Made Ground: Light Brown Sandy Slightly Gravelly Silty Clay
MG	Made Ground: Brown Sandy Slightly Gravelly Silty Clay With Medium Cobble Content
CL	Firm Brown Sandy Slightly Gravelly Silty Clay with Low Cobble Content
CL	Stiff Brown/Grey Sandy Slightly Gravelly Silty Clay with Low Cobble Content
CL	Soft Grey Sandy Slightly Gravelly Silty Clay with Low Cobble Content
CL	Stiff Brown/Grey Sandy Slightly Silty Black Sandy Gravelly Clay with Low Cobble Content
CL	Very Stiff Black Sandy Slightly Gravelly Clay with Low Cobble Content
	Water Strike - Refer to BH Log
	Obstruction - Refer to BH Log

9.3.3 Bedrock Geology

The bedrock geology of this area is Carboniferous Limestone of the Lucan Formation. The bedrock is identified as a combination of dark limestone and shale, refer to figure 9.4 below. Bedrock was located approximately 8.5m below ground level, per the site investigation report.

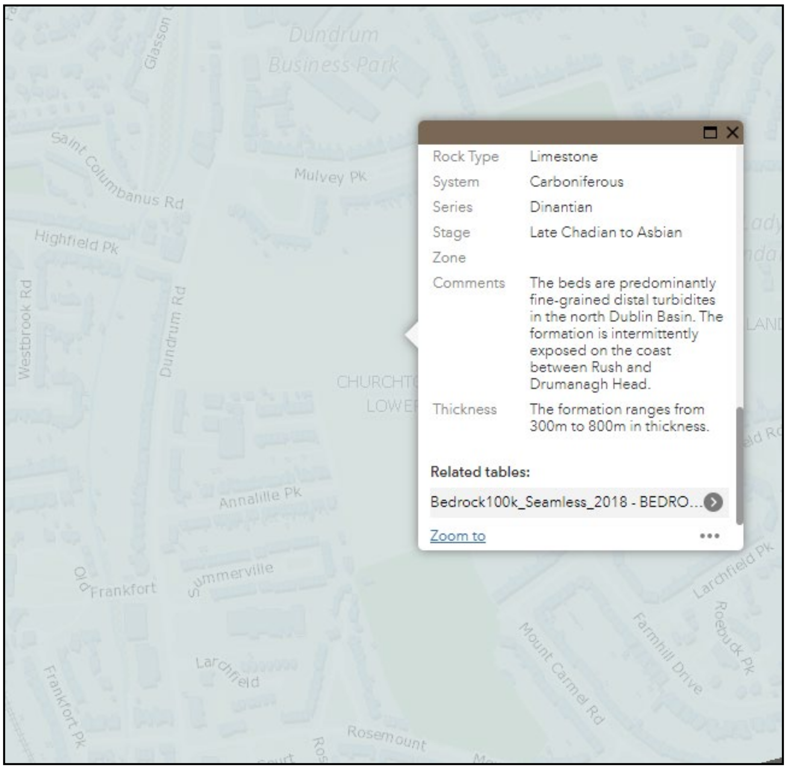

Figure 9.4: Bedrock Mapping of Site by GSI *(https://gis.epa.ie/EPAMaps/, n.d.).*

9.3.4 Subsoil (Quaternary) Geology

As can be seen in Table 9.1, the near surface subsoil is predominantly comprised of made ground or firm sandy clay

The quaternary period is the most recent stage of the geological period. It marks the period of the Ice Age and the postglacial period which extends to the present day. Most surface deposits were deposited in the Quaternary Period and provide the parent materials for the soils in the area.

Most sediments of the Quaternary period were deposited during the Ice Age itself either directly from the huge ice sheets or by meltwater from the sheets as they melted. Ice sheets would have slowly eroded the underlying bedrock producing sediment. This sediment may include particles of all sizes ranging from clay to boulder and which when spread over the surface by glacial ice, takes the form of till (boulder clay). Alternatively, sediment may be carried and sorted by meltwater and deposited as sand and gravel, with silt and clay deposited separately in lake systems or carried away to the sea. Glacial deposits therefore contain fragments of the type of bedrock over which the ice originally passed.

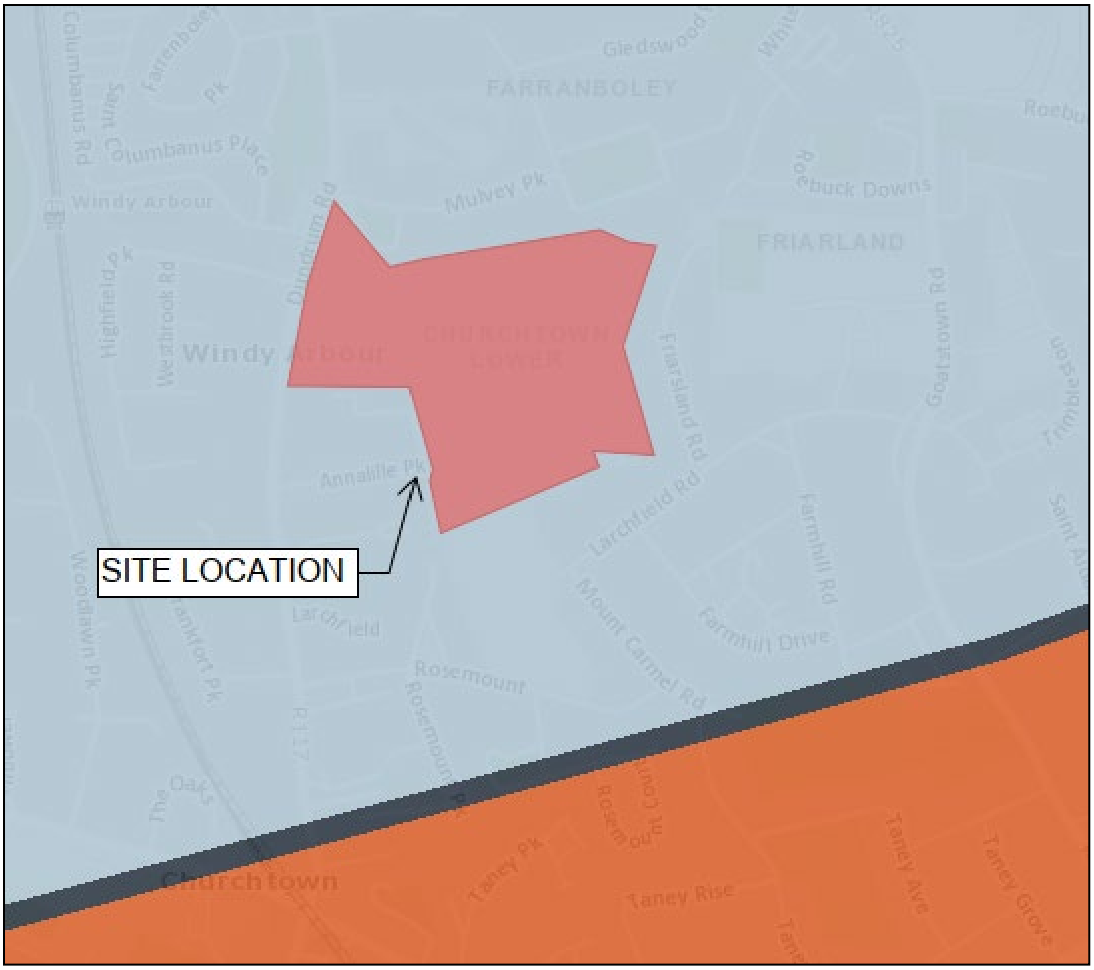

Figure 9.5: Bedrock Mapping of Site by GSI *(https://gis.epa.ie/EPAMaps/, n.d.).*

9.3.5 Soils

The GSI soils map indicates the predominant soil type in the development area to be still derived from limestones. An extract from the GSI soils map relevant to the site is detailed in figure 9.6 below.

Teagasc soil maps classify soils beneath most of the site as Urban, refer to figure 9.7.

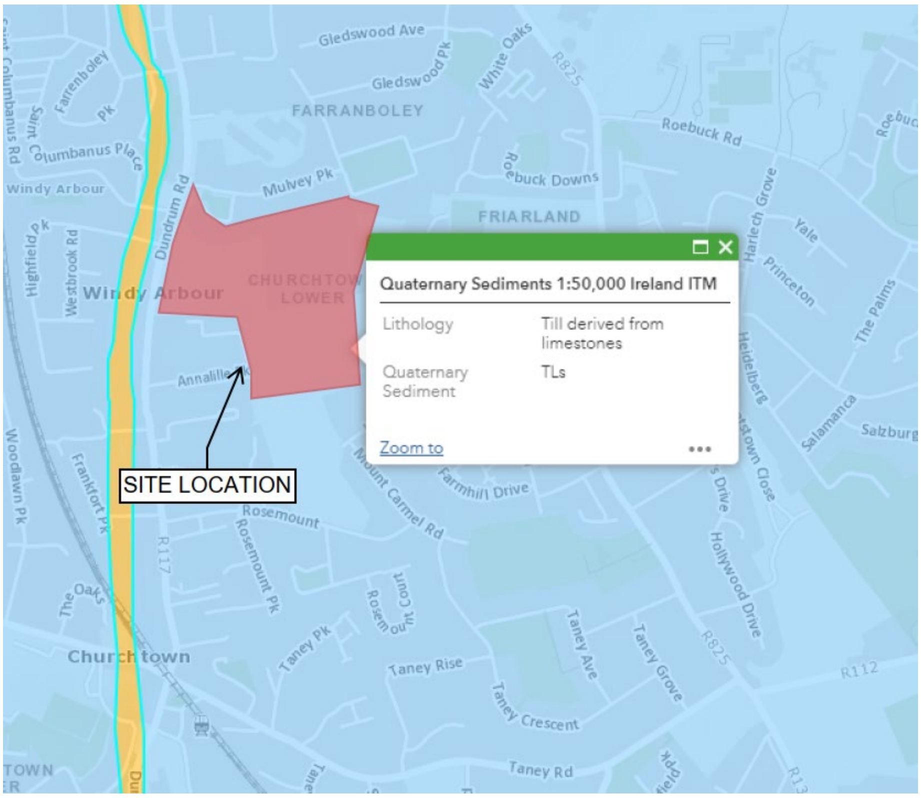

Figure 9.6: Extract from GSI Quaternary Mapping – Till Derived from Limestones *(GSI, n.d.).*

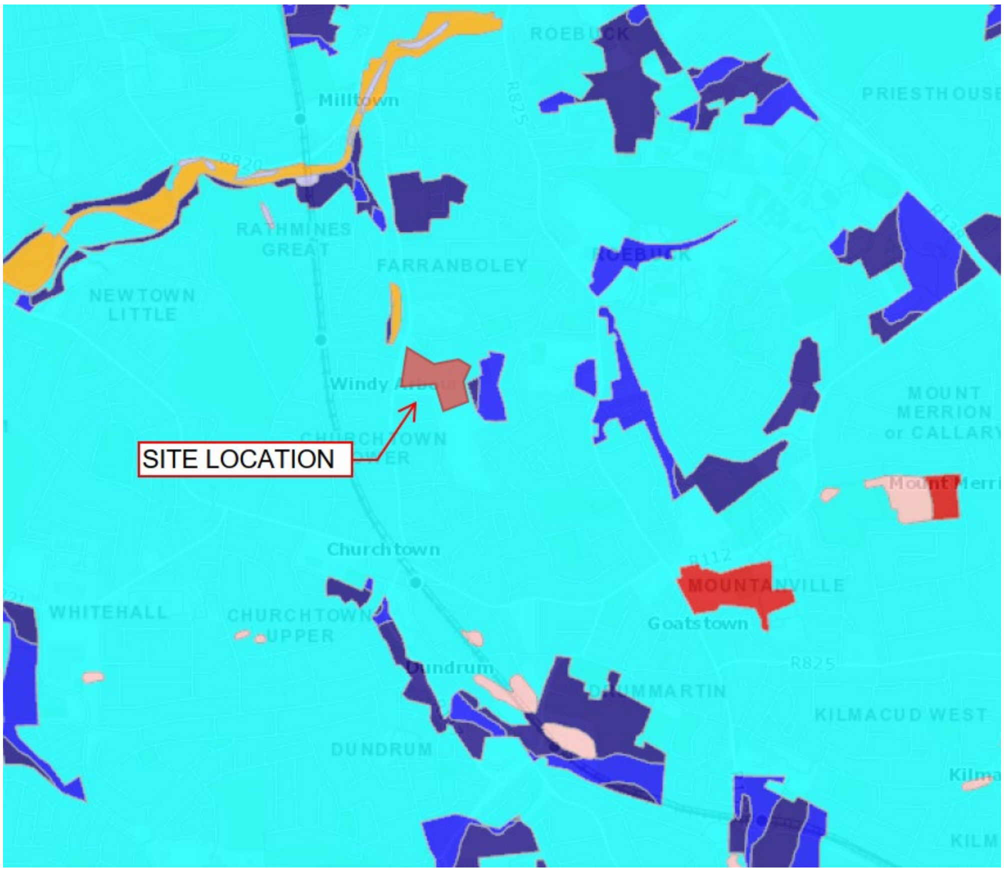

Figure 9.7: Extract from Teagasc Soil Map *(Teagasc, n.d.)* (blue = urban soil types).

9.3.6 Hydrogeology

9.3.6.1 Regional Hydrogeology

Groundwater can be defined as water that is stored in, or moves through, pores and cracks in sub soils. Aquifers are rocks or deposits that contain sufficient void spaces, and which are permeable enough to allow water to flow through them in significant quantities. The potential of the rock to store and transport water is governed by permeability, of which there are two types, intergranular and fissure permeability.

Intergranular permeability is found in sediments, sands, gravels, and clays. Fissure permeability is found in bedrock, where water moves through (and is stored in) cracks, fissures, planes, and solution openings.

When considering groundwater, it is important to consider the underlying geology, its complexity including faults, the large amounts of water and rainfall available for recharge and the overlying Quaternary deposits. The bedrock geology of this area is defined in Figure 9.3 as limestone with shale, (Dublin Calp Limestone).

The Geological Survey of Ireland has devised a system for classifying the aquifers in Ireland based on the hydrogeological characteristics, size and productivity of the groundwater resource. The three main classifications are Regionally Important Aquifers, Locally Important Aquifers and Poor Aquifers.

In Figure 9.8 the site area is classified by the GSI as a Locally Important Aquifer which is moderately productive only in local zones. This is an aquifer with a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres and the site consists primarily of Till (TLs) with no karst features in this area.

There are no groundwater wells or springs recorded on the GSI Groundwater Data Viewer mapping on or near the site. Limestones with this aquifer classification typically exhibit low storability.

A site investigation was carried out in 2021 which included assessment of soil infiltration rates based on the requirements of BRE digest 365. The results of these tests are included in the site investigation report and further detail on the methodology used is included within the infrastructure report appendices.

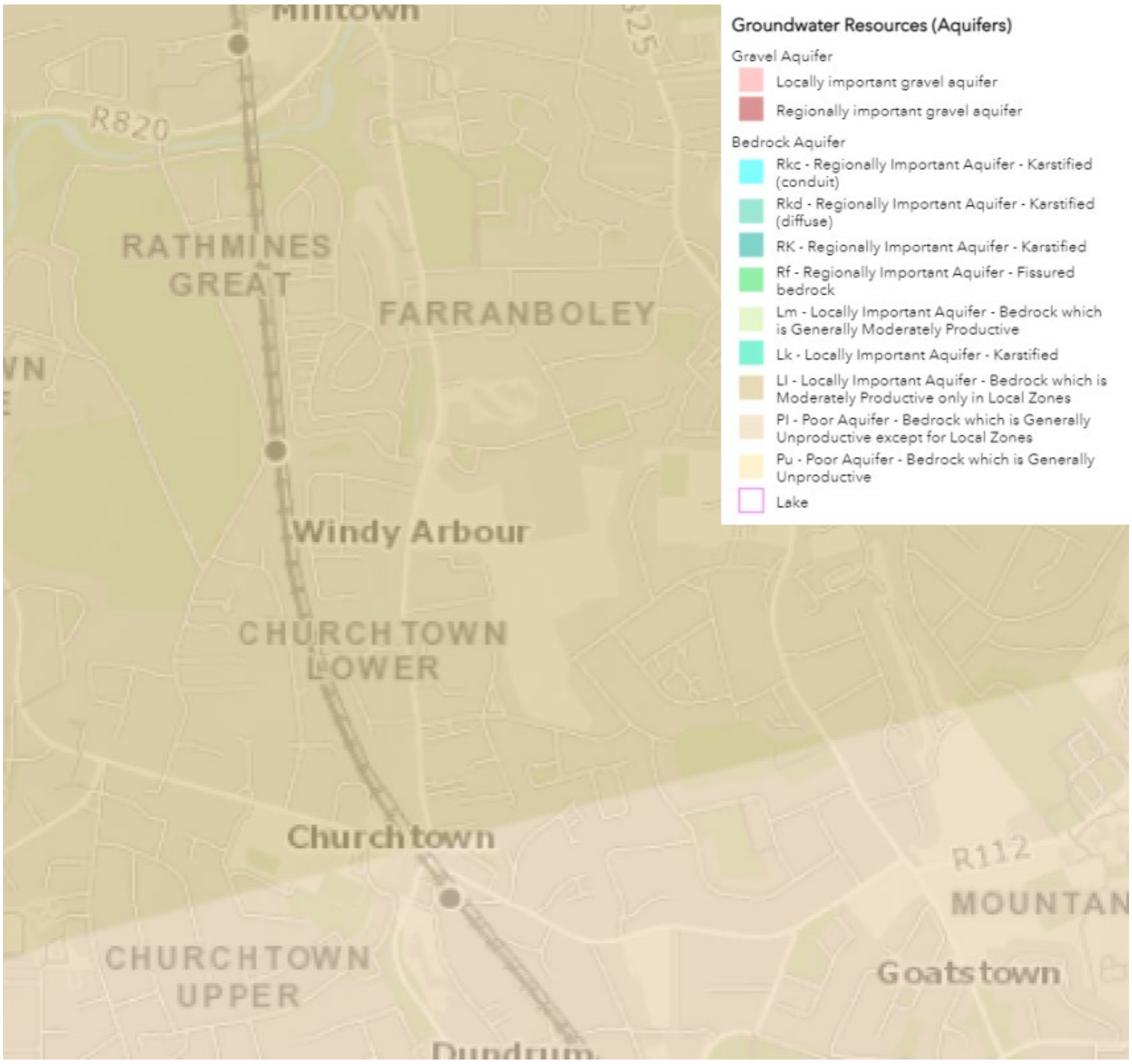

Figure 9.8: Extract from GSI Groundwater Aquifers – Bedrock Aquifer *(GSI, n.d.).*

9.3.6.2 Groundwater Vulnerability

Aquifer or groundwater vulnerability is a relative measure of the ease with which the groundwater could be contaminated by human activity and depends on the aquifer's intrinsic geological and hydrogeological characteristics. The vulnerability is determined by the permeability of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden.

Groundwater vulnerability categories are defined by the GSI as:

- **X - Extreme rock at or near surface or karst**
- **E - Extreme**
- **H - High**
- **M - Moderate**
- **L - Low**

These categories are used for mapping purposes and in the assessment of risk to ground waters. The classifications are based on the thickness and permeability of the sub-soils overlying the aquifer. The GSI has classified the aquifer vulnerability underlying the site in Figure 9.9 as “L” (low).

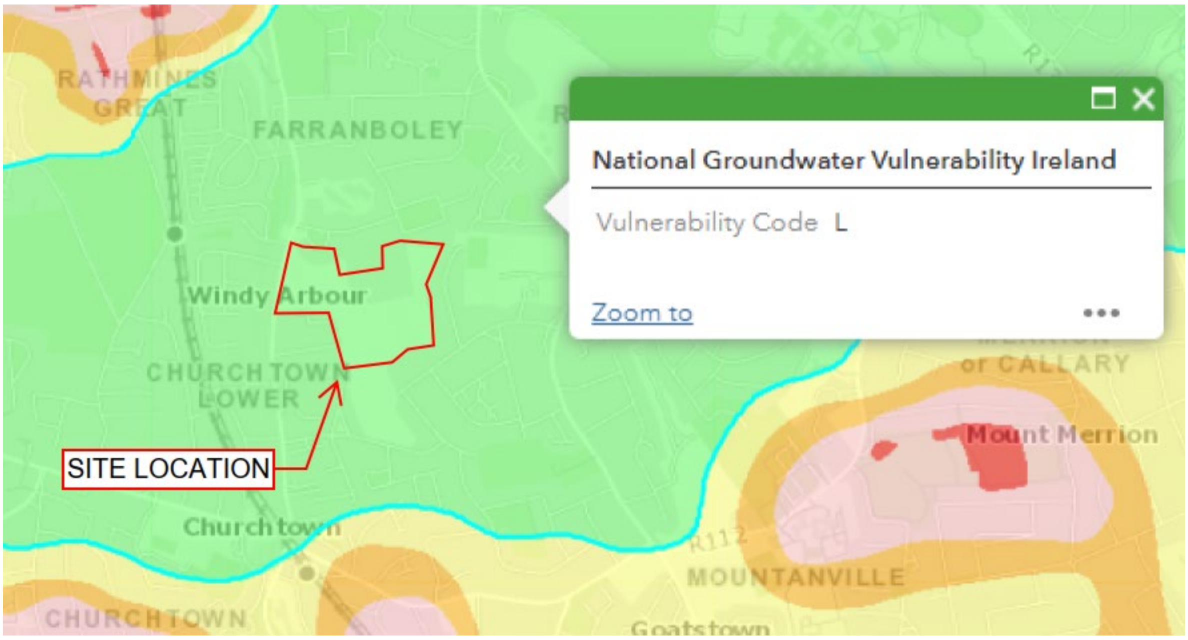

Figure 9.9: Extract from GSI Ground Water Data – Site has “L” Vulnerability *(GSI, n.d.).*

9.3.6.3 Local groundwater usage and source protection area

The GSI online map does not identify any significant or notable abstraction wells within the vicinity of the proposed development. No groundwater protection zones are marked in proximity to the site.

9.3.6.4 Recharge

Effective rainfall is the amount of rainfall available as either recharge to ground or run-off to surface water after evaporation and taken up by plants and per figure 9.10, this is 21mm/yr or 62mm/yr. The recharge coefficient, which is the proportion of effective rainfall to recharge groundwater, is estimated at 20% on the site. Recharge is the amount of rainfall that replenishes the aquifer, it is a function of the effective rainfall, the permeability and thickness of the subsoil and the aquifer characteristics.

Figure 9.10: Extract from GSI Groundwater Recharge Map *(GSI, n.d.).*

9.3.6.5 Groundwater

The characteristics of the underlying limestone bedrock and local topography appear to have a strong influence in the hydrogeology of the site. Groundwater is likely present within the upper levels of the bedrock with little or no groundwater present within the subsoils.

9.3.6.6 Groundwater Quality

Under the requirements of the Water Framework Directive, the Dublin groundwater body was classified as having an overall good status for water quality and quantity 2010-2015. The second cycle was undertaken between 2016-2021 and similarly, the overall groundwater body was classified as good. The third cycle is currently underway and will run from 2022-2027.

9.3.6.7 Groundwater Flood Risk

Groundwater flooding can occur on a site during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause periods of flooding.

9.4 Potential Impacts of the Proposed Project

9.4.1 Construction Phase

9.4.1.1 Direct

The predicted direct impacts of the proposed development on the land and soils of the surrounding environment are assessed in this section for the construction phase.

Houses in the development will have shallow strip foundations. Apartment Buildings development will be supported on piled foundations, which will extend until they reach the bedrock, approximately 8.5m below ground level. They will be socketed approximately 500mm into the rock. The piled foundations will have limited impact on the bedrock below, due to the capacity of the limestone to support the proposed foundations. There is potential for new pathways to be developed with the introduction of opes within the bedrock, however this is highly unlikely due to the nature of the bedrock and the knowledge that the area is a "locally important aquifer", which has little recharge and low vulnerability, and in effect is already highly impermeable. This is corroborated with the infiltration results from the site investigation.

It is anticipated that the general development site works, and excavation proposals will not impact the underlying bedrock geology during the construction phase. The maximum excavation depth for lift pits in basements is anticipated to extend to a depth of 4.5m below ground level. The impacts on the underlying bedrock geology arising from the construction phase will be minimal, with maximum excavation depths terminating c.4.0m above encountered bedrock levels.

The initial development of the site will involve extensive stripping of the topsoil and existing hardstanding (approximately the upper 300mm of soil). Excavation of subsoil layers is required to facilitate site development works, in particular the construction of foul and surface water sewers and underground surface water storage structures (attenuation). Bulk excavation is also required for several basements in the development. Reusable excavated soils and rock will be retained on-site for backfilling or drainage purposes to reduce the total volume of imported & exported material. Non-reusable surplus subsoil caused by excavations for foundations, roads and drainage should be stockpiled and taken off-site to a licensed landfill facility.

The associated construction earthworks and the removal of the topsoil and site hardstanding will expose subsoil layers to the effects of weathering. This will result in the erosion of soil, particularly in times of adverse weather conditions. Final buildings, roads and landscaping will eliminate these impacts. It is anticipated that the impact on soils arising from the construction phase will be negative, temporary and not significant.

The bulk earthworks are associated with the site strip, basement excavation, provision for foundations and service trenches. The estimated earthworks quantities are set out in table 9.3 below. The material excavated in the site strip is expected to be either made ground or Brown Boulder clay. Brown Boulder clay leading to Black Boulder clay is expected to be encountered during bulk excavation for the basement. Rock is not expected to be present within the excavated depth. The likely impact from the works will be moderate, permanent and negative.

Table 9.3: Predicted Bulk Excavation Volumes and Disposal.

Phase*	Site Strip** (m^3)	Bulk Excavation (m^3)	Fill Material (m^3)	Net (m^3)
Phase 1	3,229	13,929	0	17,158
Phase 2	3,513	5,759	1,109	8,163
Phase 3	6,397	14,818	2,739	18,476
Phase 4	5,840	869	2,324	4,385
Phase 5	2,299	24	1,027	1,296
Total	**21,278**	**35,399**	**7,199**	**49,478**

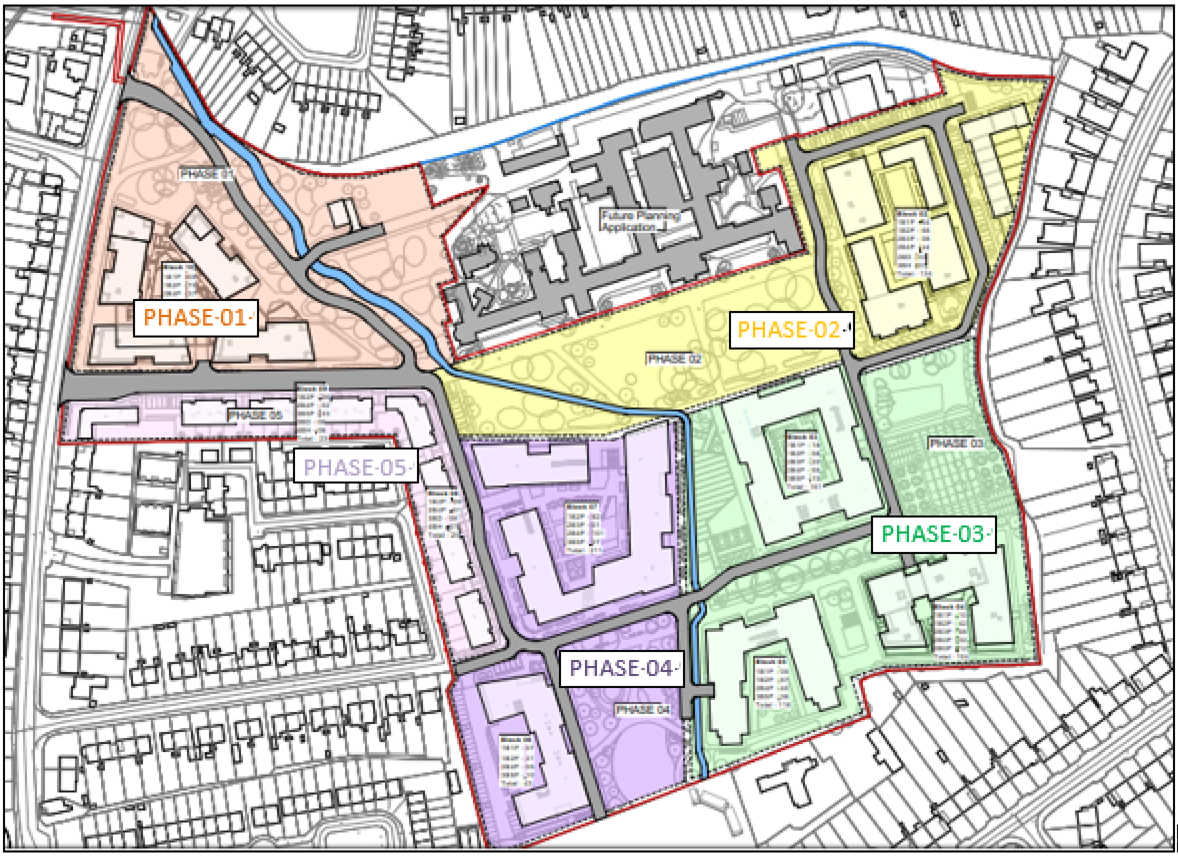

Figure 9.11: Plan View of the Development Showing the Block Layout and Outline Phasing.

9.4.1.2 Indirect

There are areas of the site covered in hardstanding and it will be necessary to remove surplus and potentially hazardous materials (soil contaminated with fuel from tanks/vehicles) from the site via trucks. As part of the construction process, there will also be increased traffic to the site to facilitate the delivery of the required materials. Large volumes of stone will be required for construction of the roads, foundations and services and large quantities of concrete, bricks, steel, tar etc. will also be required for the construction works on-site.

The regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes in the absence of mitigation.

9.4.1.3 Worst Case Scenario

There is a potential risk of localised contamination of the land and soils due to the accidental release of diesel fuel or similar hazardous materials during the construction phase, through the failure of secondary containment or a material handling accident on the site, resulting in a negative, moderate, permanent impact on the land and soils. Appropriate remediation measures would be required depending on the nature and extent of any contamination caused under such a scenario. Potential remediation measures may include the excavation and treatment of contaminated soil and in-situ remediation techniques.

Small amounts of asbestos may be encountered as part of the demolition of existing infrastructure on site. Asbestos survey to be prepared in advance of any works being undertaken on site. In the unlikely event that asbestos is encountered DLRCC are to be notified immediately, and a specialist contractor is to be commissioned to remove and dispose of any asbestos safely.

9.4.2 Operational Phase

9.4.2.1 Direct

Buildings, roads and landscaping for the development will negate the initial negative impact from the construction phase and will protect the exposed soils from ongoing weathering and erosion. The affects to the land & soils from the operational phase of the project will be neutral, imperceptible, and permanent.

9.4.2.2 Indirect

No indirect impacts on the land and soils are predicted for the operational phase.

9.4.2.3 Worst Case Scenario

On completion of the construction phase, it is not envisaged that there would be a further direct impact on the soil or geological structure. The day-to-day activities of the completed development would be unlikely to have any direct impact on the land and soils in the surrounding environment.

9.5 Mitigation Measures

9.5.1 Construction Phase

LS_1: To prevent the accidental release of hazardous materials (fuels, paints, cleaning agents, etc.) during construction site activity all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project.

Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the project.

LS_2: Sediment runoff will be minimised by standard engineering measures including sediment skirts around soil stockpiles, sediment retention barriers in surface water drains and the use of adequate construction roads.

LS_3: The provision of wheel wash areas at the construction entrances to the development will minimise the amount of soil deposited on the surrounding road network.

LS_4: Measures will be implemented throughout the construction stage to minimise the risk of contamination of the soil from accidental oil and petrol leakage from site plant. All lock up/storage areas will have a metal or concrete leak proof floor. Any accidental chemical spillages should be cleaned up and disposed of in an approved landfill site in accordance with the chemical manufacturer's recommendations.

LS_5: Exposed soil surfaces to be protected with 150mm tone hardcore layer.

9.5.2 Operational Phase

During the operational phase of the proposed development there is limited potential for site activities to impact on the geological environment of the area and therefore no mitigation measures are required.

Ensuring appropriately designed and constructed site services will protect the soils and geology from future contamination arising from operation of the developments.

9.6 Residual Impacts

9.6.1 Construction Phase

The residual impacts are the final or intended effects which occur after the proposed mitigation measures have been implemented.

If the proposed mitigation measures in section 9.5 are implemented then the residual impacts from the construction phase of the development on the land and soils in the surrounding environment will be negative, temporary, and not significant.

9.6.2 Operational Phase

The residual impacts on the surrounding land and soils environment due to the operational phase works will be neutral, imperceptible, and permanent.

9.7 Monitoring

9.7.1 Construction Phase

The contractor will be required to monitor the implemented mitigation measures proposed as part of the EIAR document and CEMP.

9.7.2 Operational Phase

No further impact on the land and soils is anticipated during the operational phase and therefore no monitoring is required.

9.8 Interactions

9.8.1 Public Health

There is the potential for public health issues to arise due to the contamination of the land and soils due to the construction works. If the proposed mitigation measures are applied during the construction process, then the danger to public health will be negative, imperceptible and short term.

9.8.2 Any Other Applicable

There are interactions between land, soils, geology and hydrogeology and material assets and built assets (traffic). Throughout the construction stage of the project, there will be an increase in traffic on the roads due to deliveries to and from the site, site personnel and construction works. This impact will be negative, temporary and significant. There will be an increase in traffic in the general vicinity of the site during the operational stage, this will be negative, permanent and slight.

There are interactions between land, soils, geology and hydrogeology and surface water, with some surface water conveyed and stored in SuDS features such as soakaways and discharging to the ground where possible, replicating the existing greenfield site drainage as closely as possible. The likely impact will be permanent, slight and neutral.

There are interactions between land, soils, geology and hydrogeology and material assets, with the construction of basements and drainage/utilities impacting the quantity of soil and subsoil as these materials will be removed to facilitate construction. The likely impact will be moderate, permanent and negative.

There are interactions between lands and soils and material assets (waste), during the construction phase, excavated soil, stone, clay and made ground (c. 56,677 m3) will be generated from the excavations required to facilitate site levelling and construction of the new foundations. It is estimated that c. 49,478 m3 of excavated material will need to be removed off-site. However, it is envisaged that c. 7,199 m3 material will be reused on-site as fill. Where material must be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 9 & 18 and the requirements of the C&D RWMP (Appendix 18.1), will ensure the effect is long-term, imperceptible, and neutral.

There are interactions between land, soils, geology and hydrogeology and air quality. It is outlined by AWN that construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. However, it is determined that with the appropriate mitigation measures to prevent fugitive dust emissions, it is therefore predicted that there will be no significant interactions between air quality and land and soils.

There are interactions between land, soils, geology and hydrogeology and archaeology. During the Construction Phase, there is the potential for direct impacts on archaeological features because of construction activities, primarily ground excavation.

There are interactions between land, soils, geology and hydrogeology and the biodiversity. During the construction phase, excavated soil, stone, clay and made ground (c. 56,677 m^3) will be generated from the excavations required to facilitate site levelling and construction of the new foundations. It is estimated that c. 49,478 m^3 of excavated material will need to be removed off-site. However, it is envisaged that c. 7,199 m^3 material will be reused on-site as fill. Where material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. As such, there is the potential for impacts on local biodiversity via the proposed excavation and re-profiling works. There will be a loss of some vegetation on site, but this is not expected to impact significantly on surrounding areas Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 9, the predicted effects on biodiversity are short to long term, imperceptible, and neutral. The biodiversity of the subject site is likely to improve following the completion of landscaping works.

9.9 Cumulative Impacts

The potential cumulative impacts of the proposed development on Land and Soils have been considered in conjunction with developments in the surrounding area. We outline the status of each project and the expected cumulative impacts associated with this development.

- **D16A/0818 – Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14.**
  The proposed site is approximately 1.35km away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **ABP31013821 – Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14.**
  The proposed site is approximately 770m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **D19A/0162 – Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14.**
  The proposed site is approximately 650m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **ABP30835320 – The Car Sales Premises Currently Known as Vector Motors, Goatstown Road, Dublin 14, D14FD23.**
  The proposed site is approximately 650m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **D20A/0328 – University College Dublin, Belfield, Dublin 4.**
  The proposed site is approximately 1.25km away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **ABP30943021 – 2.12ha At Our Lady's Grove, Goatstown Road, Dublin 14.**
  The proposed site is approximately 1.25km away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **ABP31128721 – c0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14.**
  This development has been submitted for planning and is currently awaiting decision. The proposed site is approximately 400m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **ABP31182621 – Lands at Knockrabo, Mount Anville Road, Dublin 14.**
  This development has been submitted for planning and is currently awaiting decision. The proposed site is approximately 1000m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **TC06D.311553 – Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14.**
  The proposed development has not been submitted for planning yet. The proposed site is approximately 650m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **CMH Future S34 – Lands at Central Mental Hospital, Dundrum Road, Dublin 14.**
  The proposed development has not been submitted for planning yet. The S34 development (Apartment blocks 1, 11 and 12, housing and refurbishment of the existing

Victorian buildings) do not have any proposed basements and therefore it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

- **ABP31293522 – Sommerville House, Dundrum Road, Dublin 14.**

  The proposed development has been submitted for planning and is currently awaiting decision. The proposed site is approximately 150m from our development. The proposal involves the construction of 111no. units. There is no indication of basements within the development and therefore it is not anticipated that there will be any significant cumulative impacts on the Land, Soils, Geology or Hydrogeology during the construction or operational phase of the developments.

9.10 'Do-Nothing' Effect

Under a '*do-nothing'* scenario there would be no change to the soil environment at the application site.

9.11 Difficulties in Compiling the Chapter

No difficulties were encountered in completing this section.

9.12 Conclusion

This chapter of the EIAR has assessed the impacts of the proposed Strategic Housing Development (SHD) at the lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14 on the land, soils, geology and hydrogeology. The existing baseline scenario of the site and surrounds have been reviewed with a desktop study, site walkaround and site investigation (included as appendix 9.1). Based on the proposed development, any potential impacts during both the construction and operational stages on the land, soils, geology and hydrogeology have been reviewed, these are listed in section 9.4 of this chapter. From these potential impacts, a set of mitigation measures are set out to be implemented throughout the project.

As part of the construction process for the foundations for the houses and apartment blocks, as well as the general site works, there are risks associated with potential negative impacts on the lands, soils, geology and hydrogeology. The mitigation measures set out in this chapter, along with the measures set out within this EIAR, aims to reduce the effect these impacts will have on the surrounding land, soils, geology and hydrogeology.

There are several proposed building developments in this part of South Dublin. None are in close proximity to the site except the future development of the Central Mental Hospital buildings and immediate surrounds. This is adjacent to the subject site but the nature of the proposed works means that it's cumulative impact is not significant.

9.13 References

Guidelines for the Preparation of Soil, Geology and Hydrogeology Chapters of Environment Impact Statements (Institute of Geologists of Ireland (IGI) 2013);

Draft Guidelines on the Information to be contained in Environmental Impact Assessments Reports (EPA 2017)

Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, European Commission, 2017

Revised Guidelines on the Information to be contained in Environmental Impact Statements (EPA 2015a);

Advice Notes for Preparing Environmental Impact Statements (EPA 2015b);

Current & historical Ordnance Survey Maps (1829 – 1842,1837 – 1842 & 1888, 1913),

Aerial photography (1995 & 2000),

The Geology of Ireland, Ed. C. H. Holland, (Dunedin Academic Press, 2001),

Geological maps of the site produced by the GSI,

Quaternary Maps,

Bedrock Mapping,

Groundwater Vulnerability Mapping,

Aquifer Yield Maps.

APPENDIX 9.1 – SITE INVESTIGATION REPORT

See Volume 2 – Appendices

10.0 HYDROLOGY

10.1 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 was prepared by Marcelo Allende (BSc BEng), 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). 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.

10.2 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 (i.e., where its assessment are applicable to all large scale developments).

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 normally 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 10.1.

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);
- Surface water features within the area of the site;
- Inter-relationship between groundwater and surface water.

10.2.1 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:

- Infrastructure Report, Dundrum Central. BMCE, January 2022;
- Site Specific Flood Risk Assessment, Dundrum Central. BMCE, January 2022;
- Construction & Environmental Management Plan, Dundrum Central. BMCE, January 2022;
- Site Investigation Report, Dundrum Central Development. Site Investigations Ltd, November 2021;
- Various design plans and drawings

10.3 Baseline Environment

The receiving environment is discussed in terms of water and hydrology in the following points.

10.3.1 Site Area Description

The site is located in the north of Dundrum town centre, on lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14.

In terms of the local topography, there is considerable variation in ground levels across the site. In broad terms the main part of the site slopes down gradually from the southwest corner towards the northeast corner, from +45.21m OD down to +38.76m OD. The western portion of the site slopes down towards the Dundrum Road entrance at +38.44m OD. These low points are the furthest locations from the high topography in the south corner at a distance of over 400m away.

10.3.2 Hydrology

The proposed development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and Dodder River sub-catchment (WFD name: Dodder_SC_010, Id 09_16) (EPA, 2021).

The Slang River runs from south of Dundrum Village northwards down to the River Dodder and passes c. 70 m west of the western site boundary on the Dundrum Road. The Slang River joins the River Dodder c. 850 m north of the development site. From here the River Dodder flows for approx. 2.0km before discharging into the Liffey Estuary lower transitional waterbody which in turn discharges into Dublin Bay coastal waterbody which includes Special Area of Conservation (SAC)/ proposed Natural Heritage Area (pNHA). There is a hydrological connection between the drainage ditches on site to the Elm Park Stream but no direct connection to the Slang River. Figure 10.1 below presents the site location in relation to the hydrological environment.

Figure 10.1: Site Location and Hydrological environment.

With regard to the local drainage, a drainage ditch runs through the site and northwards along the eastern boundary, as shown in Figure 10.2 below. The existing buildings on site discharge to a combined drainage system on site. This system discharges to the 300mm diameter combined sewer in the Dundrum Road, connecting at the current site entrance.

A 525mm diameter surface water sewer enters the south side of the site from Rosemount Green (refer to Figure 10.1 below). This connects into an open drainage ditch which runs west to east across the site along the southern edge of the walled garden and discharges through a grated opening in the boundary wall (location B1 in Figure 2.1 below) where it continues as a drainage ditch running northwards just along and outside of the east boundary wall. This ditch joins the Elm Park Stream in Goatstown c. 220m from the subject proposed development site. The Elm Park Stream is culverted for part of its course and discharges through UCD before emerging in Elm Park Golf Course, from where the watercourse finally discharges to Dublin Bay coastal waterbody just south at Merrion Gates c. 2.8 Km to the northeast of the subject site.

Figure 10.2: Aerial view of the site with water drainage indicated (Source: BMCE, 2022).

In addition, there is a minor existing surface water input to the existing open drainage ditch. The hydrological connections between the site and existing waterbodies is presented in Figure 10.3 below. In addition, Figures 10.4 and 10.5 present geological cross sections in the context of local drainage and topography based on the Site Investigation Report carried out by Site Investigations Ltd in November 2021.

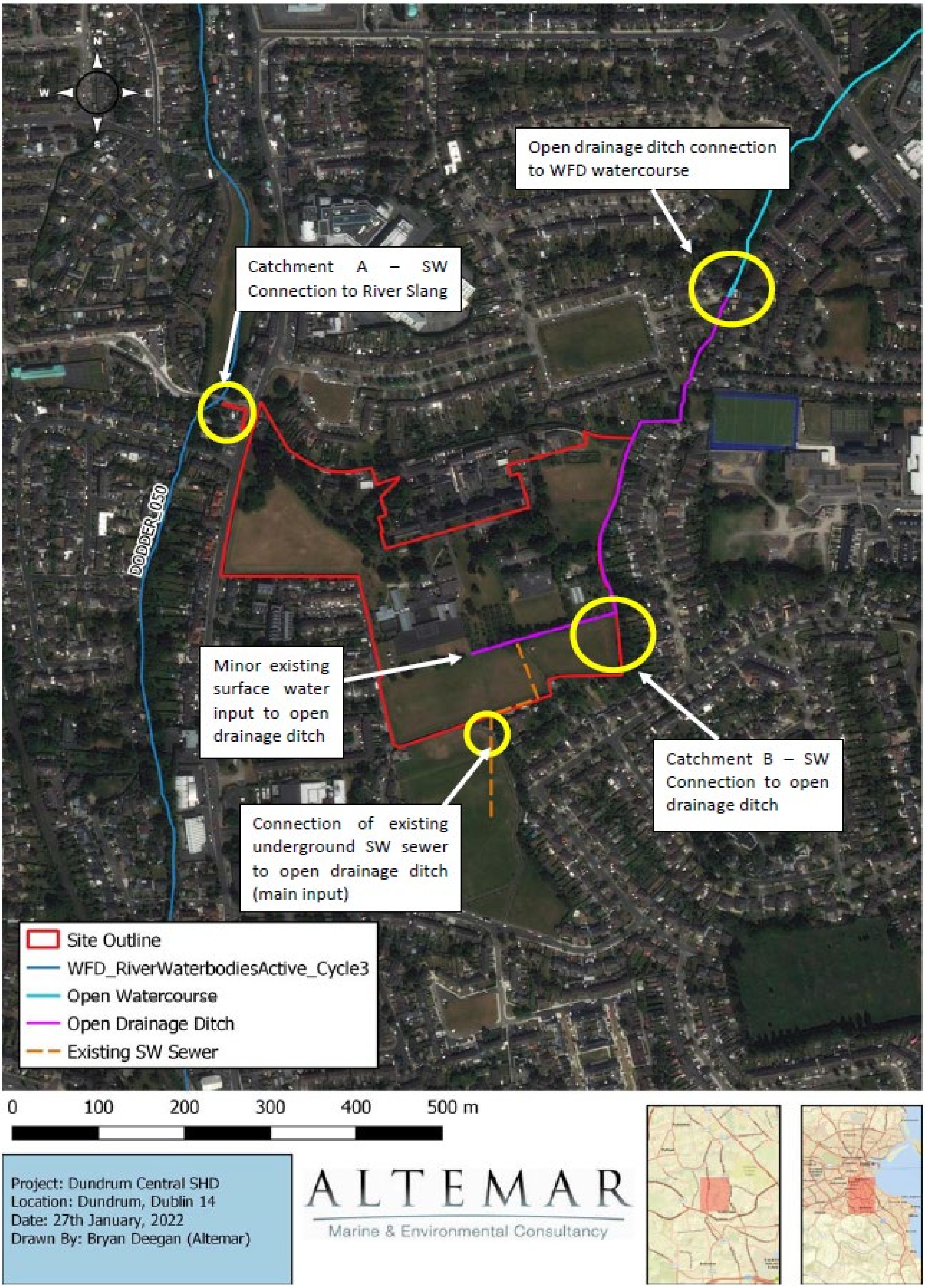

Figure 10.3: Outline of hydrological connections between waterbodies. (Source: Altemar, 2022).

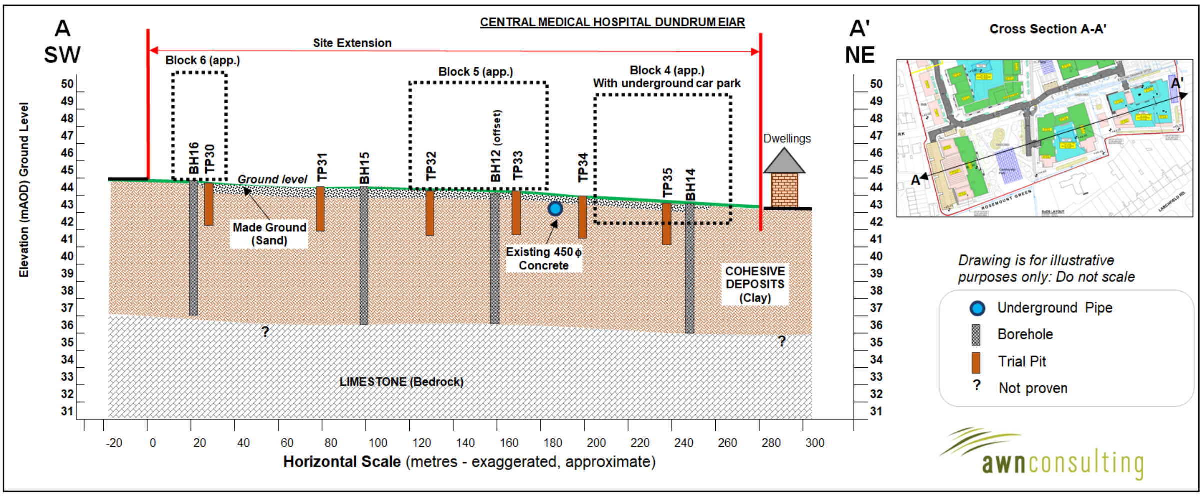

Figure 10.4: Local Cross Section A-A' (SW-NE).

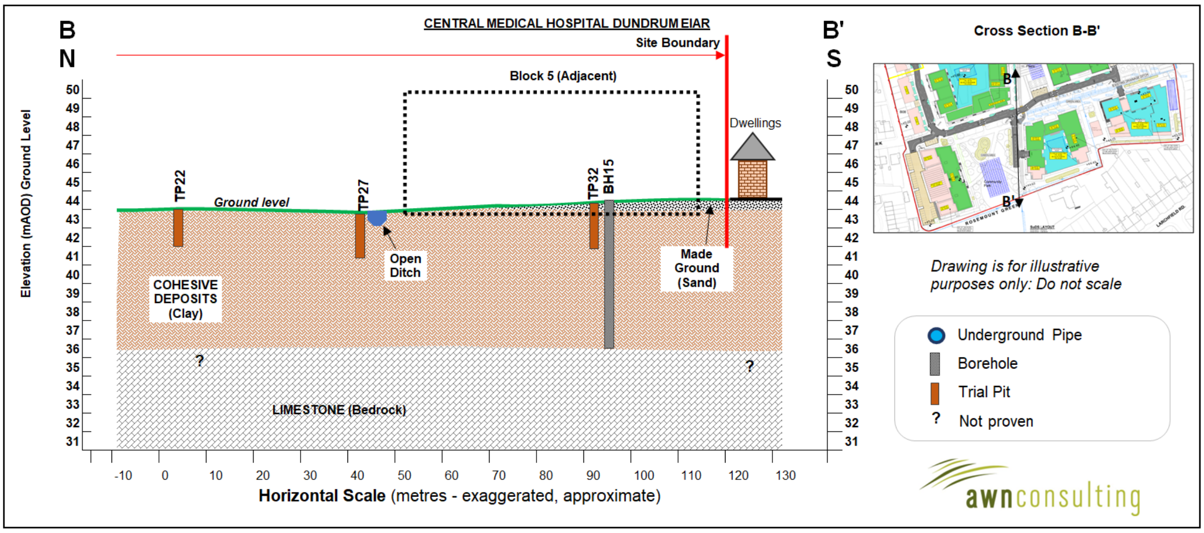

Figure 10.5: Local Cross Section B-B' (N-S).

As can be seen above (Figure 10.3), there is an indirect connection to the River Slang through surface water drainage on the existing site.

According to the Geohive historical maps (25 inches, 1888-1913) the existing surface water sewer mentioned above would have replaced the old Mulvey Park stream which used to drain the area from Taney hill, south of the site, prior to urbanisation.

According to the NPWS (2022) on-line database there are no special protected areas on or in the vicinity of the subject site.

10.3.3 Existing Foul Water Service

The foul drainage from the existing buildings on site drains to a combined drainage system on site which discharges to the 300mm diameter combined sewer on the Dundrum Road. The combined sewer drains in a northerly direction towards the Dodder River and eventually discharges into Ringsend WWTP.

10.3.4 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 (extended due to Covid situation) with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). It should be noted that the third cycle of RBMP 2022-2027 is currently open for public consultation and is due to be adopted in 2022.

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 Slang River in this area is associated with the WFD surface waterbody Dodder_050. The most recent published status (www.epa.ie – River Waterbody WFD Status 2013-2018) of this waterbody is 'Moderate' and its environmental risk is qualified by the WFD as 'At Risk of not achieving good status'. This condition is due to a moderate biological status (phytobenthos, invertebrate and fish status or potential) and poor dissolved oxygen conditions. In addition, its chemical status failed to achieve good status due to a Benzo(a)pyrene failure.

The EPA does not collect water quality data for the Elm Park Stream and does not have an assigned status and risk currently. The Elm Park Stream is associated with the WFD surface waterbody Brewery Stream_010.

The above status for the Slang River is related to data from 1 no. EPA water quality station in the Dodder River located c. 1.9 Km downstream of the subject site ('Footbridge, Beaver Row', refer to Figure 10.3 below).

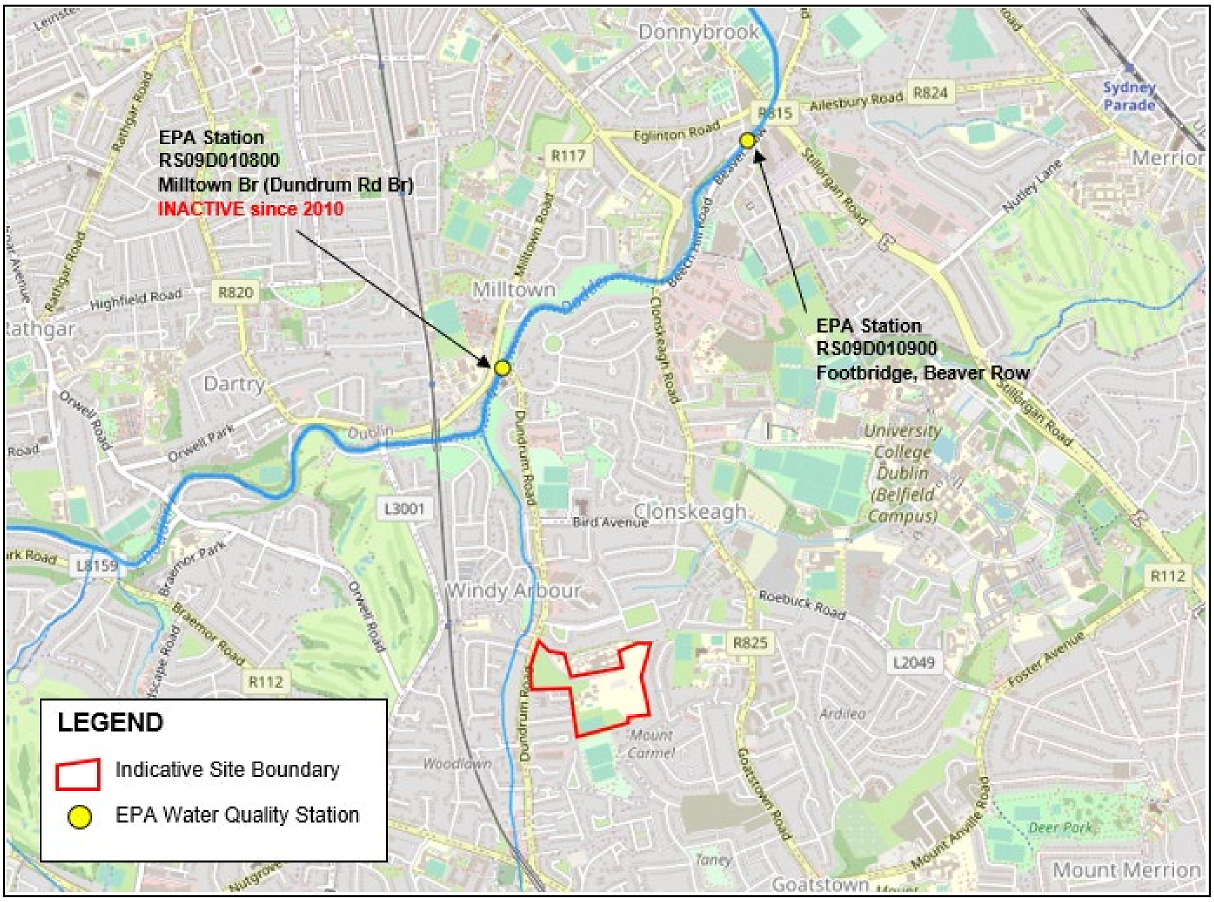

Figure 10.6: EPA Water Quality Stations near of the Subject Site. (Source: EPA, 2022.)

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 10.1 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 Dodder River are shown in Table 10.2 below.

Table 10.1: 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 10.2: Q Ratings for Dodder River.

RIVER	Station No.	Location	1981	1984	1988	1991	2007	2010	2013	2016	2019
Dodder	RS09D010900	Footbridge, Beaver Row'	2-3	2-3	3	3	3	4	4	3-4	3-4

As it can be seen from Q Ratings above, the Dodder River has recorded a 'Moderate' status for their latest records, which means an 'Slightly Polluted' water quality.

10.3.5 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 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. 2.9 Km to the northeast of the subject site.

The Dublin Bay coastal waterbody has a WFD status (2013-2018) of 'Good' and a WFD risk score of 'Not at risk'. The surface water quality data for the Liffey Estuary Lower and Dublin Bay (EPA, 2021) indicate that they are 'Unpolluted'. 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.

10.3.6 Flooding

According to the site specific Flood Risk Assessment carried out by BMCE (2022), 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 Dodder River or the internal drainage network above mentioned in this area.

10.3.7 Rating of Importance of Hydrological Attributes

Based on the TII methodology (2009) (See Appendix 10.1), 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.

10.4 The Proposed Project

The Land Development Agency intend to apply to An Bord Pleanála (the Board) for permission for a Strategic Housing Development with a total application site area of c.9.6 ha, on lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14.

The development with a total gross floor area of c. 106,770 sq m (c. 106,692 sq m excluding retained existing buildings), will consist of 977 no. residential units and 3,889 sq m of non-residential uses.

The development also comprises the demolition of existing structures, alterations and partial demolition of the perimeter wall.

The development aspects related to the water/ hydrological component are detailed below. A full development description is included in Chapter 5.0 of this document.

10.4.1 Surface Water Drainage

10.4.1.1 Construction Phase

A method statement will be prepared by the contractor and agreed with Dún Laoghaire-Rathdown County Council prior to commencement of the works, detailing the mitigation measures (already included in section 10.6 below) to be taken to ensure that no water run-off from the site occurs during the construction period. 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 (to be determined) and collected for treatment based on the conditions of a DLRCC and/or Irish Water licence, prior to pumping to the surface sewer network. There is a drainage ditch running through the site (refer to Section 10.3.2 above). Direct uncontrolled run-off into this will not be allowed.

A new surface water sewer will be laid from the site entrance to a manhole adjacent to the River Slang on St. Columbanus' Road. The trench excavation for this drain is 2metres below ground level approx. and no significant groundwater ingress is not expected into the trench during construction. Trench boxing & pumping will be required to control any groundwater ingress into pipe trenches that does occur. Any particular requirements in respect of de-watering (and all other construction management requirements) are subject to agreement by the contractor with Dún Laoghaire-Rathdown County Council.

During excavation works, only limited groundwater ingress is expected into the excavation, given the ground conditions i.e. clay soils, associated to localised perched water. As such, Some minor de-watering will still be required to remove any groundwater or rainwater accumulations (refer to Chapter 9.0).

Groundwater in the excavations will be pumped out. As noted, it is estimated that the required pumping rate will be low. It is envisaged that the water to be discharged will be clean groundwater as the areas to be excavated are not contaminated (based on site investigation information). It is therefore proposed that the water be discharged into the existing sewer network on the surrounding public roads under a discharge license regulated by Dún Laoghaire-Rathdown County Council / Irish Water, issued under the Water Pollution Act

(Section 4 License). To confirm this, extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the sewers. In case that some contamination in encountered, silt traps should be used to remove silt and any significant suspended solids prior to discharge from the site in accordance with the requirements of the discharge license.

10.4.1.2 Operational Phase

The proposed surface water drainage system is designed to comply with the 'Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Technical Document – Volume 2, New Developments, 2005' and the 'Greater Dublin Regional Code of Practice for Drainage Works, V6.0 2005'. CIRIA Design Manuals C753, C697 and C609 have also been used to design the surface water drainage system within the site.

The development will be split into three catchments. The catchments will be attenuated separately by means of blue roofs and attenuation tanks, which follow approximately the existing site topography and natural drainage routes on site. Catchment A drains to the Slang, via an existing surface water sewer. Catchments B drains to the open drainage ditch on site (B1) or just outside the site (B2). Refer to Figure 10.7 below for details for connection points 'A' , 'B1' and 'B2' and catchments.

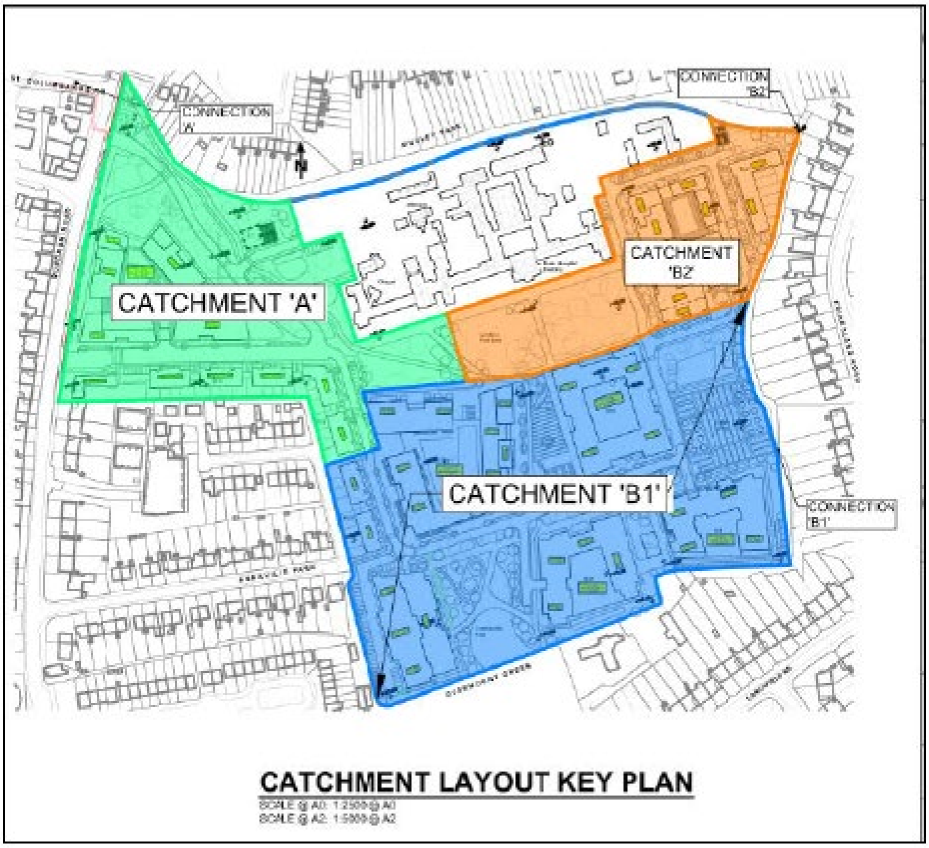

Figure 10.7: Proposed Catchment Strategy. (Source: BMCE, 2022.)

The total area will collect all the surface water drainage into an underground pipe network. The drainage system will use different SuDS measures in the treatment train. Surface materials will consist of, but not limited to permeable paving, intensive and extensive green/blue roofs and podiums, impermeable roofs, bio-retention areas, filter strips, a detention basin, impermeable hardstanding, tree pits and landscaped areas. Refer to the Infrastructure Report (BMCE, 2022) for further details.

The GDSDS requires that flood waters be managed within the site for a 1 in 100-year flood. The surface water from each sub-catchment will flow into an attenuation tank or detention basin, which has been designed for that drained area. Discharge flow is restricted to the greenfield equivalent runoff for the catchment area.

Basements or under croft car parks are covered by podium slabs and do not receive direct rainfall. There will be limited outflow from these areas. They are drained by a separate system that outfalls to a petrol interceptor buried below the ground floor slab. From there, the car park drainage is pumped to the nearest surface water manhole, in accordance with Irish Water requirements, and is not at risk of any backflow from the surface water system during storm conditions.

10.4.2 Foul Water

The proposed foul drainage system will be designed to take discharges from the new residential units. There is a small amount of commercial/retail space on site. Drainage from any kitchen/canteen facilities will discharge through a grease separator designed. The foul system will connect to the Irish Water network at the existing 300mm combined sewer in the Dundrum Road surface. The combined sewer drains in a northerly direction towards the Dodder River and eventually discharges into Ringsend WWTP. The peak wastewater discharge is estimated at 0.952 l/s (BMCE, 2022).

A Pre-connection Enquiry application was submitted to Irish Water to confirm capacity in the receiving network and a Confirmation of Feasibility letter was obtained on the 23rd of September 2021. Refer to the Infrastructure Report (BMCE, 2022) for further details.

10.4.2 Water Supply

There is an existing 9-inch public watermain in Dundrum Road. The existing buildings on site are serviced from this main. This watermain is to be upgraded to a 250mm diameter HDPE pipe, to Irish Water requirements, to cater for the development. This has been set out in the specific comments in the Irish Water confirmation of feasibility letter of the 23rd of September 2021.

10.5 Potential Impacts of the Proposed Project

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 9.0. Waste Management is also considered an interaction.

10.5.1 Construction Phase

10.5.1.1 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 10.6 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; however the increasement of sediments loading in run-off is considered as a potential impact .

10.5.1.2 Contamination of Local Water Courses

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 in order to avoid potential contamination of local water courses 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.

10.5.2 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 Infrastructure Report (BMCE, 2022) for further details.

The site will be served by the existing water supply and foul water network.

10.5.2.1 Effects on Local Recharge due to Increase in Hardstanding Area

There will be an increase in hardstanding area (c. 7,570 m^2, BMCE, 2022) 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 **long term-imperceptible-neutral** and **negligible** magnitude based on the overall size of the underlying aquifer.

10.5.2.2 Effects on Water Quality in Dublin Bay

As mentioned above, the peak wastewater discharge is calculated at 0.952 l/s (BMCE, 2022). 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 a planning for a new upgrade to this facility was received in 2019 and is currently in process.

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 0.952 l/s (which would equate to 0.009% 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). 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 (0.009% 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.

Therefore, there is no likely impact on the water quality in Dublin Bay due to the operation of the proposed development and the potential for impact is classified as **long term-imperceptible-neutral** and **negligible** magnitude.

10.5.3 Potential Impacts on Elm Park Stream – Worst Case Scenario

In order to assess potential impacts on the Elm Park Stream which, as stated above, has an 'Unassigned' WFD status, potential sources during both the construction and operational phases are considered. As also mentioned above, there is a hydrological connection between the drainage ditches on site to the Elm Park Stream, which is located c. 470 m downstream the subject site. For the purposes of undertaking the potential of any hydrological linkages, all potential sources of contamination are considered without taking account of any mitigation measures intended to avoid or reduce harmful effects of the proposed project (i.e. a worst-case scenario). Construction sources (short-term) and operational sources (long-term) are considered below.

10.5.2.1 Construction Phase

Hydrocarbons or any hazardous chemicals will be stored in specific bunded areas. Refuelling of plant and machinery will also be carried out in bunded areas to minimise risk of any potential being discharged from the site. As a worst-case scenario, a rupture of a 1,000 litre tank to ground is considered in this analysis which disregards the effect of bunding.

Leakage may occur from construction site equipment. As a worst-case scenario an unmitigated leak of 300 litres is considered.

These potential leakages would be single short-term events.

In addition, construction requires soil excavation and removal. Unmitigated run-off could contain a high concentration of suspended solids during earthworks. These could be considered intermittent short-term events, i.e. if adequate mitigation measures stated below and incorporated in the Construction Environmental Management Plan (CEMP) fail.

There is a direct open-water pathway between the site and the Elm Park Stream. Should any silt-laden stormwater from construction or hydrocarbon-contaminated water from a construction vehicle leak/tank leak manage to enter into the surface water sewer, the suspended solids will naturally settle within the ditch drainage ditches; however, in the event of a worst case hydrocarbon leak of 1,000 litres this would be diluted to background levels (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) by the time the stormwater reaches the Elm Park Stream (470m downgradient).

10.5.2.2 Operational Phase

The development site includes basement and under croft car parking areas. Leakage of petrol/ diesel fuel may occur from these areas, run-off may contain a worst-case scenario of 70 litres for example. Any corresponding risk here would be mitigated by the interception storage system which comprises permeable paving and filter drains.

As mentioned above, the stormwater drainage system follows SuDS measures before discharging into the mentioned open drainage ditch following the characteristics of a greenfield run-off. It should be noted that the worst-case scenario (70 litres) disregards the effect of SuDS and petrol interceptors.

The potential for a release is low as there is no bulk fuel/chemical storage and no silt laden run-off. Stormwater will be collected by a drainage system which includes SuDS measures, an attenuation system and oil/ petrol interceptors prior to discharge off-site. In addition, the potential for hydrocarbon discharge is quite minimal based on an individual vehicle (70 litres) leak being the only source for hydrocarbon release. However, even if the operation of the proposed SuDS and interceptor systems are excluded from consideration, there is 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) in the worst case scenarios described above at section 3.2. The volume of contaminant release is low and combined with the significant attenuation within the open drainage network, hydrocarbons will dilute to background levels 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 at the Elm Park Stream.

Therefore, there is no likely impact on the WFD classification elements for surface water body status either ecologically or chemically as the potential for impact is **temporary** and **negligible**.

10.6 Mitigation 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 below.

The site is drained by the public stormwater 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. 2.9 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.

10.6.1 Construction Phase

An Outline Construction Environmental Management Plan (CEMP) has been prepared by BMCE (2022) for the proposed development and is included with the planning documentation. However, 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 detailed 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 detailed 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 and these measures will be included in the detailed CEMP. The mitigation measures below are associated to the identified potential impacts, i.e.:

- Increased Sediments Loading in Run-off
- Contamination of Local Water Courses

10.6.1.1 Surface Water Run-off

As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, the following mitigations will be put in place to manage run-off during the construction phase. It has to be noted that these mitigation measures were considered in the impact assessment below.

H_1: 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 DLRCC and/or Irish Water licence, prior to pumping to the surface sewer network.

H_2: Direct uncontrolled run-off into the drainage ditch running through the site will not be allowed.

H_3: 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.

H_4: Any discharge of construction water required during the construction phase 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.

H_5: 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 by personnel with special qualifications in environmental monitoring and water quality to ensure that the water is of sufficient quality to discharge to the sewer. The use of silt 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 (Site Investigations Ltd, 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.

H_6: 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).

H_7: 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.

H_8: 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.

10.6.1.2 Fuel and Chemical Handling

H_9: 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.

H_10: 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.

H_11: 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.

H_12: 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 projected detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

10.6.1.3 Soil Removal and Compaction

H_13: 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.

H_14: 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.

H_15: 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.

10.6.2 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 (GDSDS). 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 10.4.1.2 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.

10.7 Residual Impacts

10.7.1 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 10.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

10.7.2 Operational Phase

The implementation of design 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 10.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

10.8 Monitoring

10.8.1 Construction Phase

During construction phase the following monitoring measures will be implemented:

- 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.

- These monitoring measures will be carried out by personnel with special qualifications in environmental monitoring and water quality

10.8.2 Operational Phase

No monitoring measures will be implemented during the operational phase. However, 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.

10.9 Reinstatement

In the event that the proposed development is reinstated, there is not likely to be any significant impacts on the hydrological environment at the site.

10.10 Interactions

10.10.1 Land, Soils, Geology & Hydrogeology

During the construction phase, there is an inter-relationship between soils, geology and hydrogeology and surface water due to the potential increasing of sediments loading in run-off as a result of the excavation required to facilitate site levelling and construction of the new foundations. Adherence to the mitigation measures in Chapter 9 and 10 and the requirements of the CEMP, will ensure the effect is ***long-term***, ***imperceptible*** and ***neutral.***

10.10.2 Biodiversity

The potential effects on surface water drainage can involve the Biodiversity component due to a potential hydrological connection between the site and protected habitats. 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]). No significant impacts on biodiversity as a result in changes in hydrology or hydrogeology are foreseen. The waterflow will be maintained in the drain on site and no significant loss in water or deterioration in water quality is foreseen.

In addition, adherence to the mitigation measures in Chapter 8 and 10 and the requirements of the CEMP, will ensure the effect is ***long-term***, ***imperceptible*** and ***neutral.*** These measures are deemed sufficient to deal with Hydrology and elements that could potentially impact on biodiversity.

10.11 Cumulative Impacts

The potential cumulative impacts of the proposed development on the hydrological environment has been considered in conjunction with developments in the surrounding area. Table 10.3 below outlines the status of each project and the expected cumulative impacts associated with this development.

Table 10.3: Granted Planning Permission by DLRCC or ABP.

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
D16A/0818	Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14	11th Sept 2017	- Demolition c. 425 sq m - 120 no. apartments - 120 car parking spaces - 144 bicycle spaces
ABP31013821	Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14	25th Aug 2021	- SHD - Demolition 2,913.8 sq m - 231 no. residential units - After school childcare facility 161 sq m - Café 83 sq m - 118 no, car parking spaces - 462 no. cycle spaces - 4 no. motorcycle spaces
D19A/0162	Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14	8th August 2019	- Demolition - 43 no. residential units - 47 no. car parking spaces - 92 no. cycle parking spaces
ABP30835320	The car sales premises currently known as Vector Motors (formerly known as Victor Motors), Goatstown Road, Dublin 14, D14FD23	3rd Feb 2021	- SHD (Student accommodation) - 960 sq m demolition - 239 no. bed spaces - 6 no car parking spaces
D20A/0328	University College Dublin, Belfield, Dublin 4	21st Jan 2021	- Extension to the existing car park to provide 239 no. additional car parking spaces, resulting in a total permanent surface car park comprising 300 no. car-parking spaces (61 no. existing spaces plus 239 no. new additional spaces). - The proposed development also seeks a modification of the Athletics Track development permitted under Dun Laoghaire Rathdown County Council Reg. Ref. D19A/0001, to omit 185 no.

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
			permitted temporary car parking spaces, resulting in a total of 70 no. temporary car parking spaces being delivered as part of the permitted Athletics track development.
ABP30943021	2.12 ha at Our Lady's Grove, Goatstown Road, Dublin 14	3rd June 2021	- SHD - Student Accommodation - 698 no. bed spaces - 9 no. car parking - 4 no. motorcycle - 860 no. cycle parking
ABP31128721	c.0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14	20th Dec 2021	- SHD - 115 no. residential units - 80 sq m creche

All the above developments include increase in hardstanding areas and are require to provide full attenuation in compliance with the requirements of the Greater Dublin Strategic Drainage Study through SuDS measures. Therefore, there are no foreseen cumulative effects in terms of flooding. All the above developments are required to manage surface water discharges in accordance with S.I. 272 of 2009 and S.I. 77 of 2019 amendments.

During the operation of the above projects there is no potential for deterioration in water quality and WFD Status as design of these developments will include SuDS measures such as interception and attenuation system.

In addition, the projects presented in Table 10.4 below are planned projects that are at various stages of the planning process and do not have planning permission at the time of writing this EIAR.

Table 10.4: Surrounding Projects with no Planning Permission.

DLRCC/ ABP Reg. Ref.	Address	Lodgement Date/ Status	Overview of Development
ABP31182621	Lands at Knockrabo, Mount Anville Road,, Goatstown, Dublin 14	Lodged on 1st Nov 2021 as a SHD with ABP. Decision due 28th Feb 2022.	- SHD (Amendment to Phase 2 permitted) - 227 no. units (134 no. additional units from permitted SHD) - 178 no. car parking spaces - 519 no. bicycle spaces

ABP312935	Sommerville House, Dundrum Road, Dublin 14.	Lodged on 7th March 2022 as a SHD with ABP. Decision due 27th June 2022	- SHD - 111 No. units - 39 no car parking spaces - 164 no. bicycle spaces
TC06D.311553	Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14	Lodged as a SHD Pre-Application Consultation Request with ABP. ABP feedback provided on 14th Jan 2022.	- SHD (Consultation) - 884 no. apartments - Creche
N/A	Lands at Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14 (Section 34 proposal)	Pre-application engagement commenced with DLRCC. Planning application due to be lodged with DLRCC when the SHD (the proposed project) has been decided.	- 3,540 sq m demolition - 71 no. residential units - 5,566 sq m non-residential floorspace - 60 no. car parking spaces

During their construction phases, all the above developments will have to incorporate measures to protect soil and water quality in compliance (included discharges to surface water) with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019). Therefore, there is no potential for any cumulative change on surface water quality during the construction phase of the projects above.

During their operation phases, the same approach presented above leads to the conclusion that there will be no cumulative effect on surface water quality or flooding due to the implementation of SuDS measures following the requirements of the Greater Dublin Strategic Drainage Study.

With regard to the future S34 proposal which forms part of the Central Mental Hospital Masterplan, this development will be independent of the proposed development. This includes its surface water drainage and mitigation measures, which also shall meet the requirements of the Greater Dublin Strategic Drainage Study.

10.11.1 Construction Phase

As mentioned above, there are several existing residential and commercial developments close by, along with the multiple permissions remaining in place. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. Other developments will also have to incorporate measures to protect soil and water quality in compliance (included discharges to surface water) with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019). As a result, there will be minimal cumulative potential for change in soil quality or the natural hydrological regime. The cumulative impact is considered to be ***short-term***, ***neutral*** and ***imperceptible*****.**

10.11.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All developments are required to manage groundwater discharges in accordance with S.I. 272 of 2009 and S.I. 77 of 2019 amendments. As such there will be no cumulative impact to surface water quality and therefore there will be no cumulative impact on the Surface Waterbody Status. The operation of the proposed development is concluded to have a ***long-term***, ***imperceptible*** significance with a ***neutral*** impact on water quality.

The aforementioned increase in hardstanding within the area will have a cumulative but minor reduction in recharge to the underlying aquifer. The SuDS measures have been designed to reintroduce water to ground where feasible through bio-retention, tree pits, filter trenches, etc.

10.12 'Do-Nothing' Effect

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no, excavation, construction or operation at this Site. There would, therefore, be a neutral effect on the hydrological environment.

10.13 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered during the development of this chapter.

10.14 Conclusion

However, a brief summary of the impacts identifies, their assessments, mitigation measures and residual impacts is presented hereafter.

The following potential impacts and assessments on the hydrological environment were identified:

- Construction Phase:

  - Increased Sediments Loading in Run-off;
  - Contamination of Local Water Courses.
- Operational Phase:
  - Effects on Local Recharge due to Increase of Hardstanding Area;
  - Effects on Water Quality in Dublin Bay;

The potential impacts during construction phase are considered to be **short term – imperceptible impact** with a **neutral impact on quality**. i.e. an impact capable of measurement but without noticeable consequences.

The potential impacts during operation phase are considered to be **long term – imperceptible impact** with a **neutral impact on quality** and **negligible magnitude**.

In addition, as order there is a hydrological connection between the drainage ditches on site to the Elm Park Stream, which is located c. 470 m downstream the subject site and in order to assess potential impacts on the Elm Park Stream which has an 'Unassigned' WFD status, an assessment without taking account of any mitigation measures was considered (i.e. worst case scenario). As can be seen in Section 10.5.3 above, there is no likely impact on the WFD classification elements for surface water body status either ecologically or chemically as the potential for impact is **temporary** and **negligible**.

The following mitigation measures (which are detailed in Section 10.6 above) were incorporated and associated to the aforementioned potential impacts:

- Construction Phase:
  - Increased Sediments Loading in Run-off: H_1; H_2; H_3; H_4; H_5; H_6; H_7; H_8; H_13; H_14; H_15
  - Contamination of Local Water Courses. H_1; H_2; H_4; H_5; H_9; H_10; H_11:H_12; H_13; H_14; H_15
- Operational Phase:
  - Effects on Local Recharge due to Increase of Hardstanding Area: Not mitigation measures needed.
  - Effects on Water Quality in Dublin Bay: Not mitigation measures needed. Design measures (SuDS in compliance with GDSDS requirements and foul water drainage) will provide alleviation for this impact.

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** and the magnitude of impact is considered **negligible.**

During the operational phase the residual impact will be **long term-imperceptible-neutral** with **negligible** magnitude.

The cumulative impact is considered to be **short-term**, **neutral** and **imperceptible** during the construction phase and **short-term**, **neutral** and **imperceptible** during the operational phase.

10.15 References

- 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.
- Infrastructure Report, Dundrum Central. BMCE, January 2022;
- Irish Water (2021). Ringsend Wastewater Treatment Plant Annual Environmental Report 2020.
- Irish Water (2018) Ringsend Wastewater treatment plant Upgrade Project Environmental Impact Assessment Report.
- Inspector's Report – ABP-301798-18. 10-year permission for development of the Ringsend wastewater treatment plant upgrade project including a regional biosolids storage facility.
- Board Order and Report of Inspector – ABP-301798-18. 10-year permission for development of the Ringsend wastewater treatment plant upgrade project including a regional biosolids storage facility.
- Site Specific Flood Risk Assessment, Dundrum Central. BMCE, January 2022;
- Construction & Environmental Management Plan, Dundrum Central. BMCE, January 2022;
- Site Investigation Report, Dundrum Central Development. Site Investigations Ltd, November 2021;

APPENDIX 10.1

NRA/TII Criteria for Rating the Magnitude and Significance of Impacts at EIA Stage National Roads Authority (NRA/ TII, 2009)

Table 10.1: Criteria for Rating Site Attributes – Estimation of Importance of Hydrological Attributes (NRA).

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes. Quality Class A (Biotic Index Q4, Q5). Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for wide range of leisure activities.
High	Attribute has a high quality or value on a local scale	Salmon fishery. Locally important potable water source supplying >1000 homes. Quality Class B (Biotic Index Q3-4). Flood plain protecting between 5 and 50 residential or commercial properties from flooding. Locally important amenity site for wide range of leisure activities.
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery. Local potable water source supplying >50 homes. Quality Class C (Biotic Index Q3, Q2- 3). Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities. Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1). Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

Table 10.2: Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrological Attribute (NRA).

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss or extensive change to a waterbody or water dependent habitat. Increase in predicted peak flood level >100mm. Extensive loss of fishery. Calculated risk of serious pollution incident >2% annually. Extensive reduction in amenity value.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm. Partial loss of fishery. Calculated risk of serious pollution incident >1% annually. Partial reduction in amenity value.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm. Minor loss of fishery. Calculated risk of serious pollution incident >0.5% annually. Slight reduction in amenity value.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level. Calculated risk of serious pollution incident <0.5% annually.
Minor Beneficial	Results in minor improvement of attribute quality	Reduction in predicted peak flood level >10mm. Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually.
Moderate Beneficial	Results in moderate improvement of attribute quality	Reduction in predicted peak flood level >50mm. Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually.
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm

Table 10.3: Rating of Significant Environmental Impacts at EIS Stage (NRA).

Importance of Attribute	Magnitude of Importance			
	Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

11.0 AIR QUALITY AND CLIMATE

11.1 Introduction

This chapter assesses the likely air quality and climate impacts associated with the proposed development located on the lands of the Central Mental Hospital, Dublin 14. A full description of the development is available in Chapter 5 – Description of the Proposed Project.

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.

11.2 Methodology

11.2.1 Criteria for Rating of Impacts

11.2.1.1 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 11.1). 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 11.1: 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}

Pollutant	Regulation Note 1	Limit Type	Value
		Annual limit for protection of human health	40 µg/m³ PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m³ $PM_{2.5}$

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

11.2.1.2 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 11.2.1.1 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/(m²*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/(m²*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.

11.2.1.3 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 Dun Laoghaire - Rathdown County Council Climate Change Action Plan 2019 – 2024 published in 2019 (Dun Laoghaire - Rathdown County Council and Codema, 2019) outlines a number of goals and plans to prepare for and adapt to climate change. There are five key action areas within the plan: Energy and Buildings, Transport, Flood Resilience, Nature-based Solutions and Resource Management. Some of the measures promoted within the Action Plan under the 5 key areas involve building retrofits, energy master-planning, better integration of transport and land use planning, increasing public bike facilities, developing public transport routes, development of flood resilient designs, promotion of the use of green infrastructure and waste prevention initiatives. The implementation of these measures will enable the Dun Laoghaire - Rathdown County Council area to adapt to climate change and will assist in bringing Ireland closer to achieving its climate related targets in future years. New developments need to be cognisant of the Action Plan and incorporate climate friendly designs and measures where possible.

11.2.2 Construction Phase

11.2.2.1 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 and climate. 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.

11.2.2.2 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.

11.2.3 Operational Phase

11.2.3.1 Air Quality

The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2017) and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). Transport Infrastructure Ireland (TII) reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

In 2019 the UK Highways Agency DMRB air quality guidance was revised with *LA 105 Air Quality* replacing a number of key pieces of guidance (HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13, part of IAN 185/15). This revised document outlines a number of changes for air quality assessments in relation to road schemes but can be applied to any development that causes a change in traffic. Previously the DMRB air quality spreadsheet was used for the majority of assessments in Ireland with detailed modelling only required if this screening tool indicated compliance issues with the EU air quality standards. Guidance from Transport Infrastructure Ireland (TII, 2011) recommends the use of the UK Highways Agency DMRB spreadsheet tool for assessing the air quality impacts from road schemes. However, the DMRB spreadsheet tool was last revised in 2007 and accounts for modelled years up to 2025. Vehicle emission standards up to Euro V are included but since 2017, Euro 6d standards are applicable for the new fleet. In addition, the model does not account for electric or hybrid vehicle use. Therefore, this a somewhat outdated assessment tool. The LA 105 guidance document states that the DMRB spreadsheet tool may still be used for simple air quality assessments where there is unlikely to be a breach of the air quality standards. Due to its use of a “dirtier” fleet, vehicle emissions would be considered to be higher than more modern models and therefore any results will be conservative in nature and will provide a worst-case assessment.

The 2019 UK Highways Agency DMRB air quality revised guidance *LA 105 Air Quality* states that modelling should be conducted for NO_2 for the base, opening and design years for both the do minimum (do nothing) and do something scenarios. Modelling of PM_{10} is only required for the base year to demonstrate that the air quality limit values in relation to PM_{10} are not breached. Where the air quality modelling indicates exceedances of the PM_{10} air quality limits in the base year then PM_{10} should be included in the air quality model in the do minimum and do something scenarios. Modelling of $PM_{2.5}$ is not required as there are currently no issues with compliance with regard to this pollutant. The modelling of PM_{10} can be used to show that the project does not impact on the $PM_{2.5}$ limit value as if compliance with the PM_{10} limit is achieved then compliance with the $PM_{2.5}$ limit will also be achieved. Historically modelling of carbon monoxide (CO) and benzene was required however, this is no longer needed as concentrations of these pollutants have been monitored to be significantly below their air quality limit values in recent years, even in urban centres (EPA, 2021a).

The key pollutant reviewed in this assessment is NO_2. Modelling of operational NO_2 concentrations has been conducted for the do nothing and do something scenarios for the base year (2024) opening year (2024), and design year (2039). The TII guidance (2011) states that the assessment must progress to detailed modelling if:

- Concentrations exceed 90% of the air quality limit values when assessed by the screening method; or
- Sensitive receptors exist within 50m of a complex road layout (e.g. grade separated junctions, hills etc).

The UK Highways Agency guidance *LA 150* (2019) scoping criteria outlined in Section 11.2.2 was used to determine the road links required for inclusion in the modelling assessment. Sensitive receptors within 200m of impacted road links are included within the modelling assessment. Pollutant concentrations are calculated at these sensitive receptor locations to determine the impact of the proposed development in terms of air quality. The guidance states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling (UK Highways Agency, 2019a). The TII guidance (2011) defines sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. A total of 3 no. sensitive receptors within 200m of impacted road links were included within the modelling assessment (see Figure 11.1), these are all high sensitivity residential properties.

The following model inputs are required to complete the assessment using the DMRB spreadsheet tool: road layouts, receptor locations, annual average daily traffic movements (AADT), percentage heavy goods vehicles (%HGV), annual average traffic speeds and background concentrations. Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the worst-case sensitive receptors using generic meteorological data. The DMRB model uses conservative emission factors, the formulae for which are outlined in the DMRB Volume 11 Section 3 Part 1 – HA 207/07 Annexes B3 and B4. These worst-case road contributions are then added to the existing background concentrations to give the worst-case predicted ambient concentrations. The worst-case ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

The TII document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. The TII significance criteria have been adopted for the proposed development and are detailed in Appendix 11.2, Table A11.2.1 and Table A11.2.2. The significance criteria are based on NO_2 and PM_{10} as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3).

Conversion of NO_x to NO_2

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

Transport Infrastructure Ireland states the recommended method for the conversion of NOx to NO_2 in *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). The TII guidelines recommend the use of DEFRAs NOx to NO_2 calculator (2020) which was originally published in 2009 and is currently on version 8.1. This calculator (which can be downloaded in the form of an excel spreadsheet) accounts for the predicted availability of O_3 and proportion of NOx emitted as NO for each local authority across the UK. O_3 is a regional pollutant and therefore concentrations do not vary in the same way as concentrations of NO_2 or PM_{10}.

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

Update to NO_2 Projections using DMRB

In 2011 the UK DEFRA published research (Highways England, 2013) on the long term trends in NO_2 and NO_X for roadside monitoring sites in the UK. This study marked a decrease in NO_2 concentrations between 1996 and 2002, after which the concentrations stabilised with little reduction between 2004 and 2010. The result of this is that there now exists a gap between projected NO_2 concentrations which UK DEFRA previously published and monitored concentrations. The impact of this 'gap' is that the DMRB screening model can under-predict NO_2 concentrations for predicted future years. Subsequently, the UK Highways Agency published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years. This methodology has been used in the current assessment to predict future concentrations of NO_2 as a result of the proposed development.

Traffic Data Used in Modelling Assessment

Traffic flow information was obtained from JB Barry Consulting for the purposes of this assessment. Data for the Do Nothing and Do Something scenarios for the base year 2024, opening year 2024 and design year 2039 were provided. The traffic data in AADT is detailed in Table 11.2 along with the % HGV. Only road links that met the DMRB scoping criteria outlined in Section 11.2.2 and that were within 200m of receptors were included in the modelling assessment (Links 1 – 3). It was assumed there would be no additional background traffic growth between 2024 and 2039. In reality traffic is likely to fall, so traffic remaining at current levels represents a worst case scenario. Background concentrations have been included as per Section 11.3.3 of this chapter based on available EPA background monitoring data (EPA, 2021a).

This traffic data has also been used in the operational stage climate impact assessment (Links 2 – 5).

Table 11.2: Traffic Data Used in Modelling Assessment.

Road Name	Base Year	Do-Nothing		Do-Something		HGV (%)	Speed (kph)
	2024	2024	2039	2024	2039		
1. R177 North of Access	16,715	17,197	17,197	18,823	18,823	3%	50
2. R117 South of Access & Highfield	16,807	17,292	17,292	19,712	19,712	3%	50
3. R117 South of Rosemount	19,311	19,868	19,868	22,023	22,023	3%	50
4. Mulvey Park	1,240	1,275	1,275	1,464	1,464	3%	50
5. Rosemount Estate	2,720	2,798	2,798	3,365	3,365	3%	50

Figure 11.1: Location of Sensitive Receptors used in Air Quality Modelling Assessment.

11.2.3.2 Climate

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation*

(EU) No. 525/2013. Which has set a target of a 30% reduction in non-ETS sector 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 by reference to EPA data on annual GHG emissions (see Section 11.3.3). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency, 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meets one or more of 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.

There are four road links that will experience an increase of 10% or more in the AADT. R117 North Bird Avenue, R117 South of Access and Highfield, Mulvey Park and Rosemount Estate. These road links have been included in the detailed climate assessment (see Table 11.2).

The impact of the proposed development at a national / international level has been determined using the procedures given by Transport Infrastructure Ireland (2011) and the methodology provided in Annex D in the UK Design Manual for Roads and Bridges (UK Highways Agency, 2007). The assessment focused on determining the resulting change in emissions of carbon dioxide (CO_2). The Annex provides a method for the prediction of the regional impact of emissions of these pollutants from road schemes and can be applied to any project that causes a change in traffic. The inputs to the air dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds (see Table 11.2).

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. The Building Lifecycle Report and the Energy and Sustainability Report prepared in relation to this assessment has been reviewed and used to inform the operational phase climate assessment. This report outlines a number of measures in relation to energy usage from the proposed development primarily in relation to heat and electricity. A number of measures have been incorporated into the overall design of the development to reduce the impact to climate where possible.

11.2.3.3 Air Quality 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 Scheme*s (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 designated sites within 200m of any road links impacted by the proposed development therefore, there is no potential for nitrogen deposition and an assessment is not required.

11.3 Baseline Environment

11.3.1 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 Dublin Airport meteorological station, which is located approximately 13.6 km north of the site. Dublin Airport meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 11.2). For data collated during five representative years (2017 – 2021), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.3 m/s over the period 2005 – 2019 (Met Eireann, 2022).

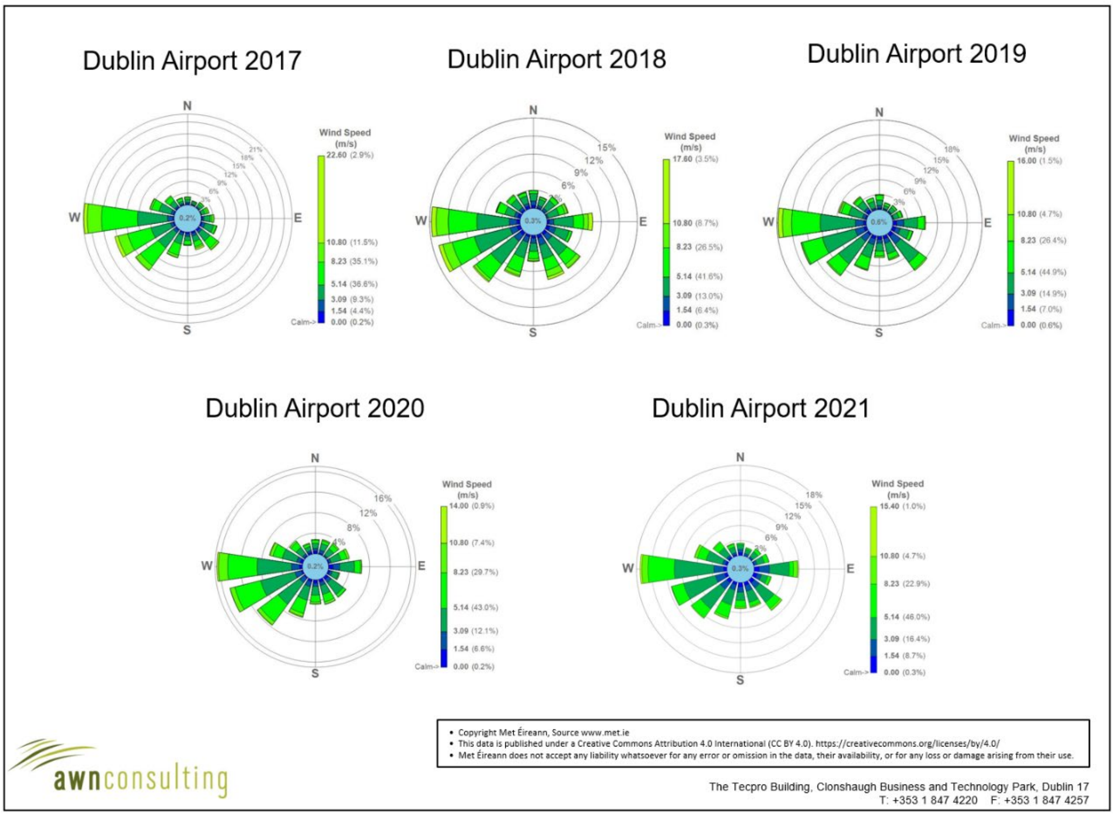

Figure 11.2: Dublin Airport Met Station Windrose 2017 – 2021 (Met Eireann, 2022).

11.3.2 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

Long-term NO_2 monitoring was carried out at the Zone A suburban background locations of Rathmines, Dun Laoghaire, Swords and Ballyfermot for the period 2015 - 2019 (EPA, 2021a). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3, average results range from 13 – 22 µg/m^3 (Table 11.3). The NO_2 annual average for this five-year period suggests an upper average limit of no more than 19 µg/m^3 for an urban background location. Based on the information below and keeping regard for the further distance from the city centre, a conservative estimate of the current background NO_2 concentration for the region of the proposed development is 19 µg/m^3.

Table 11.3: 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 was carried out at the suburban Zone A locations of Rathmines, Dún Laoghaire, Tallaght, Ballyfermot and Phoenix Park over the period 2015 – 2019. Concentrations range from 9 – 16 µg/m^3 over the five-year period with at most 9 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m^3 in 2019 (35 exceedances are permitted per year) (EPA, 2021a). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 13 µg/m^3.

Table 11.4: 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.

Background concentrations for Opening Year 2024 and Design Year 2039 have been calculated. These have used current estimated background concentrations and the year on year reduction factors provided by Transport Infrastructure Ireland in the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011) and the UK Department for Environment, Food and Rural Affairs LAQM.TG(16) (2018).

11.3.3 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).

11.4 Potential Impacts of the Proposed Project

11.4.1 Construction Phase

11.4.1.1 Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust and $PM_{10}/PM_{2.5}$ emissions. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m. The proposed development can be considered major in scale and therefore, there is the potential for significant dust soiling impacts within 100m of the site (Table 11.5). The closest high sensitivity receptors (residential properties) to the site are approximately 20 m to the south of the site. In the absence of mitigation there is the potential for short-term, negative, slight impacts to nearby sensitive receptors as a result of construction dust emissions.

As the proposed development is considered major in scale there is the potential for vegetation effects within 25m of the site (Table 11.5). In the absence of mitigation there is the potential for a short-term, negative, and slight impact to nearby vegetation.

Table 11.5: Assessment Criteria for the Impact of Dust from Construction, with Standard Mitigation in Place (TII, 2011).

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

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 11.2.2. It can therefore be determined that the construction stage traffic will have an imperceptible, neutral, localised and short-term impact on air quality.

11.4.1.2 Climate

There is the potential for a number of greenhouse gas emissions to 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.

11.4.1.3 Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 11.5 PM_{10} emissions can occur within 25m of the site for a development of this scale. Therefore, in the absence of mitigation there is the potential for slight, negative, short-term impacts to human health as a result of the proposed development.

11.4.2 Operational Phase

11.4.2.1 Air Quality

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of NO_2 emissions for the opening and design years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined. The assessment was carried out at 3 no. high sensitivity residential receptors (R1 – R3) (see Figure 11.1).

Transport Infrastructure Ireland's document Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (2011) detail a methodology for determining air quality impact significance criteria for road schemes and this can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

The results of the assessment of the impact of the proposed development on NO_2 in the opening year 2024 are shown in Table 11.6 and for design year 2039 are shown in Table 11.7. The annual average concentration is in compliance with the limit value at the worst-case receptor in 2024 and 2039. Concentrations of NO_2 are at most 70% of the annual limit value in 2024 and at most 67% in 2039 for the do-something scenario. In addition, the hourly limit value for NO_2 is 200 $\mu g/m^3$ and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The maximum 1-hour NO_2 concentration is not predicted to be exceeded in any modelled year (Table 11.8).

The impact of the proposed development on annual mean NO_2 concentrations can be assessed relative to "Do Nothing (DN)" levels. Relative to baseline levels, there is predicted to be an imperceptible increase in NO_2 concentrations at all receptors for both the opening year of 2024 and design year of 2039. Concentrations will increase by at most 0.8% of the annual limit value in 2024 and by 0.9% in 2039 at worst case receptor (R2). Using the assessment criteria outlined in Appendix 11.2, Table A11.2.1 and Table A11.2.2 the impact of the proposed development in terms of NO_2 is considered negligible at all receptors. Therefore, the overall impact of NO_2 concentrations as a result of the proposed development is long-term, negative and imperceptible.

Concentrations of PM_{10} were modelled for the baseline year of 2024. The modelling showed that concentrations were in compliance with the annual limit value of 40 $\mu g/m^3$ at all receptors assessed, therefore, further modelling for the opening and design years was not required as per the UK Highways Agency guidance (2019a). Concentrations reached at most 0.94 $\mu g/m^3$

excluding background concentrations. When a background concentration of 13 µg/m^3 is included the overall impact is 35% of the annual limit value at the worst case receptors (R2 and R3).

The impact of the proposed development on ambient air quality in the operational stage is considered long-term, localised, negative and imperceptible.

Table 11.6: Predicted Annual Mean NO_2 Concentrations – Opening Year 2024 (µg/m^3).

Receptor	Impact Opening Year 2024				
	DN	DS	DS-DN	Magnitude	Description
R1	26.3	26.5	0.14	Imperceptible Increase	Negligible
R2	27.7	28.1	0.32	Imperceptible Increase	Negligible
R3	27.2	27.4	0.23	Imperceptible Increase	Negligible

Note 1 Based on UK Highways Agency IAN technique for predicting future NO_2 concentrations

Table 11.7: Predicted Annual Mean NO_2 Concentrations – Design Year 2039 (µg/m^3).

Receptor	Impact Design Year 2039 Note 1				
	DN	DS	DS-DN	Magnitude	Description
R1	25.1	25.3	0.19	Imperceptible Increase	Negligible
R2	26.5	26.9	0.37	Imperceptible Increase	Negligible
R3	25.9	26.2	0.26	Imperceptible Increase	Negligible

Note 1 Based on UK Highways Agency IAN technique for predicting future NO_2 concentrations

Table 11.8: Predicted 99.8th percentile of Daily Maximum 1-hour NO_2 Concentrations (µg/m^3).

Receptor	Opening Year 2024		Design Year 2039	
	DN	DS	DN	DS
R1	92.2	92.7	87.9	88.6
R2	97.1	98.2	92.7	94.0
R3	95.1	95.9	90.8	91.7

11.4.2.2 Climate

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. 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.

There is the potential for a number of greenhouse gas emissions to atmosphere during the operational phase of the development. The predicted concentrations of CO_2 for the future years of 2024 and 2039 are detailed in Table 11.9. These are significantly less than the 2024 and 2030 target set out under EU legislation (targets past 2030 are not available). It is predicted that in 2024 the proposed development will increase CO_2 emissions by 0.00029% of the EU 2024 target. In 2039 CO_2 emissions will increase by 0.00035% of the 2030 target. Therefore, the climate impact of the proposed development is considered negative, long-term and imperceptible.

Table 11.9: Climate Impact Assessment.

Year	**Scenario**	**CO_2 (tonnes/annum)**
2024	Do Nothing	881
	Do Something	997
2039	Do Nothing	881
	Do Something	997
Increment in 2024		116.6 Tonnes
Increment in 2039		116.7 Tonnes
Emission Ceiling (kilo Tonnes) 2024		**40,113** Note 1
Emission Ceiling (kilo Tonnes) 2030		**33,381** Note 1
Impact in 2024 (%)		0.00029 %
Impact in 2039 (%)		0.00035 %

Note 1 Target under *Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013*

In addition, the proposed development has been designed to reduce the impact to climate where possible, the following measures have been incorporated into the design of the development: The use of photovoltaics as a means of providing a renewable source of energy for the building is being considered. Energy efficient light fittings will be installed throughout the proposed development and it is intended for heat pumps to provide a centralised communal heating scheme. The proposed development aims to be a “Near Zero – Energy Building” meaning it will have a very high energy performance. Further measures incorporated in the design of the proposed development to reduce the impact to climate can be found in the Building Lifecycle Report and the Energy and Sustainability Report prepared in relation to the development.

11.4.2.3 Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. However, air dispersion modelling of traffic emissions has shown that levels of all pollutants are below the ambient air quality standards set for the protection of human health. It can be determined that the impact to human health during the operational stage is long-term, negative and imperceptible.

11.5 Mitigation Measures

11.5.1 Construction Phase

11.5.1.1 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 11.3. 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:

- **AC_1:** 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.
- **AC_2:** Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- **AC_3:** Vehicles exiting the site will make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- **AC_4:** 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.
- **AC_5:** Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- **AC_6:** 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.
- **AC_7:** During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

11.5.1.2 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 and N_2O 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.

AC_8: The prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
AC_9: Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

11.5.2 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 within Section 11.4.2.2 along with the Building Lifecycle Report and the Energy and Sustainability Report prepared in support of this planning application.

11.6 Residual Impacts

11.6.1 Construction Phase

11.6.1.1 Air Quality

Once the dust minimisation measures outlined in Section 11.5 and Appendix 11.3 are implemented, the impact of the proposed development in terms of dust soiling will be short-term, negative and imperceptible at nearby receptors.

11.6.1.2 Climate

According to the IAQM guidance (2014) site traffic, plant and machinery are unlikely to have a significant impact on climate. Therefore the predicted impact is neutral, short-term and imperceptible.

11.6.1.3 Human Health

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

11.6.2 Operational Phase

11.6.2.1 Air Quality

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the UK DMRB model. The modelling assessment determined that the change in emissions of NO_2 at nearby sensitive receptors as a result of the proposed development will be imperceptible. Therefore, the operational phase impact to air quality is long-term, localised, negative and imperceptible.

11.6.2.2 Climate

Modelling of operational phase CO_2 emissions as a result of the traffic associated with the proposed development was carried out to determine the impact to climate. It was found that emissions of CO_2 will increase by an imperceptible amount as a result of the proposed development and are significantly below the EU GHG targets. The operational phase impact to climate is long-term, negative and imperceptible. In addition, the proposed development has been designed to reduce the impact to climate where possible during operation.

11.6.2.3 Human Health

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

11.6.2.4 Worst Case Impact

Conservative background concentrations were used in order to ensure a robust assessment. Thus, the predicted results of the operational stage assessment are worst-case and will not cause a significant impact on either air quality or climate.

11.7 Monitoring

11.7.1 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 2m above ground level. The TA Luft limit value is 350 mg/(m2*day) during the monitoring period between 28 - 32 days.

11.7.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

11.8 Interactions

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures (see Appendix 11.3) that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and imperceptible with respect to human health.

Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on the surrounding road network. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and biodiversity along with interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures, outlined in Appendix 11.3, to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and biodiversity. It is also predicted that there will be no significant interactions between air quality and land and soils once mitigation measures are in place.

No other significant interactions with air quality and climate have been identified.

11.9 Cumulative Impacts

11.9.1 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.

There is the potential for the construction phase of the proposed development coincide with the construction phase of other permitted projects in the area (see Table 11.10 and Table 11.11). The proposed development is predicted to have an imperceptible impact on air quality during the construction phase once the mitigation measures outlined in Section 11.5 and Appendix 11.2 are implemented. The mitigation includes best practice dust control measures to prevent significant dust emissions occurring. Provided these measures are in place for the duration of the construction phase of the proposed development cumulative construction dust impacts are predicted to be imperceptible.

In addition future phases of the CMH S34 development may give rise to cumulative impacts. The overall S34 Application consists of a site area of 2.42ha with 3,101 sqm of demolition which will have an impact on the cumulative construction dust in the area and its effect on nearby sensitive receptors. However, provided the mitigation measures outlined in Section

11.5 and Appendix 11.3 are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted.

Table 11.10: List of Cumulative Projects in the Area of the Proposed Development.

DLRCC/ ABP Reg. Ref.	Address	Decision Date	Overview of Development
D16A/0818	Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14	11th Sept 2017	- Demolition c. 425 sq m - 120 no. apartments - 120 car parking spaces - 144 bicycle spaces
ABP31013821	Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14	25th Aug 2021	- SHD - Demolition 2,913.8 sq m - 231 no. residential units - After school childcare facility 161 sq m - Café 83 sq m - 118 no, car parking spaces - 462 no. cycle spaces - 4 no. motorcycle spaces
D19A/0162	Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14	8th August 2019	- Demolition - 43 no. residential units - 47 no. car parking spaces - 92 no. cycle parking spaces
ABP30835320	The car sales premises currently known as Vector Motors (formerly known as Victor Motors), Goatstown Road, Dublin 14, D14FD23	3rd Feb 2021	- SHD (Student accommodation) - 960 sq m demolition - 239 no. bed spaces - 6 no car parking spaces
D20A/0328	University College Dublin, Belfield, Dublin 4	21st Jan 2021	- Extension to the existing car park to provide 239 no. additional car parking spaces, resulting in a total permanent surface car park comprising 300 no. car-parking spaces (61 no. existing spaces plus 239 no. new additional spaces). - The proposed development also seeks a modification of the Athletics Track development permitted under Dun Laoghaire Rathdown County Council Reg. Ref. D19A/0001, to omit 185 no. permitted temporary car parking spaces, resulting in a total of 70 no. temporary car parking spaces being delivered as part of the permitted Athletics track development.
ABP30943021	2.12 ha at Our Lady's Grove, Goatstown Road, Dublin 14	3rd June 2021	- SHD - Student Accommodation - 698 no. bed spaces - 9 no. car parking - 4 no. motorcycle - 860 no. cycle parking
ABP31128721	c.0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14	20th Dec 2021	- SHD - 115 no. residential units - 80 sq m creche

The above projects have been granted planning permission by Dún Laoghaire-Rathdown County Council (DLRCC) or An Bord Pleanála (ABP).

Table 11.11: List of Cumulative Planned Projects in the Area of the Proposed Development.

DLRCC/ ABP Reg. Ref.	Address	Lodgement Date/ Status	Overview of Development
ABP31182621	Lands at Knockrabo, Mount Anville Road,, Goatstown, Dublin 14	Lodged on 1st Nov 2021 as a SHD with ABP. Decision due 28th Feb 2022. (At the time of writing, ABP had confirmed a delay surrounding the determination of this application)	- SHD (Amendment to permitted Phase 2) - 227 no. units (134 no. additional units from permitted SHD) - 178 no. car parking spaces - 519 no. bicycle spaces
ABP312935	Sommerville House, Dundrum Road, Dublin 14.	Lodged on 7th March 2022 as a SHD with ABP. Decision due 27th June 2022	- SHD - 111 No. units - 39 no car parking spaces - 164 no. bicycle spaces
TC06D.311553	Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14	Lodged as a SHD Pre-Application Consultation Request with ABP. ABP feedback provided on 14th Jan 2022.	- SHD (Consultation) - 884 no. apartments - Creche
N/A	Lands at Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14	Pre-application engagement commenced with DLRCC. Planning application due to be lodged with DLRCC when the SHD (the proposed project) has been decided.	- 3,540 sq m demolition - 71 no. residential units - 5,566 sq m non-residential floorspace - 60 no. car parking spaces

The above projects are planned projects that are at various stages of the planning process. They key distinction from the projects listed above is that they do not have planning permission at the time of writing.

Due to the short-term duration of the construction phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered imperceptible.

There are no significant cumulative impacts to air quality or climate predicted for the construction phase.

11.9.1.1 Details of Future Planning Application at the Subject Lands

This section provides further detail in relation to the future planning application which will be submitted by the Applicant to Dún Laoghaire-Rathdown County Council under Section 34 of the *Planning and Development Act 2000* (as amended) once the proposed SHD project has been decided. This proposal relates to the Central Mental Hospital lands and reflects the second component of the delivery of the site-wide Masterplan for the lands which is described in detail in Chapter 5 of this EIAR (the first component being this SHD 'the proposed project').

The proposed development strategy in respect of the delivery of the site-wide Masterplan is covered in depth in both the enclosed *Planning Report* and *Response to ABP Opinion*, prepared by Tom Phillips + Associates. The compatible, yet standalone, nature of the two relevant planning proposals is detailed within these reports.

For context and for the purposes of cumulative assessment, an overview of the Section 34 proposal is set out below, including an extract from the draft Site Plan for the Section 34 application showing the red line boundary and site layout.

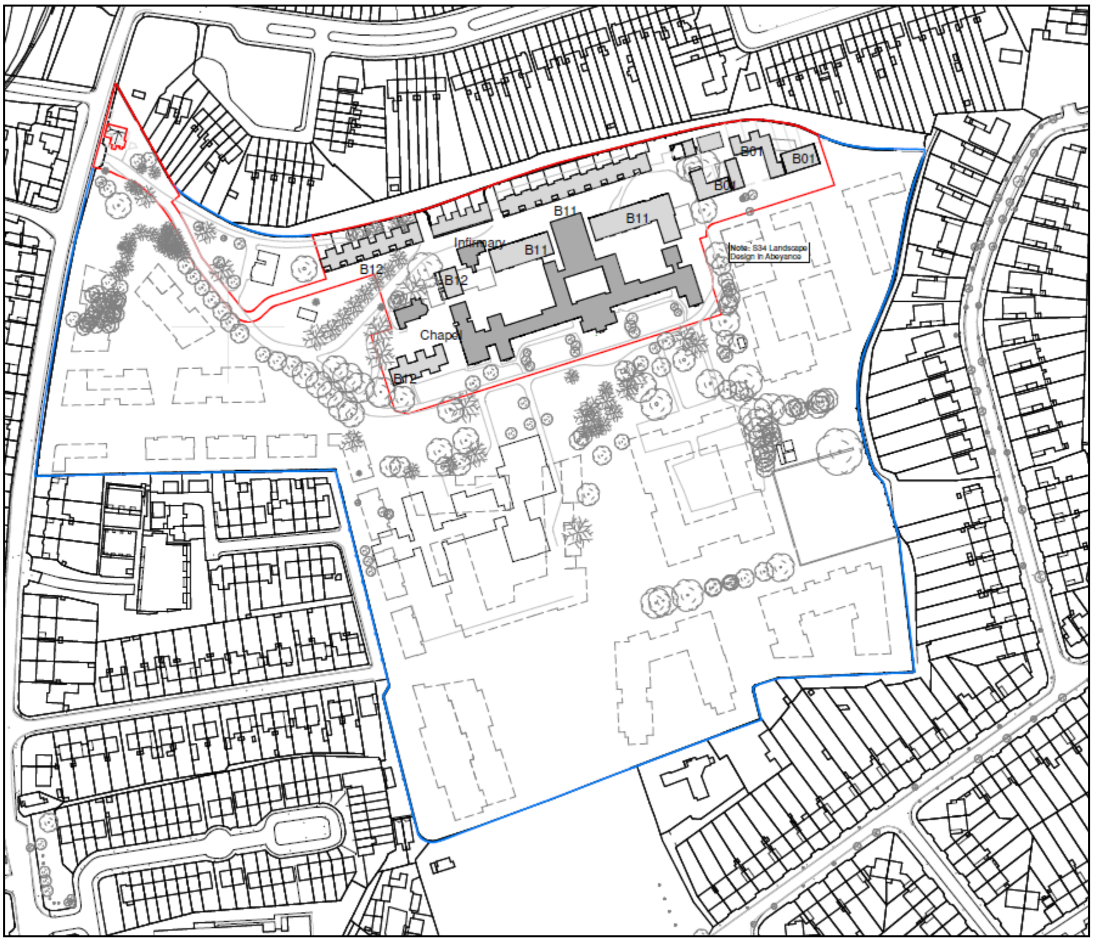

Figure 11.3: Extract from the draft Site Plan prepared by Reddy A+U for the Section 34 proposal at the Central Mental Hospital lands.

At the time of writing, it is envisaged that the future Section 34 proposal will comprise 71 no. residential units and 5,536 sq m of non-residential floorspace:

- 3,101 sq m of demolition, including:
    - Outbuildings and ancillary structures to rear of Main Hospital Building;
    - Eastern wing of Main Hospital Building (later addition to building);
    - Chimney structure;
    - Structures adjacent to farm buildings.

- Change of use and adaptation of the following existing buildings:
    - Main Hospital (5,266 sq m) – Enterprise Centre
    - Chapel (107 sq m) – Community Use
    - Infirmary (158 sq m) – Community/ Enterprise Use
    - Coach House (35 sq m) – Storage
    - Farm Buildings (246 sq m) – Residential
    - Workshops (151 sq m) – Residential

- New residential buildings:
    - Block 01 (1,111 sq m (incl. farm buildings) – 12 no. residential units
    - Block 11 (3,528 sq m) – 36 no. residential units
    - Block 12 (2,133 sq m) (incl. workshops) – 20 no. residential units

- 62 no. car parking spaces.

An extract from the draft Schedule of Accommodation, prepared by Reddy A+U, for the Section 34 proposal is provided below.

	Apartments					Duplex Apartments		Houses			
Block	Studio	1-Bed	2-Bed (3P)	2-Bed	3-Bed	2-Bed (D)	3-Bed (D)	House (3-Bed)	House (4-Bed)	Total	Application
Block 01	1	1		3				7		12	S34
Block 11		18	7	4	1				9	39	S34
Block 12		2		3			5	4	6	20	S34
Total	**1**	**21**	**7**	**10**	**1**		**5**	**11**	**15**	**71**	
%	1%	30%	10%	14%	1%		7%	15%	21%		

Figure 11.4: Extract from draft Schedule of Accommodation for the future Section 34 proposal, prepared by Reddy A+U.

It should be noted that the Applicant intends to continue pre-application engagement with Dún Laoghaire-Rathdown County Council in respect of the Section 34 proposal before the scheme is fully finalised. This is due to the outstanding survey work that that is required to be undertaken in respect of the internals of the existing buildings to better inform proposals and assessments of potential impact (which has been delayed due to restricted access to the buildings arising from a delayed vacation of the HSE and service users). Furthermore, given that the submission of this application will follow the determination of the proposed SHD project, it is possible, should planning permission be granted, that the Section 34 proposal will require amendment to respond to any planning conditions imposed in respect of the SHD scheme.

11.9.2 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. The traffic model used is intended to predict and assess future growth in the area 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, negative and imperceptible with regards to air quality and climate.

11.10 'Do-Nothing' Effect

Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. Impacts from increased traffic volumes and associated air emissions will also not occur. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from new developments in the surrounding area, changes in road traffic, etc.). Therefore, this scenario can be considered neutral in terms of both air quality and climate.

11.11 Difficulties Encountered in Compiling the Chapter

There were no difficulties encountered when conducting this assessment.

11.12 Conclusion

In conclusion, impacts to air quality and climate can occur during both the construction and operational phases of the proposed development. During the construction stage the greatest potential for air quality impacts is from fugitive dust emissions impacting nearby sensitive receptors. Impacts to climate can occur as a result of vehicle and machinery emissions. In terms of the operational stage air quality and climate impacts will predominantly occur as a result of the change in traffic flows on the local roads associated with the proposed development. 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). This method is referenced in the TII (2011) guidance.

Any potential dust impacts can be mitigated through the use of best practice and minimisation measures which are outlined in Section 11.5. Therefore, dust impacts will be short-term and imperceptible at all nearby sensitive receptors. It is not predicted that significant impacts to climate will occur during the construction stage. Construction stage impacts to climate are predicted to be short-term, neutral and imperceptible.

The local air quality modelling assessment of operational phase traffic concluded that levels of traffic-derived air pollutants resulting from the development will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in Transport Infrastructure Ireland's guidance document 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes' (2011) the impact of the development in terms of NO_2 is long-term, localised, negative and imperceptible.

The proposed development is not predicted to significantly impact climate during the operational stage. Increases in traffic derived levels of CO_2 have been assessed against Ireland's EU GHG targets. Changes in CO_2 emissions are significantly below the EU targets and therefore the climatic impact in the operational stage is considered long-term, negative and imperceptible. In addition, the proposed development has been designed to minimise the impact to climate where possible during operation.

The best practice dust 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 short-term, localised, negative and imperceptible with respect to human health. Operational phase predicted concentrations of pollutants are predicted to be significantly below the EU standards, the impact to human health is predicted to be imperceptible, negative and long term.

11.13 References

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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)

APPENDIX 11.1
Ambient Air Quality Standards

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values which came into operation on 17th June 2002. Council Directive 1999/30/EC, as relating to limit values for sulphur dioxide, nitrogen dioxide, lead and particulate matter. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM_{10}, 40% for the hourly and annual limit value for NO_2 and 26% for hourly SO_2 limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for $PM_{2.5}$ are included in Directive 2008/50/EC. The approach for $PM_{2.5}$ was to establish a target value of 25 $\mu g/m^3$, as an annual average (to be attained everywhere by 2010) and a limit value of 25 $\mu g/m^3$, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target will range from 0% (for $PM_{2.5}$ concentrations of less than 8.5 $\mu g/m^3$ to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 µg/m^3). Where the AEI is currently greater than 22 µg/m^3 all appropriate measures should be employed to reduce this level to 18 µg/m^3 by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 - 2010 and again from 2018-2020. Additionally, an exposure concentration obligation of 20 µg/m^3 was set to be complied with by 2015 again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as "a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC". These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_X (NO and NO_2) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_X limit for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway
- 5 km from the nearest major industrial installation
- 20 km from a major urban conurbation

As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

APPENDIX 11.2
Transport Infrastructure Ireland Significance Criteria

Table 11.2.1: Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations.

Magnitude of Change	Annual Mean NO_2 / PM_{10}	No. days with PM_{10} concentration > 50 μg/m³	Annual Mean $PM_{2.5}$
Large	Increase / decrease ≥4 μg/m³	Increase / decrease >4 days	Increase / decrease ≥2.5 μg/m³
Medium	Increase / decrease 2 - <4 μg/m³	Increase / decrease 3 or 4 days	Increase / decrease 1.25 - <2.5 μg/m³
Small	Increase / decrease 0.4 - <2 μg/m³	Increase / decrease 1 or 2 days	Increase / decrease 0.25 - <1.25 μg/m³
Imperceptible	Increase / decrease <0.4 μg/m³	Increase / decrease <1 day	Increase / decrease <0.25 μg/m³

Table 11.2.2: Air Quality Impact Significance Criteria For Annual Mean Nitrogen Dioxide and PM_{10} and $PM_{2.5}$ Concentrations at a Receptor.

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration Note 1		
	Small	Medium	Large
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥40 μg/m³ of NO_2 or PM_{10}) (≥25 μg/m³ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (36 - <40 μg/m³ of NO_2 or PM_{10}) (22.5 - <25 μg/m³ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (30 - <36 μg/m³ of NO_2 or PM_{10}) (18.75 - <22.5 μg/m³ of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<30 μg/m³ of NO_2 or PM_{10}) (<18.75 μg/m³ of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value With Scheme (≥40 μg/m³ of NO_2 or PM_{10}) (≥25 μg/m³ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value With Scheme (36 - <40 μg/m³ of NO_2 or PM_{10}) (22.5 - <25 μg/m³ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value With Scheme (30 - <36 μg/m³ of NO_2 or PM_{10}) (18.75 - <22.5 μg/m³ of $PM_{2.5}$)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value With Scheme (<30 μg/m³ of NO_2 or PM_{10}) (<18.75 μg/m³ of $PM_{2.5}$)	Negligible	Negligible	Slight Beneficial

Note 1 Well Below Standard = <75% of limit value.

APPENDIX 11.3
Dust Management Plan

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (IAQM (2014), The Scottish Office (1996), UK Office of Deputy Prime Minister (2002) and BRE (2003)) and the USA (USEPA (1997)).

Site Management
The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 11.2 for the windrose for Dublin Airport). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;

- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use;
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust;
- During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.

Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;

- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002);
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

12.0 NOISE AND VIBRATION

12.1 Introduction

The following chapter presents an assessment of the impacts of the proposed residential SHD development on lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14, in terms of noise and vibration in the local environment. The Central Mental Hospital site is underpinned by a Masterplan which will also be assessed, for the purposes of cumulative impact assessment i.e. the proposed SHD residential development and the S34 application within the Central Mental Hospital site (hereinafter referred to as the CMH Masterplan).

The principal objectives of the noise and vibration assessment will be to specify appropriate threshold values and mitigation measures to ensure that the effect on the environment is minimised. The assessment for noise and vibration is based on the most up to date applicable guidance and assessment documents available both nationally and internationally.

The noise and vibration assessment has been prepared by Dr. Aoife Kelly (Senior Acoustic Consultant) who holds a BSc (Hons) in Environmental Health, a Diploma in Acoustics and Noise Control, a PhD in Occupational Noise and is a member of the Institute of Acoustics (MIOA). She has specialised in acoustics since 2014 and has extensive knowledge and experience in the field of occupational noise risk assessments, environmental noise and vibration impact assessment and inward impact assessments. She has completed noise and vibration chapters for numerous mixed residential planning applications of varying scales in Ireland.

Noise and vibration will be considered in terms of two aspects. The first is the outward effect of the development (i.e. the potential effect of the buildings and commercial activities on existing sensitive receptors in the study area), and the second is the inward effect of the existing noise and vibration sources on the development itself. A full project description is included in Chapter 5 of this Environmental Impact Assessment Report (EIAR).

12.2 Methodology

The study has been undertaken using the following methodology:

- 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;
- A desk-top assessment of the expected baseline noise environment has been carried out based on available noise mapping, and historical noise monitoring in the wider area of the development site has been reviewed, in order to characterise the receiving noise environment;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the proposed development at the nearest noise sensitive locations (NSLs) to the site;
- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at the most NSLs surrounding the development site;

- An assessment has been completed of potential cumulative impacts that may arise as a result of the proposed development and other existing or proposed plans and projects;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development; and
- The inward effect of noise from the surrounding environment into the proposed residential buildings has also been assessed to determine the requirements for additional noise mitigation to ensure a suitable internal noise environment for residential amenity.

12.2.1 Construction Phase

12.2.1.1 Criteria for Assessing Construction Noise Impacts

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phases of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.

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

This document sets out guidance on permissible noise levels relative to the existing noise environment. Table 12.1 sets out the values which, when exceeded, signify a potential significant effect at the façades of residential receptors, as recommended by BS 5228-1:2009+A1:2014.

Table 12.1: Example thresholds of potential significant effect at dwelling.

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A[17]	Category B[18]	Category C[19]
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends[20]	55	60	65
Daytime (07:00 - 19:00) and Saturdays (07:00 – 13:00hrs)	65	70	75

[17] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
[18] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
[19] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.
[20] 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

It should be noted that this assessment method is only valid for residential properties, and if applied to commercial premises without consideration of other factors, may result in an excessively onerous thresholds being set.

Fixed Limits

BS 5228-1:2009+A1:2014 gives several examples of acceptable limits for construction or demolition 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 Levels for Noise

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see Section 12.3), BS 5228-1:2009+A1:2014 has been used to inform the assessment approach for construction noise, in line with the ABC method.

Interpretation of the Construction Noise Levels (CNL)

In order to assist with interpretation of CNL, Table 1.2 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the threshold value. This guidance is taken from Table 3.16 of *DMRB: Noise and Vibration* (UKHA 2020) and adapted to include the EPA EIAR Guidelines.

Table 12.2: Interpretation of CNL at dwelling.

Impact Guidelines for Noise Impact Assessment Significance (Adapted from DMRB)	CNL per Period	EPA EIAR Guidelines	Determination
Negligible	Below or equal to baseline noise level	Not Significant	Depending on range of CNL and baseline noise level
Minor	Above baseline and below or equal to CNL	Slight to Moderate	
Moderate	Above CNL and below or equal to CNL +5 dB	Moderate to Significant	
Major	Above CNL +5 dB	Significant to Very Significant	

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.

Construction Vehicular Traffic

In order to assist with interpretation of construction traffic noise, Table 12.3 includes guidance as to the likely magnitude of impact associated with changes in traffic noise levels along an existing road. This guidance is taken from Table 3.17 of *DMRB: Noise and Vibration* (UKHA 2020).

Table 12.3: Likely effect associated with change in traffic noise level – construction noise (DMRB 2020).

Increase in Traffic Noise Level (dB)	Magnitude of Impact	Duration
<1.0	Negligible	>10 days/nights over 15 consecutive day/nights & >40 days over 6 consecutive months
1.0 – 2.9	Minor	
3 – 4.9	Moderate	
<5.0	Major	

The DMRB guidance outlined will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely impacts during the construction stage.

12.2.1.2 Criteria for Assessing Construction Vibration Impacts

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For the purpose of the proposed development, 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.

Peak Particle Velocity (PPV)

PPV is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values: -

- **British Standard BS 7385: 1993: *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*, and;**
- **British Standard BS 5228: 2009 +A1 2014: *Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* (BS5228-2).**

BS7385 and BS5228-2:2009+A1:2014 advise that, for soundly constructed residential properties 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 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in

Table B.2 of BS5228-2:2009+A1:2014 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges.

The documents note that minor structural damage can occur at vibration magnitudes that are greater than twice those presented in Table 12.4. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the Table. It should be noted that these values refer to the vibration at base of the building.

Table 12.4 sets out the limits as they apply to vibration frequencies below 4 Hz, where the most conservative limits are required. At higher frequencies, the limit values for transient vibration within Table B.2 of BS5228-2:2009+A1:2014 will apply, with similar reductions applied for continuous vibration and those for protected structures. External to the SHD application area there are three buildings which are protected buildings, namely the main hospital building, the chapel and the infirmary building.

Table 12.4: Recommended construction vibration thresholds for buildings.

Structure Type	Allowable vibration (in terms of PPV) at closest part of sensitive property to source of vibration, at frequency of ≤4 Hz	
	Transient vibration	Continuous vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s	25 mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15 mm/s	7.5 mm/s
Protected and Historic Buildings[21]	6 – 15 mm/s	3 – 7.5 mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3 mm/s	

As per BS5228-2:2009+A1:2014, below a frequency of 4 Hz where a high displacement is associated with a relatively low component PPV, a maximum displacement of 0.6 mm (zero to peak) should be used.

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 that 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 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.

[21] The relevant threshold value to be determined on a case by case basis. Where sufficient structural information is unavailable at the time of assessment, the lower value within the range will be used.

Table 12.5 below summarises the range of vibration values and the associated potential effects on humans.

Table 12.5: Guidance on effects of human response to PPV magnitudes.

Vibration level, PPV	Effect
0.140 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1 mm/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, piling can typically be tolerated at vibration levels up to 2.5 mm/s if adequate public relations are in place, or up to 12 mm/s during blasting, when advance warning is given and timeframes are known. These values refer to the day-time periods only.

During surface construction works (piling and ground breaking, etc.) the vibration limits set within Table 12.5 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 12.6 presents the significance table relating to potential impacts to building occupants during construction, based on guidance from BS5228-2:2009+A1:2014.

Table 12.6: Guidance on effects of human response to PPV magnitudes.

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
<0.14 mm/s PPV	Very Low	Imperceptible to Not significant

12.2.2 Operational Phase

12.2.2.1 Criteria for Assessing Operational Noise Impacts

The main potential source of outward noise from the proposed development will relate to traffic flows to and from the development site onto the public roads and activities from vehicular movements on site, including car park, etc. There will also be a variety of electrical and mechanical plant required to service the development. The relevant guidance documents used to assess potential operational noise and vibration impacts are summarised in the following sections.

Change in Traffic Noise Levels

In the absence of any Irish guidelines or standards describing the effects associated with changes in road traffic noise levels, reference has been made to the *DMRB Noise and Vibration* (UKHA 2020). This document provides magnitude rating tables relating to changes in road traffic noise. The document suggests that, during the year of opening, the magnitude of impacts between the Do Minimum and the Do Something scenarios are likely to be greater compared to the longer term period (fifteen years post-opening), when people become more habituated to the noise level change. It shows that small changes in noise levels are not normally noticeable, whereas an increase of 10 dB would be described as a doubling of loudness. In summary, the assessment looks at the impact with and without development at the nearest noise sensitive locations.

Table 12.7: Likely impact associated with short-term change in traffic noise level (DMRB 2020).

Change in Noise Level (dB L_{A10})	Short to medium-term magnitude	EPA criteria magnitude of impact
<1.0	Negligible	Imperceptible
1.0 to 2.9	Minor	Not Significant
3 – 4.9	Moderate	Significant
>5.0	Major	Significant

Table 12.8: Likely impact associated with long-term change in traffic noise level (DMRB 2020).

Change in Noise Level (dB L_{A10})	Subjective Reaction	Long-Term Term Magnitude	EPA Classification Magnitude of Impact
< 3.0	Barely Perceptible	Negligible	Not Significant
3 – 4.9	Perceptible	Minor	Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate
10+	More than a doubling of loudness	Major	Significant - Profound

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

Plant Noise

Once a development of this nature becomes fully operational, a variety of electrical and mechanical plant will be required to service the development. Most of this plant will be capable of generating noise to some degree. Some of this plant may operate 24 hours a day, and hence would be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties would potentially have the greatest effect. Plant contained within plant rooms has the least potential for impact, once consideration is given to appropriate design of the space.

The following wording would be considered typically suitable for a planning condition related to operational noise (plant) associated with a development of this nature: -

> *"Noise levels from the Proposed Development should not be so loud, so continuous, so repeated, of such duration or pitch or occurring at such times as to give reasonable cause for annoyance to a person in any premises in the neighbourhood or to a person lawfully using any public space. In particular the rated noise levels from the Proposed Development shall not constitute reasonable grounds for complaint as provided for in B.S. 4142. Method for rating industrial noise affecting mixed residential and industrial area.*
>
> *Reason: In order to ensure a satisfactory standard of development, in the interests of residential amenity."*

The typical planning condition outlined above related to noise emissions from mechanical plant items makes reference to the British Standard BS 4142: 2014+A1:2019: *Methods for Rating and Assessing Industrial and Commercial Sound.* This document is the industry standard method for analysing building services plant noise emissions to residential NSLs and is the document used by planning authorities in their standard planning conditions and also in complaint investigations.

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

For an appropriate BS 4142 assessment, it is necessary to compare the measured external background noise level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention, BS 4142 also advises that a penalty be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal noise characteristics outlined in BS 4142 recommends the application of a 2 dB penalty for a tone which is just perceptible at the NSL, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

The following definitions, as discussed in BS 4142, are summarised below: -

"ambient noise level, $L_{Aeq,T}$"	is the noise level produced by all sources including the sources of concern, i.e. the residual noise level plus the specific noise of mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
"residual noise level, $L_{Aeq,T}$"	is the noise level produced by all sources excluding the sources of concern, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
"specific noise level, $L_{Aeq,\ T}$"	is the sound level associated with the sources of concern, i.e. noise emissions solely from the mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
"rating level, $L_{Ar,T}$"	is the specific sound level plus any adjustments for the characteristic features of the sound (e.g. tonal, impulsive or irregular components);
"background noise level, $L_{A90,T}$"	is the sound pressure level of the residual noise that is exceeded for 90% of the time period T.

If the rated plant noise level is +10 dB or more above the pre-existing background noise level, then this indicates that complaints are likely to occur and that there will be a significant adverse effect. A difference of around +5 dB is likely to be an indication of an adverse effect, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse effect or a significant adverse effect. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low effect.

It is important to note that cumulative plant noise levels from the proposed development site must be designed so as to meet the relevant noise criteria set at a given sensitive receptor location.

Internal Noise at Receivers within the Development

To ensure there is no adverse inward impact on the future inhabitants of the proposed development itself, it is appropriate to refer to internal noise targets derived from BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings.* The recommended indoor ambient noise levels are set out in Table 12.9 and are based on annual average data; that is to say, they omit occasional events where higher intermittent noisy events may occur.

Table 12.9: Professional practice guidance on planning and noise (ProPG) internal noise levels (BS 8233:2014).

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 $L_{Aeq,16hr}$	-

Activity	Location	Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$	Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,T}$[22]

For the purposes of this study, it is appropriate to derive external assessment criteria based on the internal criteria noted in the Table above. This is done by factoring in the degree of noise reduction afforded by a partially open window. This is nominally deemed to be 15 dB.

Based on the guidance outlined the BS8233 standard, the following external noise levels would be considered reasonable in order to achieve suitable internal noise levels within the nearest residential properties:

- **Daytime (07:00 to 23:00 hrs): 55 dB $L_{Aeq,15mins}$**
- **Night-time (23:00 to 07:00 hrs): 45 dB $L_{Aeq,15mins}$**

Dún Laoghaire – Rathdown County Council Noise Action Plan (NAP)

The Dublin Agglomeration Environmental Noise Action Plan December 2018 – July 2023 Volume 2 – Dún Laoghaire – Rathdown County Council (NAP) states the following regarding how noise should be dealt with in the planning system for new noise sensitive developments:

> *"In the scenario where new residential development or other noise sensitive development is proposed in an area with an existing climate of environmental noise, there is currently no clear national guidance on appropriate noise exposure levels. The EPA has suggested that in the interim that Action Planning Authorities should examine the planning policy guidance notes issued in England titled, 'ProPG Planning and Noise: Professional Practice Guidance on Planning and Noise'. This has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England."*

In accordance with this NAP policy, an Acoustic Design Statement (ADS) has been prepared to comply with the requirements of this policy (see Section 12.5) of this chapter.

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 it's adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

[22] 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.

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

A key component of the evaluation process is the preparation and delivery of an ADS which is intended for submission to the planning authority. This document is intended to clearly outline the methodology and findings of the Stage 1 and Stage 2 assessments, so as the planning authority can make an informed decision on the permission. ProPG outlines the following possible recommendations in relation to the findings of the ADS:

A. Planning consent may be granted without any need for noise conditions;
B. Planning consent may be granted subject to the inclusion of suitable noise conditions;
C. Planning consent should be refused on noise grounds in order to avoid significant adverse effects ("avoid"); or,
D. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects ("prevent").

Section 3.0 of the ProPG provides a more detailed guide on decision making to aid local authority planners on how to interpret the findings of an accompanying ADS.

A summary of the ProPG approach is illustrated in Figure 12.1.

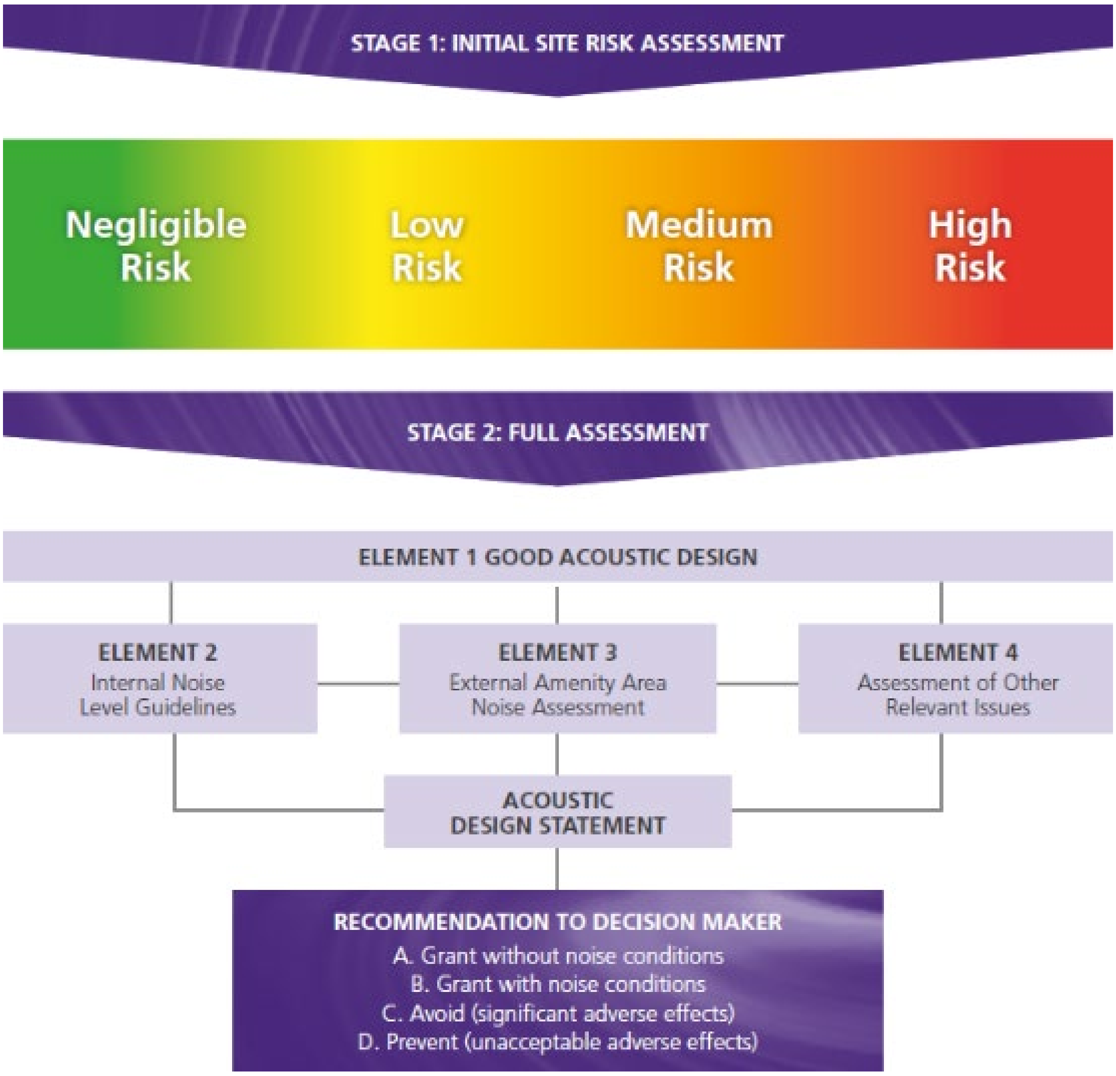

Figure 12.1: ProPG Approach. (Source: ProPG.)

WHO Environmental Noise Guidelines for Europe

The World Health Organisation (WHO) published the *Environmental Noise Guidelines for the European Region* in October 2018. The objective of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise from transportation, wind farm and leisure sources of noise. The guidelines present recommendations for each noise source type in terms of L_{den} and L_{night} levels above which there is risk of adverse health risks.

However, it should be noted that the WHO guideline values referred to here are recommended to serve as the basis for a policy-making process to allow evidence-based public health orientated recommendations. They are not intended to be noise limits and the WHO document states the following regarding the implementation of the guidelines,

> *"The WHO guideline values are evidence-based public health-oriented recommendations. As such, they are recommended to serve as the basis for a policy-making process in which policy options are considered. In the policy decisions on reference values, such as noise limits for a possible standard or legislation, additional*

considerations – such as feasibility, costs, preferences and so on – feature in and can influence the ultimate value chosen as a noise limit. WHO acknowledges that implementing the guideline recommendations will require coordinated effort from ministries, public and private sectors and nongovernmental organizations, as well as possible input from international development and finance organizations. WHO will work with Member States and support the implementation process through its regional and country offices."

It is therefore not intended to refer to the WHO guidelines in an absolute sense as part of this assessment and it will be a decision for national and local policy makers to adopt the WHO guidelines and propose noise limits for use.

12.2.2. Criteria for Assessing Operational Vibration Impacts

There are no noteworthy sources of vibration associated with the operational stage, therefore vibration criteria have not been specified.

12.3 Baseline Environment

12.3.1 Site Area Description

The existing noise and vibration environments across the development site and in the vicinity of the nearest existing noise sensitive locations are dictated by transportation sources in the study area including the existing roads and Luas movements. After development of the proposed units this is expected to remain the same. The receiving environment in terms of baseline noise and vibration is expected to be the same for the CMH Masterplan development.

12.3.2 Desk Based Study of Published Data

In order to quantify noise emissions across the existing site reference has been made to the noise maps prepared by Transport Infrastructure Ireland (TII). The following noise maps have been referred to when carrying out the desk based assessment of the baseline noise environment:

- Round 3 Noise Maps for Roads – Dublin Agglomeration, and;
- Round 3 Noise Maps for Rail – Dublin Agglomeration.

The above noise maps are provided for the overall day / evening / night period in terms of L_{den} and for the night-time period in terms of L_{night}.

All data has been taken from the EPA Mapping website http://gis.epa.ie.

Figure 12.2 to Figure 12.5 present the predicted noise levels across the development site for road and LUAS traffic in terms of L_{den} and L_{night}.

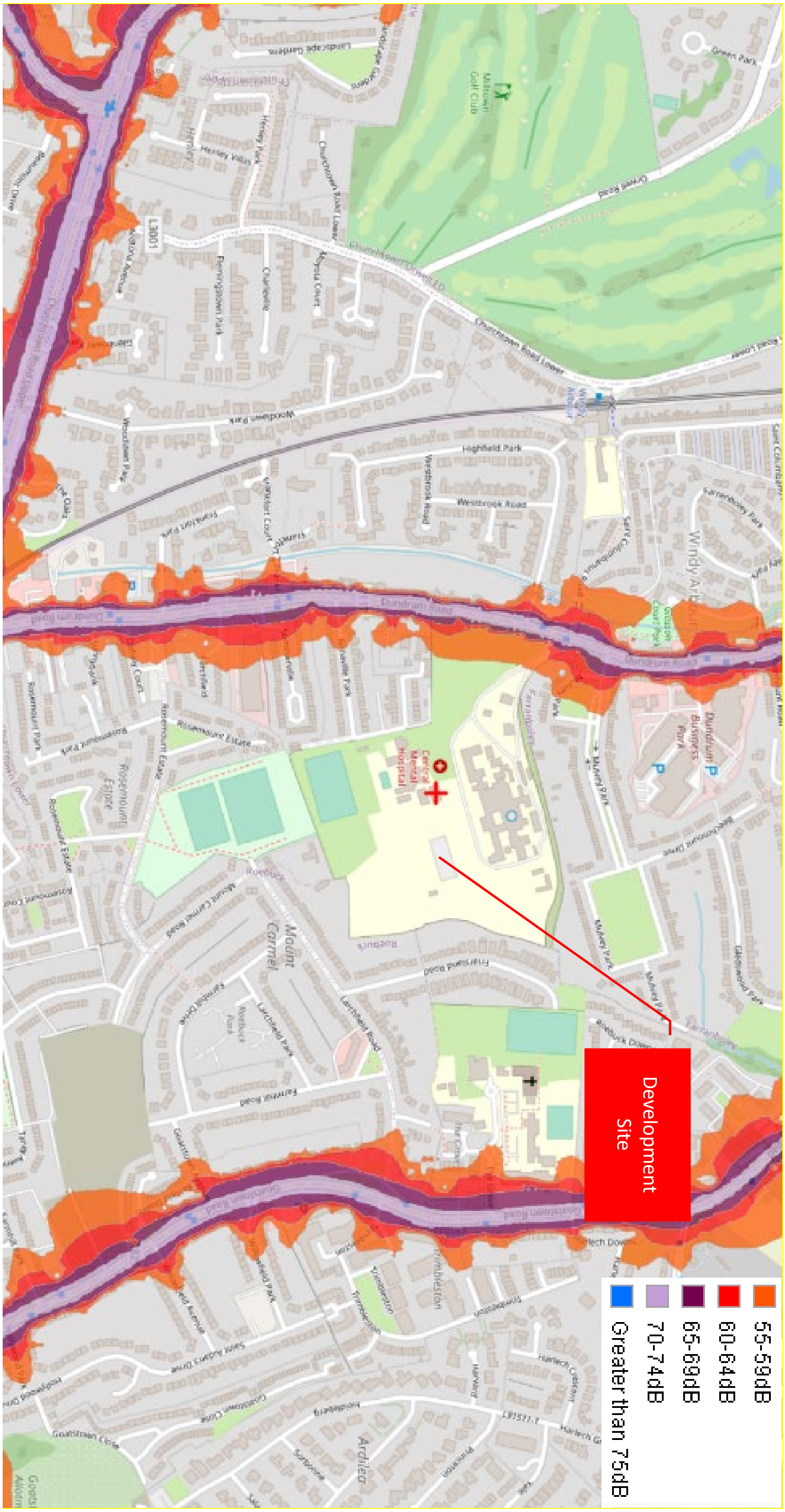

Figure 12.2: L_{den} Road Traffic Noise Levels.

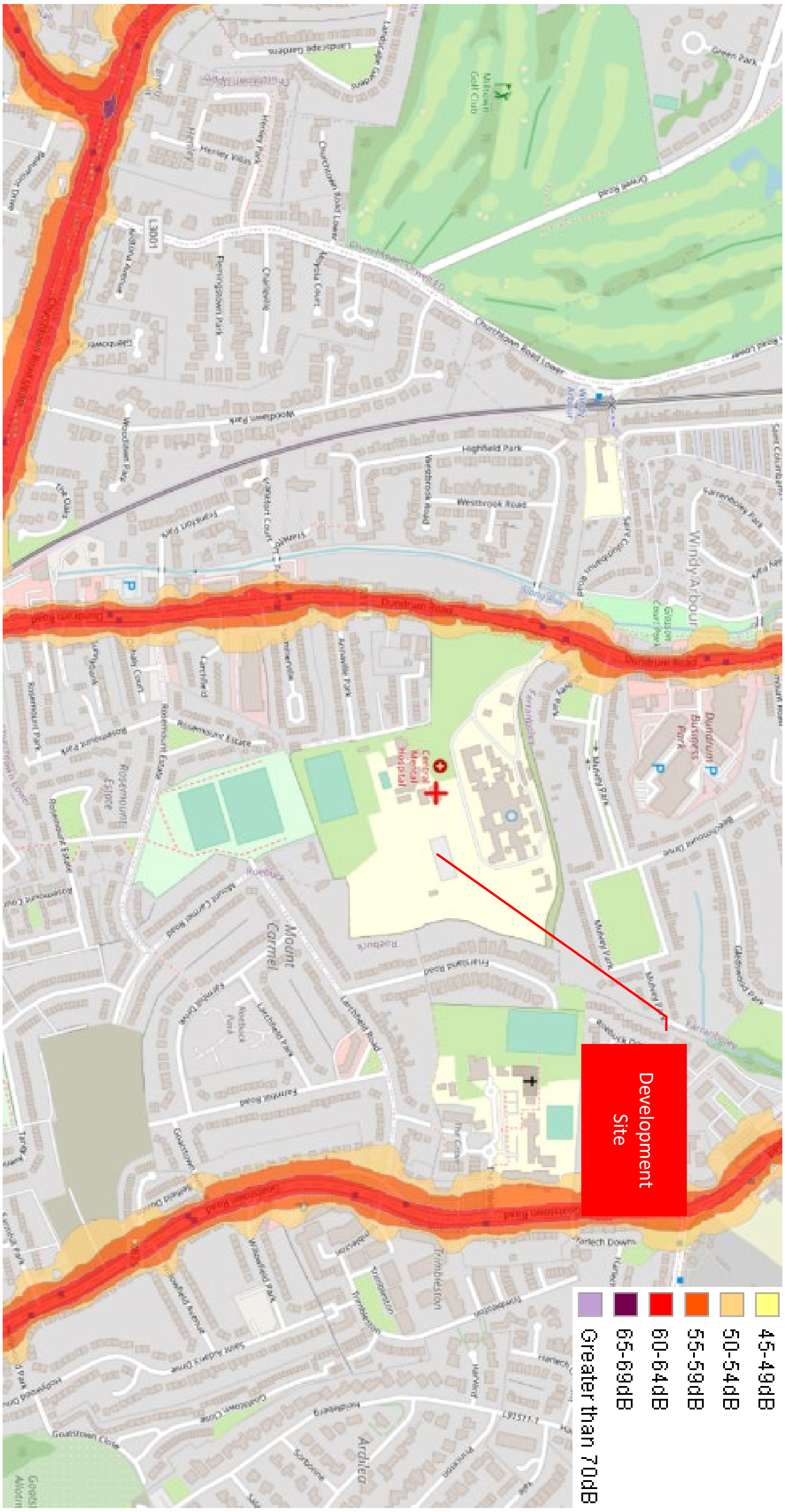

Figure 12.3: L_{night} Road Traffic Noise Levels.

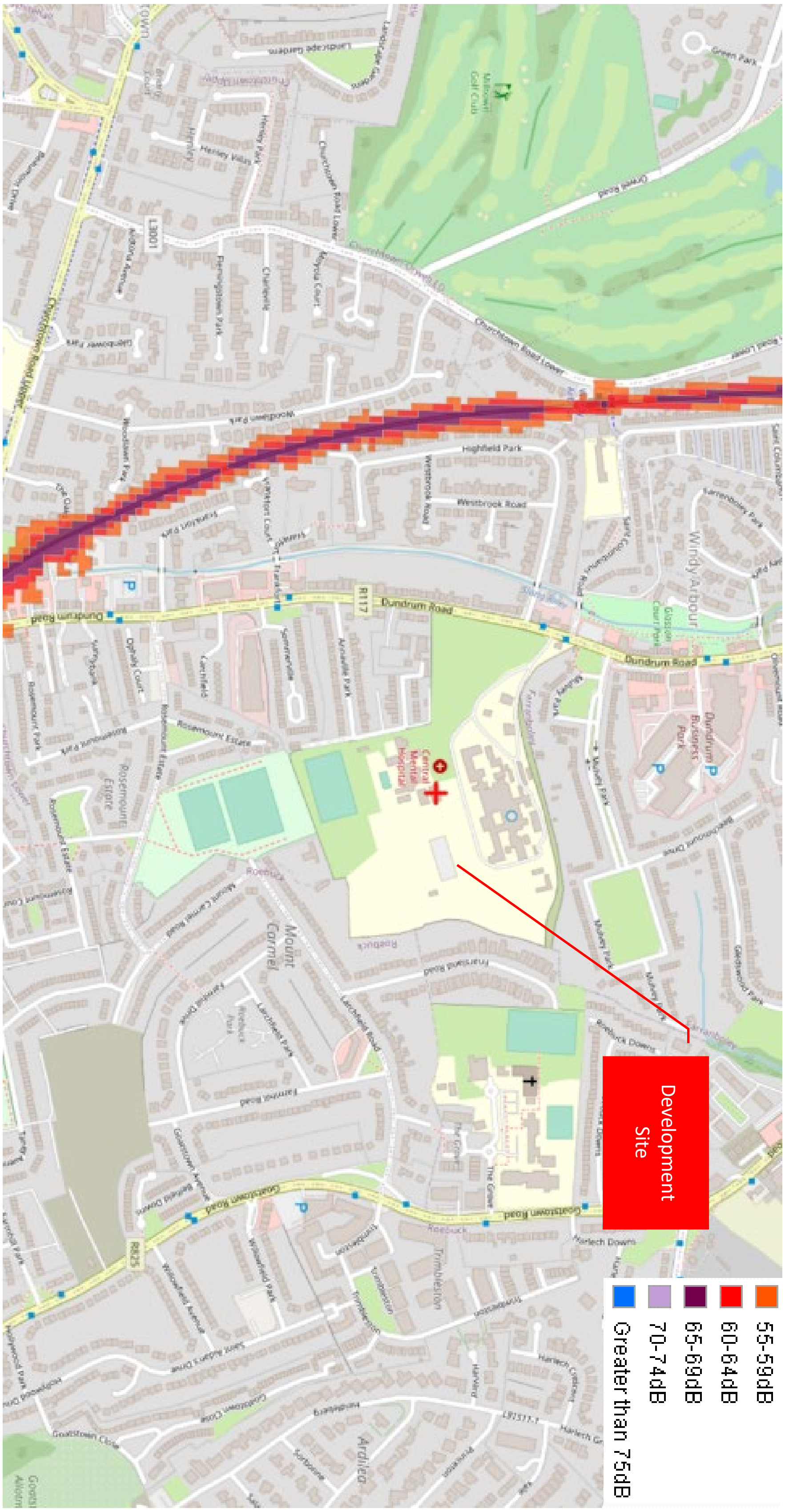

Figure 12.4: L_{den} Rail Traffic Noise Levels.

Figure 12.5: L$_{night}$ Rail Traffic Noise Levels.

The mapping contours suggest that road traffic on the R117 Dundrum Road has the potential to be the dominant noise at the development along the western boundary. It is noted that the development site is located within the 65 to 69 dB L_{den} contour and 55 to 64 dB L_{night} contours within 15m distance from the R117 Dundrum Road. Between 15m to 30m distance from the R117 Dundrum Road, the development site is located within the 60 to 64 dB L_{den} contour and the 50 to 54 dB L_{night} contour. Between 30m to 60m distance from the R117 Dundrum Road, the development site is located within the 55 to 59 dB L_{den} contour. At distances typically greater than 30m from the R117 the development site is located in the < 50 to 54 dB L_{night} contour. Note that the L_{den} values translate to an approximate value of 58 to 62 dB L_{day} across the site.

Table 12.10 summarises the current noise levels across the site for each source type.

Table 12.10: Noise Levels at development site.

Noise Source	L_{den}, dB	L_{night}, dB	L_{day}, dB [23]
Road Traffic	55 – 69	<50 – 64	53 – 67
Rail Traffic	<45	<45	<45
Total	55 – 69	<50 – 64	54 – 64

12.3.3 Environmental Noise Survey

An environmental noise survey has been conducted in order to quantify noise emissions across the existing site. The external survey was conducted in general accordance with ISO1996-2:2017 Acoustics - Description, Measurement and Assessment of Environmental Noise -- Determination of Environmental Noise Levels. Specific details are set out in the following sections.

The attended baseline noise monitoring was undertaken during April 2021 when Covid-19 pandemic restrictions when continuing to work from home was advised unless that work required a physical presence. The unattended baseline noise monitoring was undertaken during October 2021 when restrictions were eased and non-essential retail reopened and employees were permitted to return to work in businesses if working from home was not an option. To quantify any potential reductions in baseline noise levels due to the pandemic, a review of desk based study of published data was also carried out.

Combined, the 2021 survey along with the desk based study of published data, quantify the existing and future varying noise environment across the proposed development site, namely:

- The desk based study of the noise environment giving consideration to the noise levels across the site for the inward noise assessment, i.e. worst case scenario as noise levels will be higher than those measured in the noise surveys as there will be no screening from the perimeter wall to the western boundary and
- The measured noise surveys to identify the noise environment at the nearest NSLs for the outward noise assessment, i.e. potentially a worst case scenario if Covid restrictions has influenced traffic noise e.g. lower baseline noise levels would set lower construction noise thresholds for NSLs.

[23] L_{day} has been estimated by assuming day and evening noise levels are equal

12.3.3.1 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 2×10^{-5} Pa.

12.3.3.2 Environmental Noise Survey

The location of the proposed development site is such that the noise climate is dominated by road traffic. Two unattended noise surveys were undertaken in order to obtain long term measurements. Four attended monitoring locations were undertaken in the close vicinity of the proposed site, representative of the existing noise environment at the closest NSLs.

Survey Locations

The measurement location was selected on the proposed site as discussed below.

Location UN1 Unattended monitoring. Approximately 10m from the western boundary of site. Located to capture the noise environment for proposed Block 9 and 10 dwellings for inward impact assessment.

Location UN2 Unattended monitoring. Approximately 20m from the southern boundary of site. Located to capture the noise environment for proposed Block 2 to Block 8 dwellings for plant noise assessment.

Location AN1 Attended monitoring. Approximately 20 m from western boundary of site along R117 Dundrum Road. Approximately 10m from the road. Representative of the nearest NSLs situated to the west of the site.

Location AN2 Attended monitoring approximately 60 m from northern boundary of site, in line with facades of nearest NSLs to the north (Mulvey Park). Representative of the nearest NSLs situated to the north of the site.

Location AN3 Attended monitoring approximately 70 m from south eastern boundary of the site, in line with facades of nearest NSLs at the intersection of Friarsland Rd and Larchfield Rd. Representative of the nearest NSLs situated to the east and south of the site.

Location AN4 — Attended monitoring approximately 10 m from south western boundary of site, in line with facades of nearest NSLs (Annaville Grove). Representative of the nearest NSLs situated to the west of the site.

Figure 12.6 shows map indicating the monitoring locations. Photographs were not permitted on the existing site due to security restrictions.

Figure 12.6: Indicating noise survey locations. (© Google Earth.)

Personnel and Monitoring Equipment

AWN Consulting performed the unattended and attended measurements during the survey period. Measurements were performed using Rion NL-52 Sound Level Meters.

The noise survey was carried out between the following survey periods:

- Unattended noise monitoring at UN1 was undertaken between 13:04 hrs 5 October 2021 to 11:51 hrs 11 October 2021.
- Unattended noise monitoring at UN2 was undertaken between 13:25 hrs 5 October 2021 to 12:03 hrs 11 October 2021.
- Attended noise monitoring was undertaken at AN1 to AN4 between 11:05 hrs to 16:38 hrs on 27 April 2021.

Table 12.11: Instrumentation details.

Location	Manufacturer	Model	Serial Number	Calibration Data
UN1	Rion	NL-52	1076330	20 October 2020

Location	Manufacturer	Model	Serial Number	Calibration Data
UN2	Rion	NL-52	764925	9 September 2021
AN1 to AN4	Brüel & Kjaer	2250	2818080	7 May 2019
Calibrator	Brüel & Kjaer	4231	2460007	26 March 2021

Sample periods were 15 minutes. Before and after the survey, the measurement instruments were check calibrated using a Brüel & Kjaer 4231 Sound Level Calibrator.

The weather during the survey periods were generally dry and calm and was not considered to have had a detrimental effect on the noise measurements.

UN1 Results

The weather during the survey period was generally dry and calm and was not considered to have had a detrimental effect on the noise measurements. Table 12.12 and Table 12.13 presents a summary the unattended noise levels measured at location UN1.

Table 12.11: Summary of unattended noise measurements at UN1.

Day	Sound Pressure Level (dB re. $2x10^{-5}$ Pa)								
	Daytime (07:00 to 19:00 hrs)			Evening (19:00 to 23:00 hrs)			Night (07:00 to 23:00 hrs)		
	L_{Aeq}	L_{A90}	L_{AFMax}	L_{Aeq}	L_{A90}	L_{AFMax}	L_{Aeq}	L_{A90}	L_{AFMax}
Tues, October 5th	54	50	78	52	46	70	46	35	68
Wed, October 6th	52	48	83	52	48	82	47	37	68
Thurs, October 7th	53	48	84	50	44	70	46	34	68
Fri, October 8th	54	47	79	51	45	80	48	38	74
Sat, October 9th	52	47	77	50	43	77	45	34	71
Sun, October 10th	51	45	77	50	44	73	45	34	67
Mon, October 11th	55	48	73	--	--	--	--	--	--
Average	53[24]	48[25]	--	51[8]	45[9]	--	46[8]	35[9]	--

Daytime noise levels were found to range between 51 to 55 dB $L_{Aeq,12hour}$, evening noise levels were in the range between 50 to 52 dB $L_{Aeq,4hour}$, while night-time noise levels were in the were in the range between 45 to 48 dB $L_{Aeq,8hour}$. Dominant noise sources noted during the survey were road traffic on the R117 Dundrum Road.

Table 12.13 presents a summary of the daytime and night-time frequency spectrum at UN1.

Table 12.12: Summary of L_{Aeq} unattended noise measurements at UN1.

Date	Period	Octave Band Centre Frequency (Hz)						Overall
		125	250	500	1k	2k	4k	$L_{Aeq, T}$ dB
Tues, October 5th	Day	51	49	48	50	45	39	53
	Night	43	41	39	41	35	29	44

[24] Logarithmically averaged.
[25] Arithmetically averaged.

Date	Period	Octave Band Centre Frequency (Hz)						Overall $L_{Aeq, T}$ dB
		125	250	500	1k	2k	4k	
Wed, October 6th	Day	52	49	47	49	44	37	52
	Night	42	41	40	41	35	30	44
Thurs, October 7th	Day	52	50	47	48	43	35	52
	Night	41	41	39	41	35	26	44
Fri, October 8th	Day	51	49	47	49	43	34	52
	Night	42	43	42	43	38	31	46
Sat, October 9th	Day	50	48	46	48	43	33	51
	Night	41	41	39	42	36	25	44
Sun, October 10th	Day	50	48	46	48	42	31	50
	Night	41	40	38	40	33	23	43
Mon, October 11th	Day*	52	49	48	50	45	37	53
Worst Case Day		52	49	48	50	45	37	53
Worst Case Night		42	43	42	43	38	31	46

The L_{AFmax} values were measured at 15 minute intervals over the duration of the unattended monitoring survey. Figure 12.7 presents the distribution of the magnitude of L_{AFmax} events during the night period.

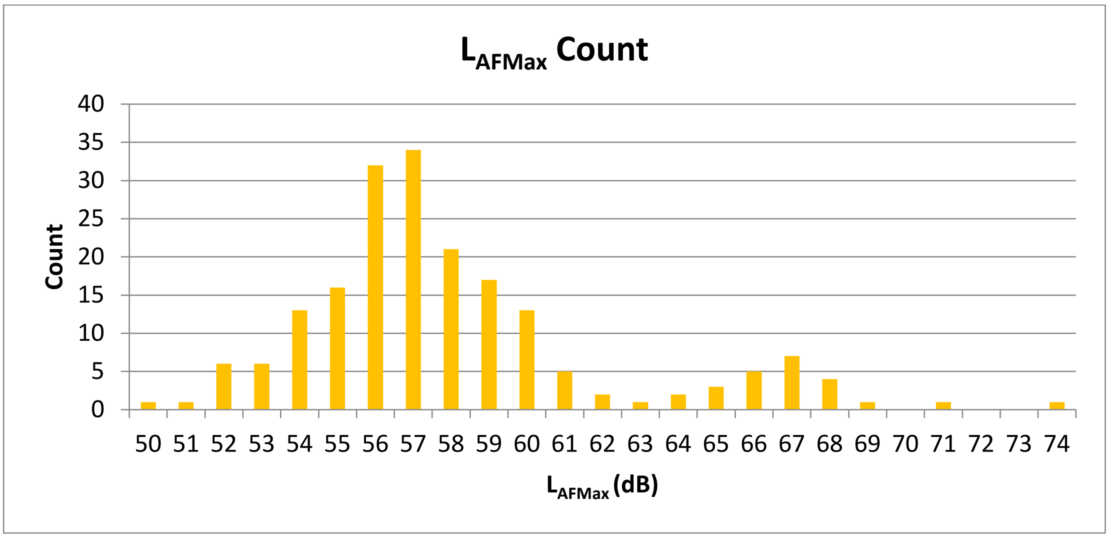

Figure 12.7: Number of L_{AFmax} events at each decibel level measured during the night period at location UN1.

Spectral data has been derived from an arithmetic averaging of the frequency content measured at the most frequent magnitude of 57 dB L_{AFmax}.

UN2 Results

The weather during the survey period was generally dry and calm and was not considered to have had a detrimental effect on the noise measurements. Table 12.14 presents a summary the unattended noise levels measured at location UN2.

Table 12.13: Summary of unattended noise measurements at UN1

Day	Sound Pressure Level (dB re. 2x10^{-5} Pa)								
	Daytime (07:00 to 19:00 hrs)			Evening (19:00 to 23:00 hrs)			Night (07:00 to 23:00 hrs)		
	L_{Aeq}	L_{A90}	L_{AFMax}	L_{Aeq}	L_{A90}	L_{AFMax}	L_{Aeq}	L_{A90}	L_{AFMax}
Tues, October 5th	50	46	73	45	43	60	39	36	64
Wed, October 6th	49	43	76	48	43	92	40	36	62
Thurs, October 7th	46	43	74	40	37	60	36	32	58
Fri, October 8th	46	41	75	42	39	67	43	36	66
Sat, October 9th	45	41	75	42	39	66	37	34	55
Sun, October 10th	46	40	79	42	40	74	39	35	61
Mon, October 11th	45	42	64	--	--	--	--	--	--
Average	47[1]	42[2]	--	44[1]	40[2]	--	40[1]	35[2]	--

Daytime noise levels were found to range between 45 to 50 dB $L_{Aeq,12hour}$, evening noise levels were in the range between 40 to 48 dB $L_{Aeq,4hour}$, while night-time noise levels were in the were in the range between 36 to 43 dB $L_{Aeq,8hour}$. Dominant noise sources noted during the survey were road traffic on the local roads and the R117 Dundrum Road in the distance.

AN1 Results

The survey results for Location A1 are presented in Table 1.15. Road traffic noise from the R117 Dundrum Road was the dominant noise source noted at this location with and birdsong audible during the measurement periods.

Table 1.14: Measured noise levels at location AN1

Date	Period	Measurement Period	Measured Noise Levels, dB re 2x10^{-5} Pa		
			L_{Aeq}	L_{AFMax}	L_{AF90}
27 April 2021	Day	11:05-11:20	67	82	55
		13.13-13:28	67	78	52
		15:05-15:20	65	77	54

Daytime ambient noise levels at this location were dominated by road traffic noise from the R117 Dundrum Road. Ambient noise levels were between 65 to 67 dB $L_{Aeq,15min}$ and background noise levels were between 52 to 55 dB $L_{A90,15min}$ during the daytime measurement period.

No significant level of vibration was noted at this location during site attendance.

AN2 Results

The survey results for Location AN2 are presented in Table 12.16. Road traffic noise from the R117 Dundrum Road was the dominant noise source noted at this location, with birdsong and intermittent overhead airplane pass by.

Table 12.15: Measured noise levels at location AN2

Date	Period	Measurement Period	Measured Noise Levels, dB re 2x10^{-5} Pa		
			L_{Aeq}	L_{AFMax}	L_{AF90}
27 April 2021	Day	12:28-12:43	49	68	45

Date	Period	Measurement Period	Measured Noise Levels, dB re $2x10^{-5}$ Pa		
			L_{Aeq}	L_{AFMax}	L_{AF90}
		13:37-13:52	49	61	46
		15:27-15:44	46	64	43

Daytime ambient noise levels at this location were dominated by road traffic noise from the distant R117 Dundrum Road. Ambient noise levels were between 46 to 49 dB $L_{Aeq,15min}$ and background noise levels were between 43 to 46 dB $L_{A90,15min}$ during the daytime measurement period.

No significant level of vibration was noted at this location during site attendance.

AN3 Results

The survey results for Location AN3 are presented in Table 12.17. Local road traffic was the dominant noise source. Other noise sources included intermittent road traffic noise, birdsong, foliage noise and activities within the housing estate.

Table 12.16: Measured noise levels at location AN3.

Date	Period	Measurement Period	Measured Noise Levels, dB re $2x10^{-5}$ Pa		
			L_{Aeq}	L_{AFMax}	L_{AF90}
27 April 2021	Day	11:57-12:12	56	71	38
		14:03-14:18	53	74	36
		16:13-16:28	55	69	42

Daytime ambient noise levels at this location were dominated by intermittent car pass by on local roads. Ambient noise levels were between 53 to 56 dB $L_{Aeq,15min}$ and background noise levels were between 36 to 42 dB $L_{A90,15min}$ during the daytime measurement period.

No significant level of vibration was noted at this location during site attendance.

AN4 Results

The survey results for Location AN4 are presented in Table 12.18. Distant road traffic noise from the R117 Dundrum Road and birdsong were the dominant noise sources noted at this location. Other noise sources included activities within the housing estate and intermittent overhead airplane pass by.

Table 12.17: Measured noise levels at location AN4.

Date	Period	Measurement Period	Measured Noise Levels, dB re $2x10^{-5}$ Pa		
			L_{Aeq}	L_{AFMax}	L_{AF90}
27 April 2021	Day	12:50-13:06	45	65	37
		14:34-14:49	40	61	33
		16:38-16:53	39	63	34

Daytime ambient noise levels at this location were dominated by distant road traffic noise from the R117 Dundrum Road. Ambient noise levels were between 39 to 45 dB $L_{Aeq,15min}$ and background noise levels were between 33 to 37 dB $L_{A90,15min}$ during the daytime measurement period.

No significant level of vibration was noted at this location during site attendance.

Outward Noise Impact Assessment of Construction and Operational Plant

At UN2 due to the central positioning of the noise monitoring location on site, the measured noise data gathered at this location is considered representative of the quieter (rear) façades of the closest NSLs overlooking the site i.e. to the north, east, south and southwest of the site. The measured noise data presented for UN2, supplemented by AN2 to AN4 will be used as a worst case scenario in setting the construction noise thresholds and operational plant noise limits for the outward noise assessment.

At those NSLs located to the west of R117 Dundrum Road, the measured noise data from AN1 will be used as a worst case scenario in setting the construction noise thresholds for the outward noise assessment.

Inward Noise Impact Assessment at Block 9 and Block 10

Although the unattended noise monitor at UN1 was positioned at 4m height it was still below the height of the existing perimeter boundary wall facing onto the R117 Dundrum Road (of 4m to 5m height). A barrier correction of 13 dB has been assumed based on the distance between the dominant road traffic noise source, the receiver and barrier, and the height of each. When compared to the EPA maps, the calculated L_{den}, L_{night} and L_{day} are comparable. The assumed noise levels presented in Table 12.19 below will be used as a worst case inward noise impact assessment for facades within 15m of the site boundary to the west i.e. western facades at Block 9 and Block 10.

Table 12.18: Assumed UN1 Noise Levels at Development Site.

n of Data	cation	Correction	Noise Levels, dB re 2x10-5 Pa			
			$_{en}$, dB	$_{ght}$, dB	$_{ay}$, dB	$_{max}$, dB
asured	UN1	13 dB	69	59	66	70
A Maps	UN1	--	69	59	66	--
sumed	UN1	--	69	59	66	70

Table 12.20 presents a summary of the daytime and night-time frequency spectrum at UN1.

Table 12.19: Summary of daytime and night-time frequency spectrum at UN1.

Period	Octave Band Centre Frequency (Hz)						Overall
	125	250	500	1k	2k	4k	$L_{Aeq, T}$ dB
Worst Case Day	65	62	61	63	58	50	66
Worst Case Night	55	56	55	56	51	44	59

The averaged spectral data has then been re-adjusted to the assessment value of 70 dB L_{AFmax}.

Table 12.20: Summary of night-time frequency spectrum at UN1.

Overall	Octave Band Centre Frequency (Hz)					
dB L_{AFmax}	125	250	500	1k	2k	4k
70	72	68	66	67	61	54

12.4 Potential Impacts of the Proposed Project

A variety of items of plant will be in use for the purposes of demolition of existing buildings, site clearance including removal of sections of the perimeter wall and general construction. The type and number of equipment will vary between the varying construction phases, and depending on the phasing of the works. There will be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for the generation of elevated levels of noise.

During the operational phase, the potential sources of noise are those associated with additional vehicular traffic on public roads, operational plant and building services, and vehicular movements and car parking on-site.

Noise and vibration emissions from the proposed development will vary both in terms of duration and magnitude. The following sections analyse the expected construction and operational phase noise and vibration impacts, both in terms of the proposed assessment criteria and the expected impacts in terms of the significance of effects.

Where applicable, the CMH Masterplan has been included in the construction and operational phase assessments however a full assessment of the S34 site will be addressed fully as part of a subsequent separate planning application.

12.4.1 Demolition and Construction Phase

A variety of items of plant will be in use for the purpose of demolition, site clearance and construction works. There will also be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for the generation of elevated levels of noise in the vicinity of existing noise sensitive properties.

The proposed general construction hours are 08:00 to 19:00 hrs, Monday to Friday and 08:00 to 14:00 hrs on Saturdays. The overall construction duration is expected to be six and a half years approximately.

The demolition and construction phases will be controlled through the use of construction noise threshold values which the contractor will be required to work within as much as is practicable. In this regard, the choice of plant, scheduling of works on site, provision of localised screening and other best practice control measures will be employed.

12.4.1.1 Sensitive Receptors

Noise and vibration impacts will be assessed to the nearest sensitive locations to the proposed development site boundaries, i.e. a worst case assessment of the closest sensitive locations during any of the construction stages. These closest locations are identified in Figure 12.8.

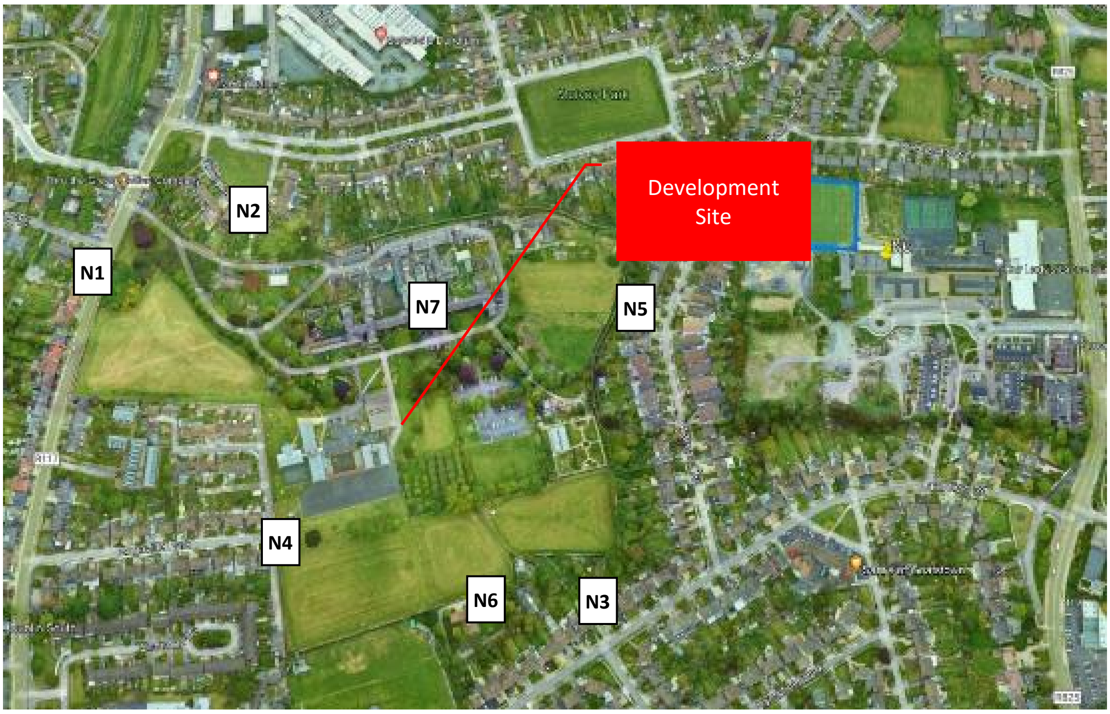

Figure 12.8: Indicating closest noise sensitive locations. (© Google Earth.)

- ***N1:*** Residential NSLs to west along R117 Dundrum Road, approx. 20 m from western boundary of site.
- ***N2***: Mulvey Park residential development approx. 30 m from northern boundary of site.
- ***N3***: Residential NSLs to north of Larchfield Road, approx. 40 m from northern boundary of site.
- ***N4***: Annaville Park residential development, approx. 10m from south-western site boundary.
- ***N5***: Residential NSLs to west along Friarsland Road , approx. 15 m from western boundary of site.
- ***N6:*** Residential NSLs along Larchfield Road, approximately 5m from southern and south-eastern site boundary.
- ***N7:*** Existing main hospital building, the chapel and the infirmary building on adjacent development site, directly adjacent to northern site boundary.

During the construction of the CMH Masterplan, as a worst-case assessment the closest NSLs within the development site at any stage of construction are:

- Block 2 residential dwellings, located approximately 10m to Phase 3 northern boundary.
- Block 3 to 5 residential dwellings, located approximately 30m to Phase 4 eastern boundary.
- Block 6 and 7 residential dwellings, located approximately 20m to Phase 4 eastern boundary.
- Block 10 residential dwellings, located approximately 15m to Phase 5 northern boundary.

The following construction noise threshold levels are proposed for the construction stage of this development:

- For residential NSLs to west of proposed site boundary along the R117 Dundrum road, it is considered appropriate to adopt the 70 dB(A) threshold level, given the baseline monitoring carried out, it would indicate that Category B values are appropriate using the ABC method.
- For residential NSLs to north, east, south and southwest of proposed site boundary it is considered appropriate to adopt the 65 dB(A) threshold level, given the baseline monitoring carried out, it would indicate that Category A values are appropriate using the ABC method.
- For clinical NSLs it is considered appropriate to adopt the 70 dB(A) threshold level, given the suburban environment in which the CMH resides.
- For Block 2 to 7 residential NSLs to it is considered appropriate to adopt the 65 dB(A) threshold level, given the baseline monitoring carried out, it would indicate that Category A values are appropriate using the ABC method.
- For Block 10 residential NSLs to it is considered appropriate to adopt the 70 dB(A) threshold level, given the baseline monitoring carried out, it would indicate that Category B values are appropriate using the ABC method.

12.4.1.2 Construction Plant

The construction programme will create typical construction activity related noise onsite. During the construction stage of the proposed works, a variety of items of plant will be in use, such as breakers, excavators, lifting equipment, dumper trucks, compressors and generators.

Due to the fact that the construction programme has been established in outline form only, it is difficult to calculate the actual magnitude of noise emissions to the local environment. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise.* This standard sets out sound power / sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels. However, it is not possible to conduct detailed accurate prediction calculations for the construction phase of a project in support of the EIAR due to the level of variability during different construction stages over short periods of time.

The following section discusses typical worst-case noise levels associated with the Proposed Development and comments on potential noise impacts at distances to the nearest NSLs.

<u>Intrusive Works and High Noise Activities Including Demolition and Basement Excavation</u>
Reference to BS 5288:2009+A1: Part 1 indicates that highest noise levels likely to be required on the site are associated with activities associated with site enabling and ground breaking associated with the initial demolition and ground clearance phase. Noise levels from these activity types are typically in the range of 80 to 90 dB L_{Aeq} at 10m.

For construction activities associated with hard ground breaking, crushing etc, a total construction noise level of 92 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would involve for example, one item of plant at 90 dB L_{Aeq} and two items of plant at 85 dB L_{Aeq} and one item of plant at 80 dB L_{Aeq} operating simultaneously within one work area which is considered a highly worst-case scenario.

<u>Utilities and Structural Works Including Piling and Foundation Slab Construction</u>

For construction works associated with activities such as site clearance, excavation and structural works including excavators, loaders, dozers, cranes, generators, concreting works and piling etc. noise levels are typically in the range of 70 to 80 dB L_{Aeq} at 10m.

For ongoing construction activity associated with the above activities, a total construction noise level of 82 and 85 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations for these activities representing variety over this stage. This would include, for example two items of plant at 80 dB L_{Aeq} and three items of plant at 75 dB L_{Aeq} operating simultaneously within one work area resulting in a total noise level of 85 dB L_{Aeq} and up to six items of plant with a noise level of between 70 and 75 dB L_{Aeq} resulting in a total noise level of 82 dB L_{Aeq} at 10m.

Superstructure and Lower Noise Activities
For construction work areas with lower noise levels such as site compounds (for storage, offices and material handling, generators etc.), smaller items of mobile plant (excavators, cranes, dozers), landscaping and concreting works with lower noise emissions, a total construction noise level of 78 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example one item of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

Given the variations of on-site activities and noise levels over any one day and considering that all activities will not operate simultaneously, the values noted above are considered robust for the purposes of assessing potential construction impacts.

12.4.1.3 Indicative Construction Noise Calculations at Varying Distances

The closest external NSLs to the Proposed Development are at distances of approximately 5m to the south and southeast boundaries along Larchfield Road. The remaining closest NSLs are at distances of approximately 10m to 40m. Remaining properties are located at distances greater than 40 m from different work stages.
The closest internal NSLs within the CMH Masterplan are directly adjacent to the site boundaries to the north i.e. the existing main hospital building, the chapel and the infirmary building.

Table 12.22 presents the calculated noise levels at distances between 10m and 100m representing the closest NSLs to the construction works. The calculations assume that plant items are operating for 66%[26] of the time. For the purpose of the assessment, a standard site hoarding of 2.4m high has been included in the calculations for noise sensitive boundaries. Screening from existing buildings have not been included in the calculations. It must be stated that for most of the time, plant and equipment will be a greater distance from the nearest NSLs than those used within the calculations in and consequently will have lower impact. Our assessment is therefore representative of a “worst-case” scenario representing construction activities at a minimum distance from the NSLs.

[26] This estimate assumes that the plant will operate for approximately 6.5 hours over the proposed 10 hour working period which equates to a 66% on time over a daytime period or 40 minutes over a 1 hour period. The dynamic nature of construction sites is such that this is deemed to be a conservative estimate, particularly for breaking and drilling work.

Table 12.21: Indicative construction noise calculations at varying distances.

Construction Programme Activity	Combined L_{Aeq} at 10 m	Predicted construction noise level at a specific distance with plant operating at 66% on-time (dB $L_{Aeq,1hour}$)					
		10 m	15 m	20 m	30 m	50 m	100 m
Initial works stage including intrusive works e.g. demolition and basement excavation	92	86	82	75	71	67	61
Utilities and structural works including piling and basement foundation slab construction	85	78	74	67	63	59	53
	82	75	72	64	61	56	50
General site work including site compounds and landscaping	78	71	68	60	57	52	46

The worst-case predicted noise levels detailed in the Table 12.22 above indicate that at the residential and clinical NSLs at distances greater than 50m from the initial works stage and at distances greater than 15m to 20m from all other works would not be expected to exceed the significance threshold of 65dB $L_{Aeq,1hr}$. At the residential NSLs overlooking the R117 Dundrum Road, at distances greater than 30m from the initial works stage and at distances greater than 10m to 15m from all other works would not be expected to exceed the significance threshold of 70dB $L_{Aeq,1hr}$. At these nearest locations the associated construction noise impact is not considered significant.

Comment on Outward Construction Noise for Residential NSLs
Based on the set distances calculated in Table 12.22 the following comments are made:

- N1 (residential properties) are located approximately 20m from the site boundary and the predicted noise level is above the significance threshold of 70 dB $L_{Aeq,1h}$ during the initial intrusive works stage, particularly during Phase 1 construction of Block 10 apartments and basement. During all other construction works the predicted noise levels is below the significance threshold of 70dB $L_{Aeq,1h}$.
  - Given the variations of on-site activities and number of plant items during any one phase and the location of works only operating along the closest boundaries for a limited the duration of the works, the calculated noise levels presented are considered to present a worst-case scenario.
- N2 and N3 (rear facades of residential properties) are located approximately 30m to the north and 40m to the southeast respectively from the closest site boundary and the predicted noise level is above the significance threshold of 65 dB $L_{Aeq,1h}$ during the initial intrusive works stage. During all other construction works the predicted noise levels is below the significance threshold of 65dB $L_{Aeq,1h}$.
  - Given the variations of on-site activities and number of plant items during any one phase and the location of works only operating along the closest boundaries for a limited the duration of the works, the calculated noise levels presented are considered to present a worst-case scenario. When the initial works are at distances greater than 50m from the significance threshold of 65 dB $L_{Aeq,1hr}$ will not be exceeded.
- N4 to N6 (residential properties) are located approximately 5m to 15m approximately to the west (N4), east (N5) and south (N6) from the closest site boundary and the predicted

noise level is above the significance threshold of 65 dB $L_{Aeq,1h}$ during all construction works stage.

- Given the variations of on-site activities and number of plant items during any one phase and the location of works only operating along the closest boundaries for a limited the duration of the works, the calculated noise levels presented are considered to present a worst-case scenario. When the initial works are at distances greater than 50m and all other works are at distances greater than 15m to 20m the significance threshold of 65 dB $L_{Aeq,1hr}$ will not be exceeded.

Comment on Outward Construction Noise for Clinical NSLs with CMH Masterplan
Based on the set distances calculated in Table 12.22 the following comments are made:

- N7 (clinical receivers) are located adjacent to the west of Phase 1 and to the north of Phase 2 site boundaries. The predicted noise level is above the significance threshold of 65 dB $L_{Aeq,1h}$ during all construction works stages.
    - Given the variations of on-site activities and number of plant items during any one phase and the location of works only operating along the closest boundaries for a limited the duration of the works, the calculated noise levels presented are considered to present a worst-case scenario. When the initial works are at distances greater than 50m and all other works are at distances greater than 15m to 20m the significance threshold of 65 dB $L_{Aeq,1hr}$ will not be exceeded.

Comment on Construction Noise for Residential NSLs within the Proposed Development
Based on the set distances calculated in Table 12.22 the following comments are made:

- Blocks 2 and 10 are located approximately 10m to 15m from the closest site boundaries during the construction phases and the predicted noise level is above the significance threshold of 65 dB $L_{Aeq,1h}$ during all construction works stages.
    - Given the variations of on-site activities and number of plant items during any one phase and the location of works only operating along the closest boundaries for a limited the duration of the works, the calculated noise levels presented are considered to present a worst-case scenario. When the initial works are at distances greater than 50m and all other works are at distances greater than 15m to 20m the significance threshold of 65 dB $L_{Aeq,1hr}$ will not be exceeded.
- Blocks 3 to 7 are located approximately 20m to 30m from the closest site boundaries the predicted noise level is above the significance threshold of 65 dB $L_{Aeq,1h}$ during the initial intrusive works stage. During all other construction works the predicted noise levels is below the significance threshold of 65dB $L_{Aeq,1h.}$
    - Given the variations of on-site activities and number of plant items during any one phase and the location of works only operating along the closest boundaries for a limited the duration of the works, the calculated noise levels presented are considered to present a worst-case scenario. When the initial works are at distances greater than 50m from the significance threshold of 65 dB $L_{Aeq,1hr}$ will not be exceeded.

The results of the initial assessment indicate that under the 'worst case' assessment scenarios construction activities are likely to exceed the recommended noise threshold levels at the closest NSLs when occurring along the closest boundaries. Noise mitigation measures will therefore be required to reduce potential impacts at these residential properties to avoid significant impacts. Further discussion on mitigation measures are included in Section 12.6.

12.4.1.3 Construction Vibration

Demolition of existing structures will involve careful deconstruction using controlled techniques. There may be a requirement for breaking ground as part of specific demolition procedures, depending on the structure. Potential for vibration impacts during the demolition phase programme are likely to be applicable to the closest receptor locations to the proposed works (N2, N4 and N7).

Empirical data for demolition 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 significantly below the vibration criteria for building damage on experience from other sites. AWN Consulting 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, and;
- 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 10m 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. The range of vibration magnitudes indicate vibration levels at the closest offsite residential NSLs (N2 and N4) and onsite clinical receivers are likely to be below the limits set out in Table 12.4. Vibration levels are also expected to be below a level that would cause disturbance to building occupants, as set out in Table 12.5. The predicted vibration impact during the construction phase is ***short-term, neutral and imperceptible***.

Nonetheless, any demolition activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Table 12.4 during all activities. Further discussion on mitigation measures during this phase are discussed in Section 12.6.

Potential for vibration impacts during the construction phase programme are likely to be limited given the ground breaking, piling and excavations required. There is potential for piling to be used for building and basement foundations for apartment 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 600 mm pile diameter for bored piling into soft ground over rock:

- **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 5 m, 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 external to the Proposed Development and the protected structures on-site in the CMH Masterplan, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 12.4 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 12.5. The predicted vibration impact during the construction phase is ***short-term, neutral and imperceptible***.

12.4.1.4 Construction Traffic

Based on the information provided by Barrett Mahony Civil and Structural Consulting Engineers it is anticipated that no more than 39 HGV peak vehicle movements will be carried out in a day based on Phase 3 of the construction works. It is assumed that all of the HGVs with enter / exit the site via R117 Dundrum Road.

An increase of 25% in traffic is required to increase overall traffic noise levels by 1 dB, which is insignificant in the overall context of the noise environment along the R117 Dundrum Road and wider road network in the vicinity of the proposed development. Therefore, the short-term noise environment assumed for this project is expected to be within at least 1 dB of the baseline scenario, which would give a magnitude of increase in traffic noise that is ***not significant***.

Based on the scenario of HGV figures identified above, it is assumed that as a worst-case scenario no more than 30 truck movements (out of the site) will occur in a one hour period. The NSLs are closest to the route at 10m distance along the R117 Dundrum entrance.

The noise level associated with an event of short duration, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The mean value of Sound Exposure Level (SEL) for a truck at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 85 dB L_{AX} at a distance of 5 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions. The SEL can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is given below.

$$L_{Aeq,T} = L_{AX} + 10Log_{10}(N) - 10Log_{10}(T) + 20Log_{10}\left(\frac{r_1}{r_2}\right) dB$$

where: -

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T in seconds).
L_{AX} is the "A-weighted" Sound Exposure Level of the event considered (dB).
N is the number of events over the course of time period T.
r_1 is the distance at which L_{AX} is expressed.
r_2 is the distance to the assessment location.

Using the equation detailed above, the predicted noise level at the nearest residential NSLs is in the order of 58 $L_{Aeq,1hr}$. Levels of this order would not be expected to exceed the significance threshold of 70 dB $L_{Aeq,1hr}$ at the closest residential NSLs along the R117 Dundrum Road.

Reference to the baseline noise levels made at AN1 along the road edge in the vicinity of the site indicates that the calculated noise levels are below the existing baseline and a change in noise level which would be barely perceptible. It should be noted that, in order to assess a worst-case scenario, a large proportion of the daily vehicle numbers have been assumed to depart over an hour long period. Therefore, it is expected in the absence of specific mitigation measures that there will be a ***negative, not significant and short-term*** impact at the closest receptors.

No further mitigation measures would therefore be required.

12.4.2 Operational Phase

Once the proposed development is operational, the potential noise impacts to the surrounding environment are predicted to be minimal. The residential aspect of the development is not expected to generate any significant noise sources over and above those which form part of the existing environment at neighbouring residential areas (road traffic noise, estate vehicle movements, children playing, etc.) and, hence, no significant impact are predicted in this regard.

Due consideration must be given to the nature of the primary noise sources when setting criteria. Potential noise impacts during the operational phase include the following:

- Additional vehicular traffic on surrounding roads;
- Building services plant;
- Deliveries;
- Car parking on-site;
- Crèche playground area; and
- Patron Noise from External Seating in Commercial Areas

Once operational, there are no noteworthy sources of vibration associated with the development site.

12.4.2.1 Additional Vehicular Traffic on Surrounding Roads

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network.

A traffic impact assessment relating to the proposed development has been prepared by ILTP Consulting as part of this EIAR (refer to Chapter 17). Figure 12.9 presents the road links external to the proposed development (1-7) and those within the development itself (8 and 9). The results of this assessment have been reviewed to predict any impact of the proposed development on traffic flows in the area. The calculated change in noise levels during Opening Year (2024) and Future Design Year (2039)[27] are summarised in Table 12.23.

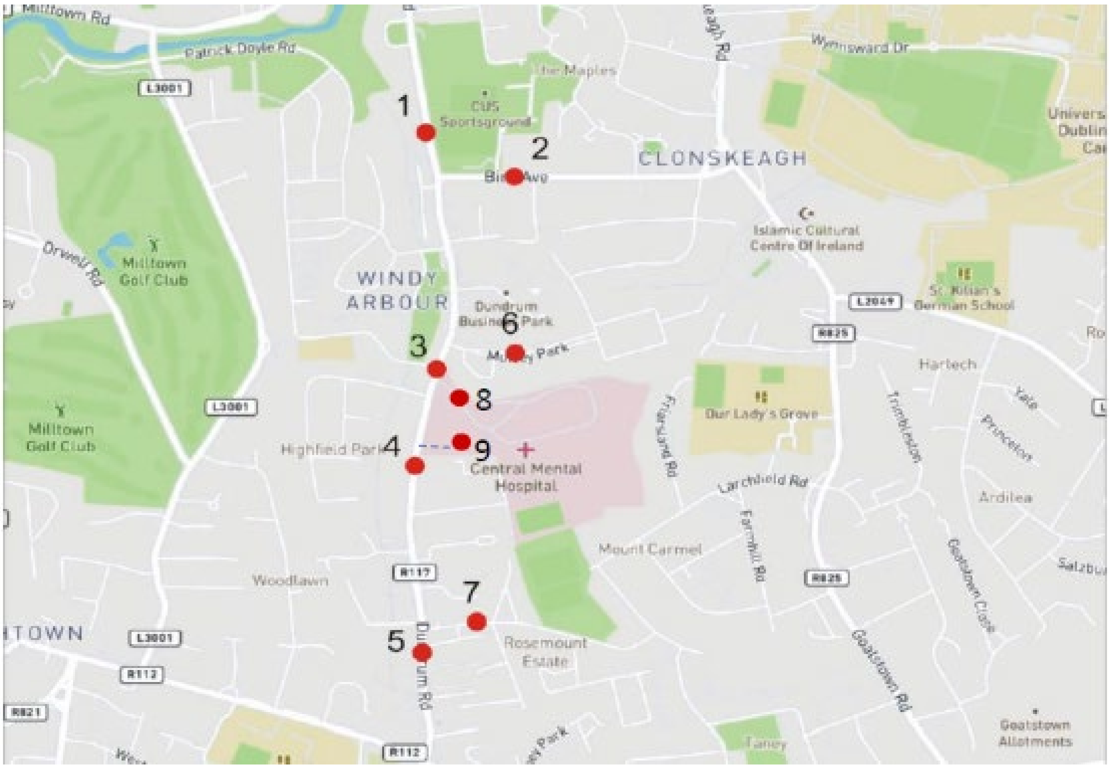

Figure 12.9: Road links for traffic assessment. (Source: ILTP Consulting.)

Table 12.22: Summary of change in noise level (Opening Year 2024 / Design Year 2039).

Location	AADT do nothing	AADT do something	Change in noise level (all vehicles)
	Opening year / Design year		
1	13,275	14,031	+0.2
2	9,156	9,647	+0.2
3	17,197	18,823	+0.4
4	17,292	19,712	+0.6
5	19,868	22,023	+0.4
6	1,275	1,464	+0.6
7	2,789	3,365	+0.8
8	295	1,361	+6.6
9	n/a	2420	n/a

The predicted increase in AADT traffic levels with links external (1 to 7) to the associated development are between 0.2 – 0.8 dB(A) in the vicinity of the roads assessed for the Opening Year and Future Design Year. This is largely due to the existing volume of traffic along the surrounding road network onto which the development traffic will travel and the small additional traffic added by the proposed development. Reference to Table 12.7 confirms that the increase in the Opening Year is *neutral, imperceptible and short-term*. Reference to Table

[27] ILTP Consulting have assumed that there is no additional background traffic growth between 2024 and 2039. In reality traffic volumes are likely to fall, hence traffic remaining at current levels as presented presents a worse-case scenario.

12.8 confirms that the increases in the Future Design Year are *neutral, not significant and long-term*.

Comment on Additional Vehicular Traffic on Internal Roads Within the Proposed Development

The predicted AADT traffic volumes along the existing internal road (Link 8) and proposed second access internal link to the associated development are also presented in Table 12.23. The predicted increase in AADT traffic levels along the existing internal link (8) to the north of the proposed development is 6.6 dB(A) assessed for the Opening Year and Future Design Year.

It is noted however that the closest NSLs external to the development are at 30m to the north of Link 8 (N2) and at 30m to the south of Link 9 (N4), with 3% of the AADT comprised of HGVs. To further assess the potential noise impact of internal traffic movements on the surrounding environment, the specific noise level associated with traffic volumes at the nearest NSLs has been calculated.

The noise level associated with an event of short duration, such as a passing vehicle movement, may be expressed in terms of its SEL (L_{AX}). The mean value of SEL for an HGV at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 85 dB L_{AX} at a distance of 10 metres from the vehicle, the SEL for a light goods vehicle in similar conditions is of the order of 68 dB L_{AX}. The SEL can be used to calculate the contribution of a series of events to the overall noise level in a given period. The SEL formula used previously in Section 12.4.1.4 construction traffic calculation also has been applied here. It has been assumed that no more than 25% of vehicles will occur in a 1 hour period.

The calculated traffic noise level associated with Opening Year / Design Year traffic within the development internal roads are summarised in Table 12.24.

Table 12.23: Summary of change in noise level internal roads (Opening Year 2024 / Design Year 2039).

Link	NSL ID.	$L_{Aeq,\ 1hr}$ Do Nothing	$L_{Aeq,\ 1hr}$ Do Something	Existing Baseline (dB $L_{Aeq,\ T}$)
		Opening year / Design year		
8	N2	42	49[28]	46-49
9	N4	-	49[29]	47

The predicted traffic noise level at the nearest residential NSLs to the north (N2) is 49 dB $L_{Aeq,1hr.}$ Whist this represents an increase in traffic noise at these NSLs, the overall noise level is well within the daytime criterion of 55 dB $L_{Aeq,1hr}$ and is within 3 dB of the measured ambient noise levels at this location (AN2) which encompasses other surrounding sources. The change in the existing baseline noise level and predicted noise level is 3 dB and would be just perceptible. As a result the impact is considered long-term and not significant.

The predicted traffic noise level at the nearest residential NSLs to the south (N4) is 49 dB $L_{Aeq,1hr}$, which is well within the daytime criterion of 55 dB $L_{Aeq,1hr}$ and is within 2 dB of the measured ambient noise levels at this location (UN2). The change in the existing noise level

[28] Screening effect from 4m perimeter wall included in calculation (8 dB reduction).
[29] Screening effect from 4m permitter wall and proposed buildings included in calculation (10 dB reduction)

and predicted noise level is 3 dB and would be just perceptible. As a result the impact is considered long-term and not significant.
In summary, the predicted increase in noise levels associated with vehicles at road junctions in the vicinity of the proposed development during the operational phase constitutes a ***long-term, not significant impact***.

12.4.2.2 Building Services and Plant

Once operational, there will be building services plant items required to serve the commercial and residential aspects of the proposed development. The specific requirements for mechanical and electrical plant items for each element of the commercial, residential buildings or crèche / community buildings has not yet been progressed at this stage of the design. Most of this plant will be capable of generating noise to some degree and may operate 24 hours a day. It would, therefore, be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties as well as louder plant areas on roofs would potentially have the greatest impact.

The type of building services plant has not yet been established. Therefore, it is not possible to calculate noise levels to the surrounding environment. In this instance, is it best practice to set appropriate noise limits that will inform the detailed design during the selection and layout of building services for the proposed development. Plant items will be selected, designed and located so that there is no negative impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the proposed development (e.g. apartments, etc.) will be designed/attenuated to meet the relevant BS 4142 noise criteria for day and night-time periods as set out in this assessment. Based on the baseline noise data collected for this assessment it is considered an appropriate design criterion is the order of **40 dB $L_{Aeq,15min}$** during daytime periods and **35 dB $L_{Aeq,15min}$** at night at the nearest sensitive receptors. This limit is set in order to achieve acceptable internal noise levels within residential spaces based on prevailing noise levels in the area.

The main known noise sources associated with the day to day operation of the site from a mechanical point of view relates to ventilation fans associated with basement carparks. Due to their location at ground level within the site, there is the potential for noise to affect residential units within the proposed development itself. Where required, additional attenuation will be incorporated into the design such that the noise level from the proposed fans does not exceed 40 dB(A) at 3m from the basement ventilation louvres in order to protect residential amenity of the spaces.

Taking into account that sensitive receivers within the proposed development are much closer than off-site sensitive receivers, once the relevant noise criteria are achieved within the proposed development, it is expected that there will be ***not significant negative impact*** at sensitive receivers off site.

12.4.2.3 Deliveries

Although the traffic figures related to the amount of delivery activity at the proposed development are currently unknown at this stage, the nearest NSLs are likely to be within the development itself. The frequency of deliveries will be designed to be within the adopted daytime criterion of 55 dB $L_{Aeq,1\,hr}$ at all adjacent NSLs during the daytime period. Existing NSLs are likely to be at a greater distance and as such the impact will be less.

At detailed design stage further assessment will be carried out to identify if those NSLs within the development itself will require enhanced façade specification to ensure internal noise levels are within the guidance set out in BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings.*

Deliveries will not be made during the night-time period.

Taking into account that sensitive receivers within the proposed development are much closer than off-site sensitive receivers, once the relevant noise criteria are achieved within the proposed development, it is expected that there will be ***not significant negative impact*** at sensitive receivers off site.

No further mitigation measures would therefore be required.

12.4.2.4 Proposed Car Parking

Within the proposed development the closest car parking space is located to the west of Block 6 and is approximately 7m from the closest off-site NSL (N4). The car parking area associated with the Community Centre in Block 6 is screened from off-site NSLs to the west (N4) by the existing perimeter wall of 4-5m height.

Within the development the closest car parking spaces are approximately 5m from the nearest on-site NSLs (various locations across the site itself).

Typical noise levels 10m beyond the boundary of a busy car park during peak periods are of the order of 48 dB $L_{Aeq,T}$. Allowing for distance and estimated frequency of usage, the noise levels due to car parking activity would be of the order of 41 dB $L_{Aeq,1hr}$ for the residences located closest to the car park at N4 and 54 dB $L_{Aeq,1hr}$ at the apartments within the development overlooking car parking areas. These levels are within the daytime criterion of 55 dB $L_{Aeq,1hr}$ and are comparable to the measured ambient noise levels at these locations (AN4 and UN2).

It is envisaged that activity levels in the car park spaces immediately located beside the apartments within the development during the night-time period would be significantly less. Assuming that there are ten times less car park movements during the night time period as during the daytime period, the noise levels due to car parking activity would be less than 45 dB $L_{Aeq,1hr}$ at the closest car park spaces. These levels are within the night time criterion of 45 dB $L_{Aeq,15min}$ and comparable to the measured ambient noise levels at this location (UN2).

In summary, the likely noise impact of car park activities on the local environment is ***negative, not significant and long-term*** for NSLs.

12.4.2.5 Crèche Playground Noise Breakout

There is a creche located within Block 10 to the west of the proposed site. Measurement of noise levels generated by children playing outdoors at several crèches and kindergartens indicate typical noise levels in the order of 56 dB $L_{Aeq,1hr}$ at distance of 5 metres. The closest off-site NSL (N4) is 40m from the crèche play area. Considering the distance activities from the crèche are calculated to be 33 dB $L_{Aeq,1hr}$. Therefore, it is expected in the absence of specific mitigation measures that there will be a ***neutral, imperceptible and long-term*** impact at the closest off-site receptors.

The nearest on-site residential NSL apartments are B10-01-09 and B10-01-10 overlooking the Block 10 crèche play area to the east of Block 10. Considering the closest Block 10 receptors are located at the first floor the calculated noise level is approximately less than the recommended daytime criterion of 55 dB $L_{Aeq,1hr.}$ Therefore, it is expected in the absence of specific mitigation measures that there will be a ***negative, not significant and long-term*** impact at the closest on-site Block 10 receptors.

No further mitigation measures would therefore be required.

12.4.2.6 Patron Noise from External Seating in Commercial Areas

Although the maximum number of patrons occupying external commercial areas e.g. outdoor café seating area, the nearest NSLs are likely to be within the development itself. The maximum capacity will be designed to be within the adopted daytime criterion of 55 dB $L_{Aeq,1hr}$ at all adjacent NSLs during the daytime period. Existing NSLs are likely to be at a greater distance and as such the impact will be less.

At detailed design stage further assessment will be carried out to identify if those NSLs within the development itself will require enhanced façade specification to ensure internal noise levels are within the guidance set out in BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings.*

External seating areas will not be occupied during the night-time period.

Taking into account that sensitive receivers within the proposed development are much closer than off-site sensitive receivers, once the relevant noise criteria are achieved within the proposed development, it is expected that there will be ***not significant negative impact*** at sensitive receivers off site.

No further mitigation measures would therefore be required.

12.5 Inward Noise Impact

The Acoustic Design Statement (ADS) has been presented separately to the operational impacts as it refers to the inward impact assessment of the residential properties within the development, rather than the outward impact assessment carried out in Section 12.4.

12.5.1 Stage 1 – Noise Risk Assessment

12.5.1.1 Methodology

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. 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.

In order to conduct the noise risk assessment, noise levels recorded during the baseline survey have been corrected to account for additional noise from the development and used to calculate internal noise levels within common rooms and bedrooms. The calculations take account of the surface area of the building elements (brick work, glazing etc.), their sound reduction indices and the internal room volumes of the spaces under consideration.

In this instance there are buildings to be demolished along with sections of the western boundary perimeter wall. The site topography is not expected to change significantly during construction. For the Stage 1 ADS it has been assumed that no perimeter wall is present and there is no screening from any existing buildings which will be demolished.

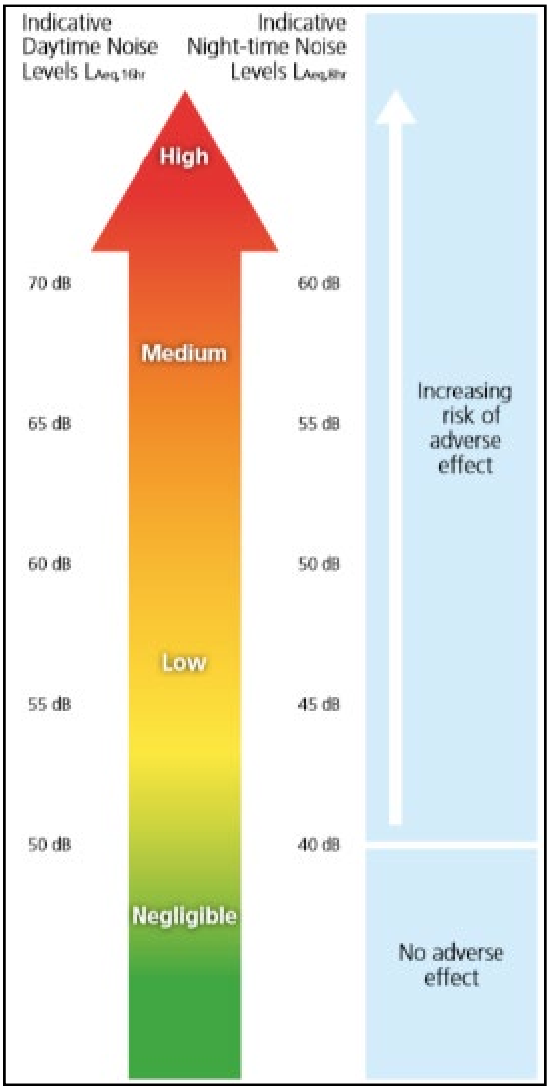

Figure 12.10: ProPG Stage 1 - Initial Noise Risk Assessment.

12.5.1.2 Baseline Noise Levels

In this instance the calculated external noise levels in the vicinity of the western boundary of the site (Blocks 9 and 10) are in the range of >50 – 66 dB $L_{Aeq,T}$ during the daytime and night-time. At the remaining boundaries of the site the measured external noise levels are <50 dB $L_{Aeq,T}$ during the daytime and night-time.

12.5.1.3 Noise Risk Assessment Conclusion

Considering the calculated noise levels presented above and applied to Figure 12.10, the initial site noise risk assessment has concluded that the level of risk varies from negligible to low at the northern, eastern and southern boundaries and across the centre of the site. To the boundaries of the site facing onto the western boundaries the level of risk is medium to high facing on to the R117 Dundrum Road boundary.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. The L_{AFmax} results indicate that there is the potential for L_{AFmax} noise levels to exceed 60 dB more than 10 times per night on facades exposed closer to the R117 Dundrum Road boundary, for which ProPG recommends that the site is considered as medium risk for L_{AFmax} values.

ProPG states the following with respect to these levels of risk:

- ***Low Risk: "At low noise levels, the site is likely to be acceptable from a noise perspective provided that 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 in the finished development."***

- ***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 parts of the development site may be categorised as Medium, principally due to the exceedance at the R117 Dundrum Road western boundary, and as such an ADS will be required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development. It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used:

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

Therefore, following the guidance contained in ProPG does not preclude residential development on sites that are identified as having medium noise risk. 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.

12.5.2 Stage 2 – Full Acoustic Design Statement

12.5.2.1 Element 1 – Good Acoustic Design Process

In practice, good acoustic design should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life or occupants or compromising other sustainable design objectives. It is important to note that ProPG specifically states that good acoustic design is not equivalent to overdesign or "gold plating" of all new development but that it seeks to deliver the optimum acoustic environment for a given site.

Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design (GAD):

- **Check the feasibility of relocating, or reducing noise levels from relevant sources;**
- **Consider options for planning the site or building layout;**
- **Consider the orientation of proposed building(s);**
- **Select construction types and methods for meeting building performance requirements;**
- **Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, construction, design and management, etc.;**
- **Assess the viability of alternative solutions; and**
- **Assess external amenity area noise.**

In the context of the proposed development at the western boundary each of the considerations listed above have been addressed in the following subsections.

Application of GAD Process to Proposed Application

Relocation or Reduction of Noise from Source
The R117 Dundrum Road is located outside the site boundary and, therefore, it is beyond the scope of this proposed development to introduce any noise mitigation at source.

Planning, Layout and Orientation
Consideration has been given to the location of both the buildings and external amenity areas. In the first instance, a primary consideration was to ensure that buildings are located as far as possible from the road.

The orientation of the site is such that the buildings themselves screen the common external amenity areas associated with the development.

Select Construction Types for meeting Building Regulations
Masonry constructions will be used in the external walls of the proposed development. This construction type offers high levels of sound insulation performance. However, as is typically the case, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade in terms of sound insulation performance.

Consideration will, therefore, be given to the provision of upgraded glazing and acoustic vents, where required. For units where it will not be possible to achieve the desirable internal acoustic environments with windows open, the proposal here will be to provide dwelling units with glazed elements and ventilators that have good acoustic insulation properties so that when the windows are closed the noise levels internally are good. Inhabitants will be able to open the windows if they wish. However, doing so will increase the internal noise level. This approach to mitigation is supported in ProPG where it states the following (emphasis has been added in bold):

> *"2.22: Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided;* ***occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open****. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design. Any reliance upon building envelope insulation with closed windows should be justified in supporting documents."*

> *"Note 5: Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal LAeq target levels should not normally be exceeded."*

> *"2.34: Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide "whole dwelling ventilation" in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see Supplementary Document 2). Furthermore, in this scenario the internal LAeq target noise levels should not generally be exceeded."*

It is very important to note that it is impractical to achieve the good internal noise levels with windows open across the vast majority of development sites in close proximity to major infrastructure such as roads. Such sites would need to be classified as having a negligible risk in accordance with the ProPG noise risk assessment approach. For this reason, there are no guidance documents either at a local level or an international level that AWN is aware of which would support the approach of achieving the ideal internal noise levels in the open window scenario. It is, therefore, considered entirely correct and justifiable to provide building façades with a moderate degree of sound insulation, such that with windows closed but vents opened, a good internal acoustic environment is achieved.

Impact of Noise Control Measures on Fire, Health and Safety

The good acoustic design measures that have been proposed on site do not have any significant impact on other issues.

Assess Viability of Alternative Solutions
Due to the height and location of the proposed buildings it is considered that any acoustic screens along the boundary of the site to attenuate traffic noise would be ineffective.

However, for the Stage 2 assessment the proposed perimeter wall heights along the western boundary will be included in the modelling.

Assess External Amenity Area Noise
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 $L_{Aeq,16hr}$."*

Noise levels across external amenity areas associated with the development are presented in Section 12.5.2.3.

Summary
Considering the constraints of the site, in so far as possible and without limiting the extent of the development area, the principles of GAD have been applied to the proposed development.

In terms of viable alternatives to acoustic treatment of façade elements, currently it is not considered likely that there will be further options for mitigation outside of proprietary acoustic glazing and ventilation.

12.5.2.2 Element 2 – Internal Noise Guidelines

Internal Noise Criteria

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 and World Health Organisation Community Noise Guidelines. The recommended indoor ambient noise levels are set out in Table 12.25 and are based on annual average data, that is to say they omit occasional events such as New Year's Eve.

Table 12.24: ProPG internal noise levels (BS 8233:2014).

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 $L_{Amax,T}$[30]

Giving consideration to the external noise levels, particularly along the western site boundary, in line with the ProPG guidelines it may be necessary to use acoustic glazing and mechanical

[30] 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.

ventilation to meet the recommended internal noise levels. The need for enhanced glazing is assessed in further detail below and in the mitigation section of the chapter.

In terms of the ventilation strategy it is understood that the air supply will be via mechanical ventilation which typically provides a sound insulation performance substantially improved over passive in-frame or wall vents.

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) 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.

The following information was included in the model:

- Site layout drawings of proposed development;
- OS mapping of surrounding environment; and
- Predicted noise levels along R117 Dundrum Road estimated from site calibration results.

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. 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 12.25: Calculated and Measured Noise Levels at Development Site.

Location	Time Period	Measured Noise Level (dB)	Calculated Noise Level (dB)
UN1	Daytime, $L_{Aeq,16hr}$	66[31]	66
	Night-time, $L_{Aeq,8hr}$	59[32]	59

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 and proposed perimeter wall alterations. Figure 12.11 and Figure 12.12 illustrate the predicted traffic noise levels for daytime and night-time.

Predicted daytime noise levels across the site range from <50 dB in sheltered areas, screened from road traffic, to 70 dB along the western boundary which face on to the R117 Dundrum Road. Predicted night-time noise levels across the site range from <50 dB in sheltered areas,

[31] 13dB has been added to daytime measured noise levels as outlined in section 12.3.3.2
[32] 13dB has been added to daytime measured noise levels as outlined in section 12.3.3.2

screened from road traffic, to 60 dB along the western boundary which face on to the R117 Dundrum Road.

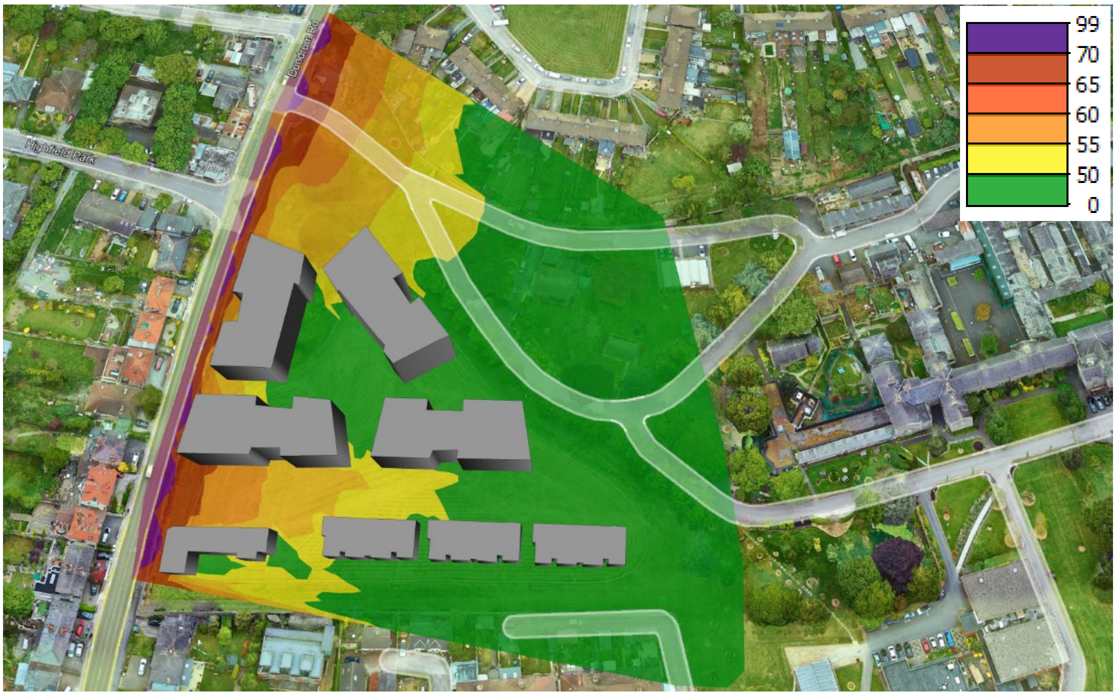

Figure 12.11: ProPg Stage 2 – Predicted Noise Levels – Daytime.

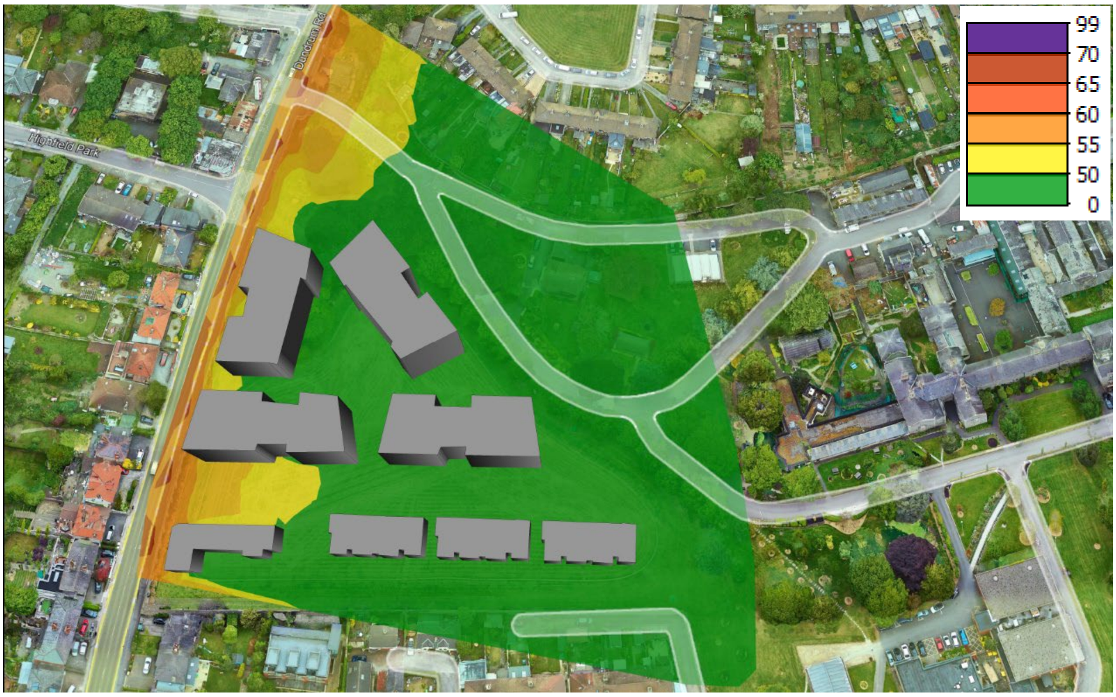

Figure 12.12: ProPg Stage 2 – Predicted Noise Levels – Night-time.

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 ventilating the 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.

Where façade levels are above these levels the sound insulation performance of the building façade becomes important and a minimum sound insulation performance specification is required for windows 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 will be required. Table 12.27 along with Figure 12.13, present the noise levels calculated to be incident on the various façades during day and night-time periods respectively.

Table 12.26: Summary of Predicted Façade Noise Levels.

Ref	Period (T)	$L_{Aeq,T}$ dB	Octave Band Centre Frequency (Hz)					
			125	250	500	1k	2k	4k
Red	Day (16hr)	67	66	63	61	65	60	51
	Night (8hr)	60	56	56	55	57	53	45
Orange	Day (16hr)	61	61	56	54	58	54	45
	Night (8hr)	54	50	50	48	51	46	38
Green	Day (16hr)	59	59	55	52	56	51	42
	Night (8hr)	52	49	49	46	49	44	36

Figure 12.13: Designation of Predicted Noise Levels for Each Façade.

These facades include:

- Block 9 (to furthermost western boundary) along western façade, northern façade and southern façade;

- Block 10 (to northwest of western boundary) along western façade, northern façade and southern façade;
- Block 10 (to southwest of western boundary) along western façade, northern façade and southern façade; and
- Block 10 (to northeast of western boundary) along western façade.

The specification of the enhanced façades are discussed in Section 12.6.3.

12.5.2.3 Element 3– External Amenity Area Noise Assessment

External Noise Levels

Figure 12.14 presents the calculated day time noise levels across the site with the development buildings in place. The contours are calculated for a height of 1.5m.

External noise levels within the vast majority of communal open spaces across the development site are less than the recommended range of noise levels from ProPG of between 50 – 55 dB $L_{Aeq,16hr}$ as illustrated in Figure 12.14. 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.

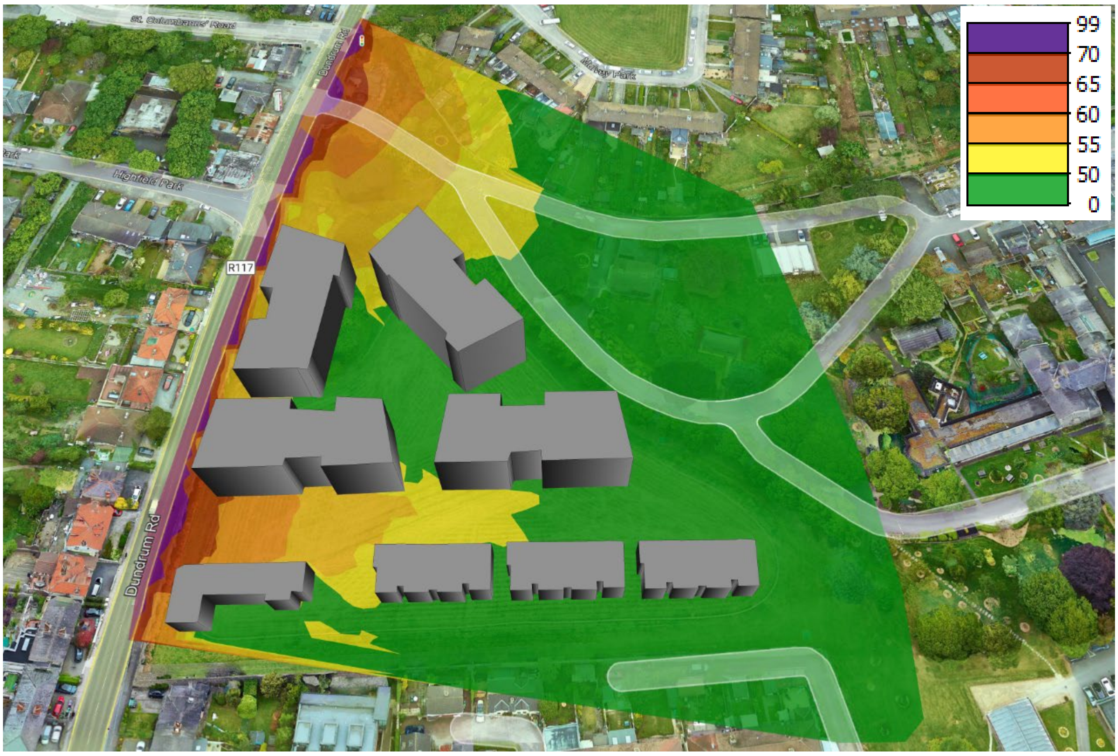

Figure 12.14: Predicted Noise Levels across External Areas (1.5m above ground).

12.5.2.4 Element 4– Assessment of Other Relevant Issues

Element 4 gives consideration to other factors that may prove pertinent to the assessment, these are defined in the document as:

- **4(i) compliance with relevant national and local policy;**

- **4(ii) magnitude and extent of compliance with ProPG;**
- **4(iii) likely occupants of the development;**
- **4(iv) acoustic design v unintended adverse consequences; and**
- **4(v) acoustic design v wider planning objectives.**

Each is discussed in turn below.

Compliance with Relevant National and Local Policy

There are no National policy documents relating to the acoustic design of residential dwellings. Locally the Dublin Agglomeration Noise Action Plans specify that the guidance contained within ProPG should be used in assessing the noise impact on new residential developments.
This Acoustic Design Statement has been prepared in compliance with the requirements of ProPG and therefore complies with the requirements of local policy.

Magnitude and Extent of Compliance with ProPG

As discussed within this chapter, the following conclusion has been drawn with regards to the extent of compliance with ProPG:

- **All dwellings as part of the development have been designed to achieve the good level of internal noise levels specified within ProPG. The closest western boundary units require closed windows and open vents to achieve this level; and**
- **External amenity areas have been assessed and calculated, due to screening from buildings they comply with the recommended criterion set out in ProPG.**

Based on the preceding, it is concluded that the proposed development is in full compliance with the requirements of ProPG.

Likely Occupants of the Development

The criteria adopted as part of this assessment are based on those recommended for permanent dwellings and are, therefore, considered robust and appropriate for the likely occupants.

Acoustic Design v Unintended Adverse Consequences

Unintended adverse consequences did not occur in relation to this proposed development.

Acoustic Design v Wider Planning Objectives

This chapter has demonstrated the noise insulation measures required to ensure that the proposed dwelling units achieve a good internal noise environment.

12.5.2.5 Conclusion

An initial site noise risk assessment has been carried out on the proposed residential development to the western boundary of the proposed development. The assessment has classified the development site on the western boundaries as medium to high risk facing on to the R117 Dundrum Road boundary. This was determined through a combination of measurements of noise levels on site and through the prediction of noise levels on the site.

Further discussion is presented in terms of the likely noise impact of both the external and internal areas of the proposed development. It has been found that all the inhabitants will have access to a quiet external area that is screened by the development itself from road traffic noise. In compliance with the relevant standards detailed in this report all habitable rooms will achieve a good internal noise environment with the enhanced acoustic glazing and mechanical ventilation.

12.6 Mitigation Measures

12.6.1 Construction Phase

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

- Selection of quiet plant;
- Noise control at source;
- Screening, and;
- Liaison with the public.

Further 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 monitoring, where required. The contractor will put in place the most appropriate noise control measures depending on the level of noise reduction required at individual working areas i.e. based on the construction threshold values for noise and vibration set out in Table 12.4 and Table 12.5.

N_1: Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

N_2: Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control at source. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

The following best practice migration measures will be employed :

- Site compounds will be located away from noise sensitive boundaries within the site constraints.
- The lifting of bulky items, dropping and loading of materials within these areas will be restricted to normal working hours.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, , utilising an acoustic canopy to replace the normal engine cover and/or ensuring the enclosure panels are closed during operation can reduce noise levels over normal operation. Mobile plant will be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, noise control measures include fitting a more effective exhaust silencer system to reduce the noise emitted.
- For percussive tools such as pneumatic breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker tool and ensuring any leaks in the air lines are sealed.
- Erecting localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, materials will not be dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant will 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.

N_3: Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Standard construction site hoarding (2.4m in height) with a mass per unit of surface area greater than 7 kg/m^2 can provide adequate sound insulation. This will be required, as a minimum around the site perimeter.

N_4: Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity (e.g. piling), the CLO will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

N_5: Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling works are in progress on another 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 ensure noise limits are not exceeded due to cumulative activities. This will be reviewed in relation to other potential cumulative works occurring on adjacent construction site in close proximity to noise sensitive properties which have the potential to lead to significant construction noise impacts.

12.6.2 Operational Phase - Noise

N_6: General Operational Phase Site Activity

The assessment outlined previously has specified noise limits at the nearest noise sensitive properties that must be achieved in order to ensure the impact is acceptable, summarised in Section 12.2.2.1.

To achieve these noise limits, it will be necessary to review (at the detailed design stage) the variety of mitigation measures and forms of noise control techniques that will be applicable. Some example of these measures are as follows:

- Duct-mounted attenuators on the atmosphere side of air moving plant;
- Splitter attenuators or acoustic louvres providing free ventilation to internal plant areas;
- Solid barriers screening any external plant; and
- Anti-vibration mounts on reciprocating plant.

In addition to the above, the following measures will be adopted to minimise potential noise disturbance for neighbours:

- All mechanical plant items (e.g. motors, pumps etc.) shall be regularly maintained to ensure that excessive noise generated by any worn or rattling components is minimised;
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document; and
- Plant items will be selected such that site noise emissions do not contain tonal or impulsive characteristics at nearby noise sensitive locations.

N_7: Building Services and Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria included in Section 12.5.6 (i.e. design criterion is the order of **40dB $L_{Aeq,15min}$** during daytime periods and **35dB $L_{Aeq,15min}$** at night at the façades of the nearest noise sensitive locations). It is expected that there will be no negative impact at sensitive receivers on or off site, and therefore no further mitigation required.

12.6.3 Operational Phase – Inward Noise Impact

N_8 Proposed Façade Treatment

The British Standard BS EN 12354-3: 2000: *Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound* provides a calculation methodology for determining the sound insulation performance of the external envelope of a building. The method is based on an elemental analysis of the building envelope and can take into account both the direct and flanking transmission paths. The Standard allows the acoustic performance of the building to be assessed taking into account the following:

- Construction type of each element (i.e. windows, walls, etc.);
- Area of each element;
- Shape of the façade, and;
- Characteristics of the receiving room.

The principals outlined in BS EN 12354-3 are also referred to in BS8233 and Annex G of BS8233 provides a calculation method to determine the internal noise level within a building using the composite sound insulation performance calculated using the methods outlined in BS EN 12354-3. The methodology outlined in Annex G of BS8233 has been adopted here to determine the required performance of the building facades.

Glazing

As is the case in most buildings, the glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. In this instance it has been calculated that the various facades are to be provided with glazing that, when closed, achieve the minimum sound insulation performance as set out in Table 12.28 (and assigned to each applicable façade in Figure 12.15).

Table 12.27: Sound insulation performance requirements for glazing, SRI (dB).

Facade	SRI (dB) per Octave Band Centre Frequency (Hz)						dB R_w
	125	250	500	1k	2k	4k	
Orange	23	27	34	40	41	43	36
Green	20	19	29	38	36	45	32

Figure 12.15: Glazed Façade Mark-Up – Blocks 9 and 10 where applicable.

Test data should be sought from the supplier of the glazing at detailed design stage to ensure that the acoustic specification is met.

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

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage.

Wall Construction

In general, all wall constructions (i.e. blockwork or concrete) offer a high degree of sound insulation, much greater than that offered by glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 54 dB R_w for this construction.

Ventilation
The ventilation strategy for the development is for mechanical ventilation. Mechanical ventilation systems typically offer a high performance in terms of preventing sound intrusion from external sources, consequently there is no assessment of the ventilation system required for this noise impact assessment.

Internal Noise Levels

Taking into account the external façade levels and the specified building envelope, the internal noise levels have been calculated. In all instances the good internal noise criteria are achieved for daytime and night-time periods i.e. at or below the internal noise level thresholds outlined in Table 12.25.

12.6 Residual Impacts

12.6.1 Construction Phase

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

During periods when initial construction works are occurring at distances of up to 50m and other construction works at a distance of up to 20m from the nearest noise sensitive locations to the site boundary, there is potential for ***temporary, negative, moderate to significant*** noise impacts to occur.

For the remainder of construction periods, construction noise impacts will be ***short-term, negative, slight to moderate.***
Vibration impacts during the construction phase will be ***neutral, short-term and imperceptible.***

12.6.2 Operational Phase

12.6.2.1 Additional Traffic on Roads

The predicted change in noise levels associated with additional traffic is expected to be ***neutral, not significant*** and ***long-term*** along the existing road network.

12.6.2.2 Building Services and Plant

Proprietary noise and vibration control measures will be employed as part of the detailed design in order to ensure that noise emissions from building services plant do not exceed the adopted criterion at any nearby NSLs. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. The impact from building services and plant is predicted to be ***negative, not significant and long term.***

12.6.2.3 Deliveries

Any change in noise levels associated with deliveries on site are expected to be ***negative, not significant*** and ***long term***.

12.6.2.4 Car Parking

Any change in noise levels associated with car parking on site are expected to be ***negative, not significant*** and ***long term***.

12.6.2.5 Crèche Playground Noise Breakout

Any change in noise levels associated with the crèche playgrounds on site are expected to be ***negative, not significant*** and ***long term***.

12.6.2.6 Patron Noise from External Seating in Commercial Areas

Any change in noise levels associated with patron noise from external seating in commercial areas on site are expected to be ***negative, not significant*** and ***long term***.

12.7 Monitoring

12.7.1 Construction Phase

During the construction phase, noise and vibration monitoring will be undertaken by the Contractor at the nearest sensitive locations to ensure construction noise and vibration limits outlined in Table 12.1 and Table 12.4 are not exceeded. Noise monitoring will be conducted in accordance with the International Standard ISO 1996: Acoustics – Description, measurement and assessment of environmental noise Part 1 (2016) and Part 2 (2017). The selection of monitoring locations will be based on the nearest sensitive buildings to the working areas.

It is recommended that noise control audits are conducted at regular intervals throughout the construction programme in conjunction with noise monitoring. The purpose of the audits will be to ensure that all appropriate steps are being taken to control construction noise emissions and to identify opportunities for improvement, where required.

12.7.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to noise and vibration are predicted to be imperceptible.

12.8 Reinstatement

During reinstatement the construction phase noise and vibration impacts outlined in Section 12.4.1 will apply.

12.9 Interactions

The potential interaction between noise and vibration and other specialist chapters in the EIAR is primarily limited to Chapter 7 (Population & Human Health), Chapter 8 (Biodiversity) and Chapter 17 (Traffic & Transportation). This chapter has been prepared in consideration of and in conjunction with the relevant elements of these chapters. For example noise and vibration impacts associated with the Proposed Development have been fully considered within this Chapter of the EIA Report. However, commentary on the impact assessment and related noise levels are also summarised specifically with respect to potential human health impacts in Chapter 7 and Chapter 8. The traffic flow projections associated with the development provided by the traffic consultants in Chapter 17 (Traffic & Transportation) has been utilised in the construction and operational noise calculations in this Chapter of the EIAR report.

12.10 Cumulative Impacts

12.10.1 Construction Phase

For the purpose of the cumulative assessment, two scenarios have been considered. The first scenario is a review of the cumulative construction impacts from the Proposed Development and the S34 application within the Central Mental Hospital site i.e. the CMH Masterplan. The second scenario is a review of approved and proposed developments in the local area which are external to the CMH Masterplan site, as summarised in Table 12.29.

Table 12.28: Developments in the Local Area.

Reg. Ref.	Name
D16A/0818	Greenacres, Kilmacud Road Upper, Dublin 14
ABP310138-21	Mount St Mary's and Saint Joseph's, Dundrum Road, Dundrum
D19A/0162	Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14
ABP308353-20	Vector Motors, Goatstown Road, Dublin 14
D20A/0328	University College Dublin, Belfield, Dublin 4
ABP309430-21	Our Lady's Grove, Goatstown Road, Dublin 14
ABP311287-21	No. 97A Highfield Park ad No. 1 Frankfort Castle and Frankfort Lodge, Old Frankfort, Dublin 14
ABP311826-21	Lands at Knockrabo, Mount Anville Road, Goatstown, Dublin 14
ABP312935-22	Sommerville House, Dundrum Road, Dublin 14
TC06D.311553	Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum
CMH Future S34	Lands at Central Mental Hospital

In order to assess the cumulative impacts it has been assumed that there would be an increase in predicted construction noise levels by no more than 3 dB when compared to the values presented in Table 12.22 in Section 12.4.1 previously.

While a 3 dB increase is a doubling of sound energy, subjectively any change in noise level below 3 dB would be barely perceptible. This 3 dB increase (maximum doubling of plant items) is based on the practical number of plant and equipment items that could be reasonably assumed at the closest boundaries to the NSLs i.e. there will be a greater separation between plant / equipment and the NSL, which will result in a reduction in the predicted noise level at the closest NSL. In addition, the construction activities in the closest site to the NSL will be the dominant noise source, with very little contribution from sites at greater distances to the NSL i.e. where the contribution from the specific phase is more than 10 dB below noise contribution from the closest phase to the NSL.

12.10.1.1 CMH Masterplan

Given the explanation above, the majority of NSLs that may be affected by the CMH Masterplan construction works are located to the north (N2 receiver) and northeast (N5 receiver) of the CMH Masterplan boundaries.

At N2 the closest construction boundaries are within 30m (Proposed Development) and 60m approximately (S34 application). The predicted cumulative construction noise levels at these NSLs to the immediate north of the site boundary will be no more than 3 dB higher than those predicted in Section 12.4.1. As a result, it would only be when demolition and basement works are within 100m of the NSLs that the recommended construction noise threshold value of 65 dB L_{Aeq} Monday through Friday (08:00 to 18:00hrs) would be exceeded at the NSLs to the immediate north of the works boundary. During all other works to the north the cumulative Masterplan CMH would be below the recommended construction noise threshold value of 65 dB L_{Aeq} Monday through Friday (08:00 to 18:00hrs). This worst-case scenario would be expected to take place over a very short period of time, if at all.

At N5 the closest construction boundaries are within 10m (Proposed Development) and 80m approximately (S34 application). As a result of sound propagation over distance the contribution of noise from the S34 construction site would be more than 10 dB below the contribution from the Proposed Development site. Therefore, there is no greater than those values presented in Section 12.4.1. Cumulative construction noise impacts are expected to be negative, significant and short-term.

12.10.1.2 Developments in the Local Area

Given the explanation above, due to the distance between the proposed development and the following grant / proposed developments in the local area it is not anticipated that there will be any significant cumulative impacts on noise and vibration at nearby NSLs during the construction or operational phase of the developments:

- D16A/0818 – Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14, located approximately 1.35km from proposed development;
- ABP31013821 – Mount Saint Mary’s and Saint Joseph’s, Dundrum Road, Dundrum, Dublin 14, located approximately 770m from proposed development;
- D19A/0162 – Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14, located approximately 650m from proposed development;

- ABP30835320 – The Car Sales Premises Currently Known as Vector Motors, Goatstown Road, Dublin 14, D14FD23, located approximately 650m from proposed development;
- D20A/0328 – University College Dublin, Belfield, Dublin 4, located approximately 1.25km from proposed development;
- ABP30943021 – 2.12ha At Our Lady's Grove, Goatstown Road, Dublin 14, located approximately 1.25km from proposed development;
- TC06D.311553 – Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14, located approximately 650m from proposed development; and

There are three development sites with planning permission granted /proposed for development nearby to the proposed development:

- SHD and Student accommodation development at Our Lady's Grove, Goatstown Road, Dublin 14 (granted project under ABP30943021) with a distance between site boundaries of 110m approximately along Friarsland Road.
- Residential development at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14 (proposed project under ABP31128721) with the distance between site boundaries greater than 210m approx.
- SHD accommodation development at Sommerville House, Dundrum Road, Dublin 14 (proposed project) with a distance between site boundaries of 50m approximately along Annaville Grove / Sommerville.

In the event that construction activities are taking place at the above mentioned sites concurrently with the construction of the proposed development, there is potential for cumulative noise impacts to occur. Due to the proximity and nature of construction works associated with the proposed development, however, noise levels from the proposed development will dominate the noise environment when occurring in proximity to the noise sensitive locations along its immediate boundary. The contribution from other sites will therefore have slight impact (i.e. will be at least 10 dB below those associated with the proposed development) such that the construction noise levels discussed in Section 12.4.1 will remain a representation of a worst case analysis.

Nonetheless 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 are expected to be ***negative, moderate to significant and short-term.***

12.10.2 Operational Phase

During the operational phase any cumulative impacts will be due to an increase in road traffic noise. However, given the insignificant levels of noise increase as a result of the traffic associated with this proposed development, it is not expected that cumulative traffic noise will increase by any significant margin as a result of this proposed development.

12.11 'Do-Nothing' Effect

The Do Nothing scenario includes this predominantly greenfield site remaining unchanged. The noise and vibration levels measured/noted during the desktop assessment and 2021 baseline studies are considered representative of the Do-Nothing scenario. The Do-Nothing scenario is, therefore, considered to have a neutral impact.

12.12 Difficulties Encountered in Compiling the Chapter

No difficulties encountered.

12.13 Conclusion

A predominantly residential development is proposed on lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14. The noise and vibration chapter presents a summary of the aspects of the development pertinent to environmental noise and vibration.

The existing noise environment has been quantified by way of an environmental noise survey consisting of attended and unattended measurements. Existing noise levels have been found to be typical of a suburban area.

Suitable noise and vibration criteria have been identified for the assessment of construction noise. Similarly, appropriate noise criteria have been selected for the relevant operational elements of the development.

This chapter has outlined the general approach to construction noise and vibration that will be considered and applied as necessary during the demolition and construction phases of the proposed development. It is acknowledged that there is likely to be some degree of short term impact on nearby receptors arising noise during the construction phase, which will require suitable mitigation, monitoring and management. Suitable best practice construction noise mitigation measures are outlined in line with BS 5228.

This chapter has outlined the main potential sources of outward operational noise from the development will be traffic flows to and from the development via public roads, mechanical and electrical plant used to service the buildings, deliveries, car parking on-site, childcare facilities (crèche) and patron noise from commercial outdoor areas.

Consideration has been given to the potential condition criteria for operational noise that may be applied by the planning authority at nearby noise sensitive locations. Such noise conditions will typically state that plant items will be selected, designed and located so that there is no negative impact on sensitive receivers within the development itself. It is reasonable to assume that there will be no significant impacts on nearby noise sensitive locations once the plant is designed/attenuated to meet the relevant BS 4142 and BS 8233 criteria, based on prevailing noise levels in the area.

Any change in noise levels associated with other potential operational sources of noise in the vicinity of the Proposed Development is expected to be not significant.

Mitigation has been specified for the Block 10 western facing facades facing onto the R117 Dundrum Road and calculations indicate that the following daytime and night-time internal noise criteria are not exceeded with the mitigation in place:

- 35 dB $L_{Aeq,16hr}$ daytime within living rooms;
- 30 dB $L_{Aeq,8hr}$ night-time within bedrooms; and,
- A value of 45 dB L_{AFmax} is not normally exceeded more than 10 – 15 times in bedrooms at night.

As a mitigation measure, an enhanced glazing specification has been proposed, which assumes the use of mechanical ventilation within the residential apartments.

The ProPG inward impact assessment demonstrates that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. Note that the calculated glazing specifications in this document are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. There may be further combinations of glazing systems that will mitigate external noise intrusion sufficiently to meet the recommended internal noise criteria. Consequently, the glazing specification should remain subject to change as the project progresses during detail design stage.

12.14 References

- **ANC, IOA & CIEH (2017).** ***ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development.***
- **British Standard BS 8233: 2014:** ***Guidance on sound insulation and noise reduction for buildings.***
- **British Standard BS 4142: 2014+A1:2019:** ***Methods for Rating and Assessing Industrial and Commercial Sound.***
- **British Standard BS 5228: 2009 +A1:2014:** ***Code of Practice for Control of Noise and Vibration on Construction and Open Sites Part 1: Noise & Part 2: Vibration.***
- **British Standard BS 7385: 1993:** ***Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.***
- **Department of Transport Welsh Office, HMSO (1988).** ***Calculation of Road Traffic Noise.***
- **Dublin City Council, DLR County Council, Fingal County Council & South Dublin County Council (2018).** ***Dublin Agglomeration Environmental Noise Action Plan 2018 – 2023.***
- **EU (2017)** ***Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)*****.**
- **EPA (2017).** ***Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft).***
- **EPA (2015).** ***Advice Notes for Preparing Environmental Impact Statements (Draft).***
- **EPA (2012).** ***Guidance Note for Noise – Licence Applications, Surveys and Assessments in Relation to Scheduled Activities NG4.***
- **EPA (2003).** ***Advice Notes on Current Practice (in the preparation of Environmental Impact Statements).***
- **EPA (2002).** ***Guidelines on the Information to be contained in Environmental Impact Statements.***

- **The UK Highways Agency (2020).** ***Design Manual for Roads & Bridges – LA111 -Revision 2.***
- **ISO 1996: 2017:** ***Acoustics – Description, measurement and assessment of environmental noise.***
- **ISO 9613-2: 1996:** ***Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation*.**
- **WHO (2018).** ***Environmental Noise Guidelines for the European Region.***

13.0 LANDSCAPE AND VISUAL

13.1 Introduction

This Landscape/Townscape and Visual impact Assessment report has been prepared in respect of a proposed Strategic Housing Development by the Land Development Agency (LDA) at the Central Mental Hospital site Dundrum Road, Dundrum, Dublin 14. This report describes the townscape/visual context of the proposed development and assesses the likely impacts of the scheme on the receiving environment, in terms of both townscape character and visual amenity.

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

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

This Landscape/Townscape and Visual Assessment report was prepared by Richard Barker Principal Landscape Architect at Macro Works Ltd of Cherrywood Business Park, Loughlinstown, Dublin 18; a consultancy firm specialising in Landscape and Visual Assessment and associated maps, graphics and verified photomontages. Relevant experience includes LVIA and TVIA for a vast range of infrastructural, industrial and commercial projects over the past 18 years, including numerous urban and Strategic Housing Development (SHD) projects.

This Chapter should be read in conjunction with the photomontages contained at Volume 3 of this EIAR.

13.1.1 Description of the Proposed Development

The Land Development Agency intend to apply to An Bord Pleanála (the Board) for a 10 year permission for a Strategic Housing Development with a total application site area of c.9.6 ha, on lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14.

The development will consist of the demolition of existing structures (3,736 sq m), including:

- Single storey Former swimming pool / sports hall and admissions unit (2,750 sq m);
- Two storey redbrick building (305 sq m);
- Temporary structures including single storey portacabins (677 sq m);
- Removal of security fence at Dundrum Road entrance;
- Demolition of element of Gatelodge (4 sq m).

The development will also consist of alterations and partial demolition of the perimeter wall, including:

- Removal of section of perimeter wall adjacent to Rosemount Green (south);
- Formation of a new opening in perimeter wall at Annaville Grove to provide a pedestrian and cyclist access and associated gate;
- Removal of section of perimeter wall at the existing Dundrum Road access;
- Alterations and removal of sections of wall adjacent to Dundrum Road, including the provision of a new vehicular, cyclist and pedestrian access;
- Alterations and removal of section of perimeter wall adjacent to Mulvey Park to provide a pedestrian and cyclist access; and
- Removal of walls adjacent to Main Hospital Building.

The development with a total gross floor area of c. 106,770 sq m (c. 106,692 sq m excluding retained existing buildings), will consist of 977 no. residential units comprising:

- 940 no. apartments (consisting of 53 no. studio units; 423 no. one bedroom units; 37 no. two bedroom (3 person) units; 317 no. two bedroom (4 person) units; and 110 no. 3 bedroom units) arranged in 9 blocks (Blocks 02-10) ranging between 2 and 6 storeys (excluding plant) in height, together with private (balconies and private terraces) and communal amenity open space provision and ancillary residential facilities;
- 17 no. duplex apartments (consisting of 3 no. 2 bedroom units and 14 no. 3 bedrooms units located at Block 02, 08 and 09), together with private balconies and terraces.
- 20 no. two and three storey houses (consisting of 7 no. three bedroom units and 13 no. 4 bedrooms units) and private rear gardens located at Block 02, 08 and 09).

The development will also consist of 3,889 sq m of non-residential uses, comprising:

- Change of use and renovation of existing single storey Gate Lodge building to provide a café unit (78 sq m);
- 1 no restaurant unit (307 sq m) located at ground floor level at Block 03;
- 6 no. retail units (1,112 sq m) located at ground floor level at Blocks 03, 06 and 07;
- 1 no. medical unit (245 sq m) located at ground floor level at Block 02;
- A new childcare facility (463 sq m) and associated outdoor play area located at ground floor level at Block 10; and
- A new community centre facility, including a multi-purpose hall, changing rooms, meeting rooms, storage and associated facilities (1,684 sq m) located at ground and first floor level at Block 06.

The development will also consist of the provision of public open space and related play areas; hard and soft landscaping including internal roads, pathways and boundary treatments, wetland feature, car parking (547 no. spaces in total, including car sharing and accessible spaces); motorcycle parking; electric vehicle charging points; bicycle parking (long and short stay spaces including stands); ESB substations, piped infrastructural services and connections; plant (including external plant for district heating and pumping station); waste management provision; SuDS measures; sustainability measures (including green roofs and solar panels); signage; public lighting; any making good works to perimeter wall and all site development and excavation works above and below ground.

13.2 Methodology

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

- A desktop study to establish an appropriate study area and relevant landscape and visual designations in the Dun Laoghaire Rathdown County Development Plan 2016-22 and Draft Dun Laoghaire Rathdown County Development Plan 2022-28;
- Fieldwork undertaken in October 2020, March 2021 and November 2021 to study the receiving environment and capture baseline photography;
- Assessment of the significance of the landscape impact of the proposed development as a function of landscape sensitivity weighed against the magnitude of the landscape impact;
- Assessment of the significance of the visual impact of the proposed development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact.

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

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

It is important to note that the Guidelines for Landscape and Visual Impact Assessment' (GLVIA-2013) follow the European Landscape Convention (ELC) definition of landscape: *'Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe, 2000)*. Thus, GLVIA-2013 covers all landscapes from *"high mountains and wild countryside to urban and fringe farmland (rural landscapes), marine and coastal landscapes (seascapes) and the landscapes of villages towns and cities (townscapes)"* - whether protected or degraded.

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

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

13.2.1 Landscape/townscape Impact Assessment Criteria

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

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

The sensitivity of the townscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape/townscape Value and Sensitivity is classified using the following criteria set out in **Table 13.11**.

Table 13.1: Landscape/Townscape Value and Sensitivity.

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

The magnitude of a predicted landscape/townscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed Development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape/townscape components and/or a change that extends beyond the immediate setting that may have an effect on the townscape character. **Table 13.2** refers.

Table 13.2: Magnitude of Landscape/Townscape Impacts.

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

The significance of a landscape/townscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following matrix set out in **Table 13.3.**

Table 13.3: Impact Significance Matrix.

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

Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

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

13.2.2 Visual Impact Assessment Criteria

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

Sensitivity of Visual Receptors

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

Susceptibility of Receptors

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

13.2.3 Visual Impact Magnitude

The visual impact magnitude relates to the scale and nature of the visual change brought about by the proposal and this is reflected in the criteria contained in **Table 13.4** below.

Table 13.4: Magnitude of Visual Impacts.

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

Negligible	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene.

13.2.4 Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix and applies the same EPA definitions of significance as used earlier in respect of townscape impacts (see **Table 13.3** above).

13.2.5 Quality of Effects

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

Whereas, the introduction of new built elements into countryside areas more often results in negative landscape and visual effects, in urban settings, development proposals are often replacing one built feature with another. The consequence for the townscape character and visual amenity is often beneficial, or may be a combination of positive effects and negative effects for different receptors. In the context of this assessment, the judgment of the quality of the effects is made in combination with the significance judgement for both landscape/townscape impacts and visual impacts e.g. Moderate / Positive or Moderate / Negative.

13.2.6 Extent of Study Area

It is anticipated that the proposed development is not likely to give rise to significant landscape/townscape or visual impacts beyond approximately 1km. As a result, a 1km-radius study area is used in this instance.

Figure 13.1: Study area for the proposed development.

13.3 Baseline Environment

The landscape/townscape baseline represents the existing context and is the scenario against which any changes to it, brought about by the proposed development, will be assessed. A description of the landscape/townscape context of the proposed site and wider study area is provided below. Although this description forms part of the landscape/townscape baseline, many of the elements identified also relate to visual receptors i.e. places from which viewers can potentially see the proposed Development.

13.3.1 Immediate Site Context

The site itself comprises of the Main Hospital Building within the north-central portion of the land holding. This stone clad, three storey over basement, gothic-style facility has multiple wings and semi-enclosed internal circulation areas. Within the surrounding grounds is an array of lower and more modern structures along with associated car parking and vehicular circulation areas. Open areas consist of both formal gardens and parkland containing grass lawns and mature specimen trees. Around the entire perimeter of the site is an imposing c. 5m high stone wall. The Central Mental Hospital (formerly Central Criminal Lunatic Asylum) was constructed in 1850. The site was originally chosen to be soothing to mental health patients and was intentionally not linked to any particular prison service to maintain distinction between criminality and illness. Thus, the grounds are laid out in parkland and formal gardens for the benefit of recuperation rather than having adopted a more utilitarian design more typically associated with incarceration.

Adjoining the site in almost all directions are mid-low density residential housing estates where the rear yards of dwellings are backed by the stone perimeter wall of the CMH site. The only exception is a portion of the southern boundary, which adjoins the northern end of a recreational open space accessed from Mount Carmel Avenue and a portion of the western Boundary wall, which fronts the Dundrum Road.

Figure 13.2: Immediate site context looking northwards.

Figure 13.3: View north across Mount Carmel Avenue open space towards site.

Figure 13.4: View from Mulvey Park residential estate looking south.

Figure 13.5: View from Annaville Park to the west of the site.

13.3.2 Broader Townscape Context

Beyond the immediate site boundary context is a broader variety of urban land uses, albeit in an overriding matrix of mid-low density semi-detached and terraced housing estates. Some of the most notable nodes of non-residential development include Our lady's Grove Primary School beyond Friarsland housing estate to the northeast of the CMH site. To the north, beyond Mulvey park Housing estate is the Dundrum Business Park.

Further west beyond the Dundrum Road, the LUAS light rail line runs in a general north – south direction between the Dundrum LUAS Stop and Windy Arbour LUAS stop. Milltown Golf Course occupies much of the north-western extents of the study area.

The most iconic aspect of the study area is Dundrum Town Centre consisting of the largest shopping mall in Ireland, which in-turn is surrounded by high density residential development in the form of apartment blocks. The LUAS line runs along the eastern side of the Dundrum Town Centre precinct and crosses over the major transport intersection of Churchtown Road and Dundrum Road in the form of an elegant tension bridge.

Other notable apartment developments within the study area include Trimblestown in the eastern portion of the study area and Fernbank just to the southwest of the LUAS bridge at Dundrum. It should also be noted that although the site and study area is generally flat to mildly undulating, there is a subtle fall in terrain from southeast to northwest across the study area. A tributary of the River Dodder forms the lowest section of the study area as it runs in a northerly direction to the west of Dundrum Road.

Figure 13.6: View from Dundrum LUAS bridge looking north along Dundrum Road in the general direction of the site.

Figure 13.7: View from Dundrum LUAS bridge looking south towards Dundrum Town Centre.

Figure 13.8: Broader urban fabric of the Study Area context looking northwards.

13.3.3 Dun Laoghaire Rathdown Development Plan 2016 – 2022

According to the Dun Laoghaire Rathdown Development Plan:

- The site is zoned under Land Use Zoning objective 'A,' with an objective 'to protect and / or improve residential amenity'.
- The lands associated with the Central Mental Hospital also have an 'Institutional Lands' designation with an objective "to protect and / or provide for institutional use in open lands".
- Within the near surrounds of the site are small zoned areas relating to Objective NC (Neighbourhood Centres) and "Objective F (Amenity Open Space).
- Dundrum Business Park, which is a short distance to the north of the site, has an underlying zoning of Objective E (Economic Development and Employment), whilst Dundrum town centre further to the south has a zoning of Objective MTC (Major Town Centre).
- The light blue dotted line that encompasses the site and much of the west and south towards Dundrum Town Centre denotes an area for which a Local Area Plan will be prepared.

Aside from the aforementioned zoning considerations (above), according to Map 1 of the development plan (see Figure 13.13 below):

- There are no protected structures within the site;
- There are no Candidate Architectural Conservation Areas within the near vicinity of the site;
- There are no designations to preserve 'Views', 'Prospects' or 'Trees/Woodlands' within the near vicinity of the site

- The site is not within or near a High Amenity Area.

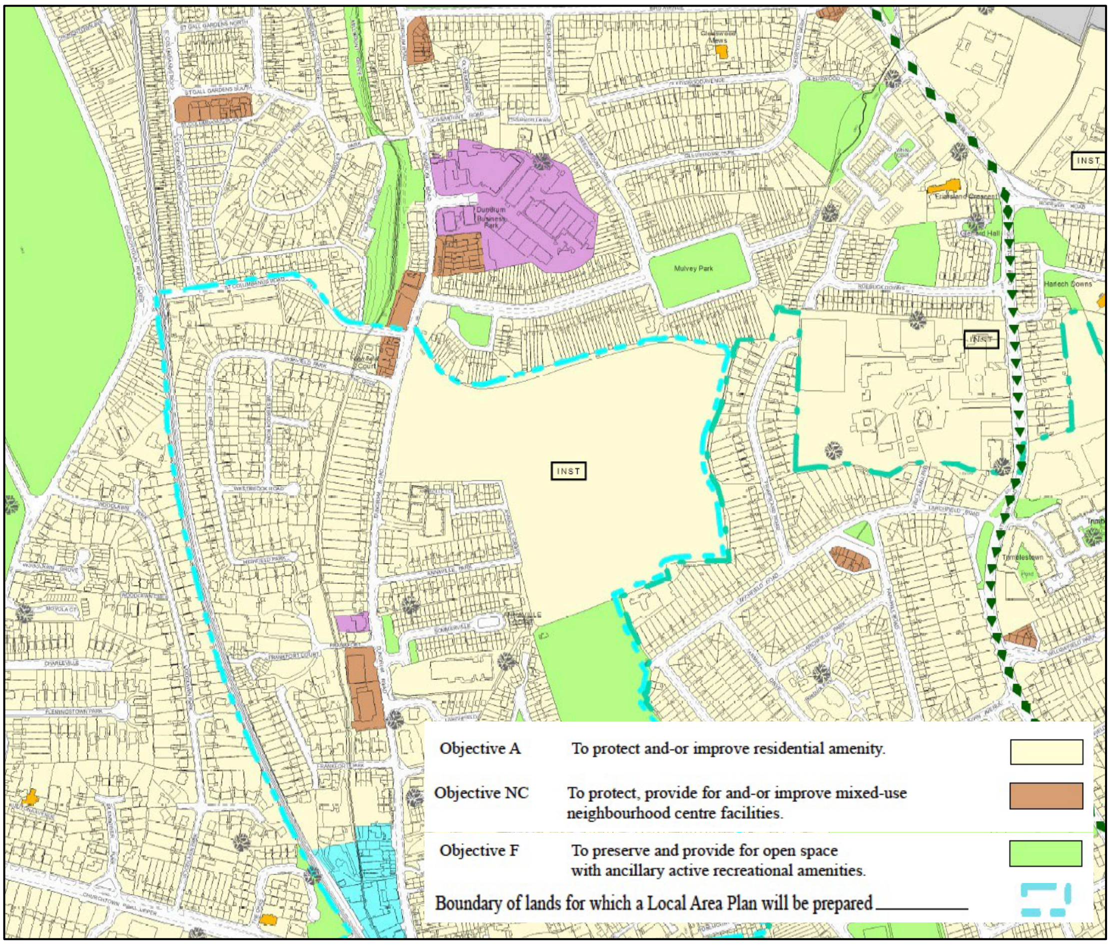

Figure 13.9: Extract of the DLR CDP Map 1.

Chapter 4 of the Development Plan pertains to 'Landscape, Heritage and Biodiversity' with Section 4.1.2 pertaining to 'Landscape.' It states:

> "The landscape of Dún Laoghaire-Rathdown is a dynamic and living landscape. It is not a static entity but is the outcome of thousands of years of action and interaction between natural and human factors."

However, there are no known policies or objectives in this Section that are of relevance to the site.

Dun Laoghaire Rathdown Landscape Character Assessment

Appendix 7 of the Dún Laoghaire-Rathdown County Development Plan ('DLRCDP') identifies that there are 14 Landscape Character Areas ('LCA') within the administrative area of Dún Laoghaire-Rathdown. However, the LCA's relate to the rural landscape of the Dún Laoghaire-Rathdown jurisdictional area and are not considered to be relevant in this instance.

Dundrum Local Area Plan 2019 – 2025

While it is The Council's intention to prepare a Local Area Plan for Dundrum for the period

2019 – 2025, only an 'Issues Paper has been published to date (published November 2018) seeking input from interested parties. Within the Issues Paper it is noted;

> *"Several major sites will, most likely, be coming forward for development in the near-to-medium future which will significantly change the context for Dundrum – including the soon-to-be-vacated Central Mental Hospital lands and the 'Dundrum Phase 2' development at the old shopping centre site. It is the opportunity for regeneration and renewal provided by major development sites such as these that is, in part, the catalyst for the new Local Area Plan, alongside other important local issues such as flood risk and public realm improvements."*

Visual Policy

Policy LHB6 in the DLRCDP relates to protected views and prospects and states:

- *"Policy LHB6: Views and Prospects - It is Council policy to protect and encourage the enjoyment of views and prospects of special amenity value or special interests."*

Table 4.1.1 of the DLRCDP lists 14 of 'Prospects to be Preserved' but none of these occur within the study area. The DLRCDP also states '*Roads or other public areas from which there is a View that is deemed worthy of protection are graphically shown on the Development Plan Maps*'. Certain locations are identified on the DLRCDP Development Plan Maps ('DPM') under the heading of '*Other Objectives*' including; '*To preserve Views*'; and '*To preserve Prospects*'. On review none of these are relevant to the proposed development.

It should be noted that there are designated scenic views within the Dublin Mountains from which distant views of the proposed development will be afforded. These are well outside of the study area and the viewing scenario will be that of a node of increased intensity of residential development within the overall context of Dublin City. In that context, views of the development may be of notable interest but will not have a material negative influence on visual amenity.

13.3.4 Draft Dun Laoghaire Rathdown Development Plan (2022 – 2028)

It is noted that a draft of the Draft Dun Laoghaire Rathdown Development Plan (2022 – 2028) was issued for review in January 2021. One of the key changes of note with regard to the CMH site is that three of the existing buildings, the 'Asylum', 'Catholic Chapel' and 'Hospital Building' were also included in the Record of Protected Structures.
Also noted is that a new Specific Local Objective (SLO) has been included in the southern portion of the Central Mental Hospital lands and the northern portion of the adjacent Rosemount Green. This states;

> *113 – "Any integration of / or connectivity between the Central Mental Hospital lands with the adjoining residential area should include the development of enhanced sporting facilities/ infrastructure for existing and future residents."*

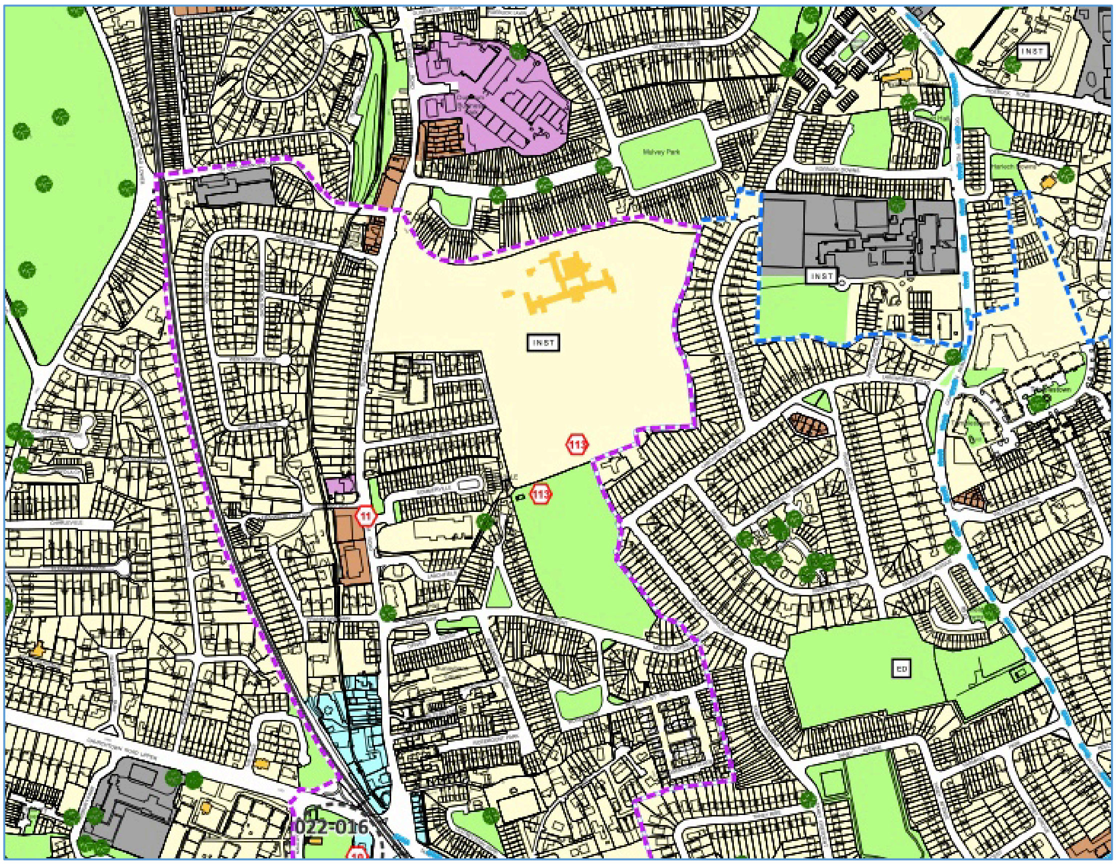

Figure 13.10: Extract of the Draft DLR CDP (2022-2028) Map 1 showing the Protected Structures within the CMH grounds and SLO 113.

13.3.5 Zone of Theoretical Visibility (ZTV)

Only those parts of the receiving environment that potentially afford views of the proposed development are of concern to visual impact assessment. A computer-generated Zone of Theoretical Visibility (ZTV) map has been prepared to illustrate where the proposed development is potentially visible from. Whilst a standard ZTV map is based solely on terrain data (bare ground visibility), and ignores features such as vegetation and buildings, this is of little value in a medium to high density urban setting such as Dundrum. In this instance Digital Surface Model (DSM) data, which does account for the surrounding surface elements of vegetation and buildings, has been used to prepare the ZTV map (**Figure 13.7**). Furthermore, a sequence of ZTV maps based on the relative heights of buildings has also been prepared in order to get an understating of where comprehensive scheme visibility might exist and where only the tops of the tallest buildings might be seen rising above intervening urban elements. Three ZTV map examples are provided herein (Lowest structures mid height structures and the tallest structures). These ZTV maps were also used to aid VP selection for the visual impact assessment.

Figure 13.11: Zone of Theoretical Visibility (ZTV) map based on Digital Surface Model (DSM) data generated for the lowest 2 storey elements.

As can be seen from Figure 13.9, there will be very little visibility of 2 storey elements within the site and this is largely due to the tall perimeter wall that surrounds the site, which is being substantially retained. It should also be noted that where the yellow visibility pattern strikes the ground plain it denotes ground level visibility, but where it strikes roof tops / treetops it is essentially showing visibility from 1.7m above these features. At worst it is indicating some potential for visibility from upper level windows in such instances, but not from ground floor / street level. The main ground level views in this instance are from the playing pitches to the south (where the perimeter wall will be removed) and from portions of open space within Mulvey Park estate to the north.

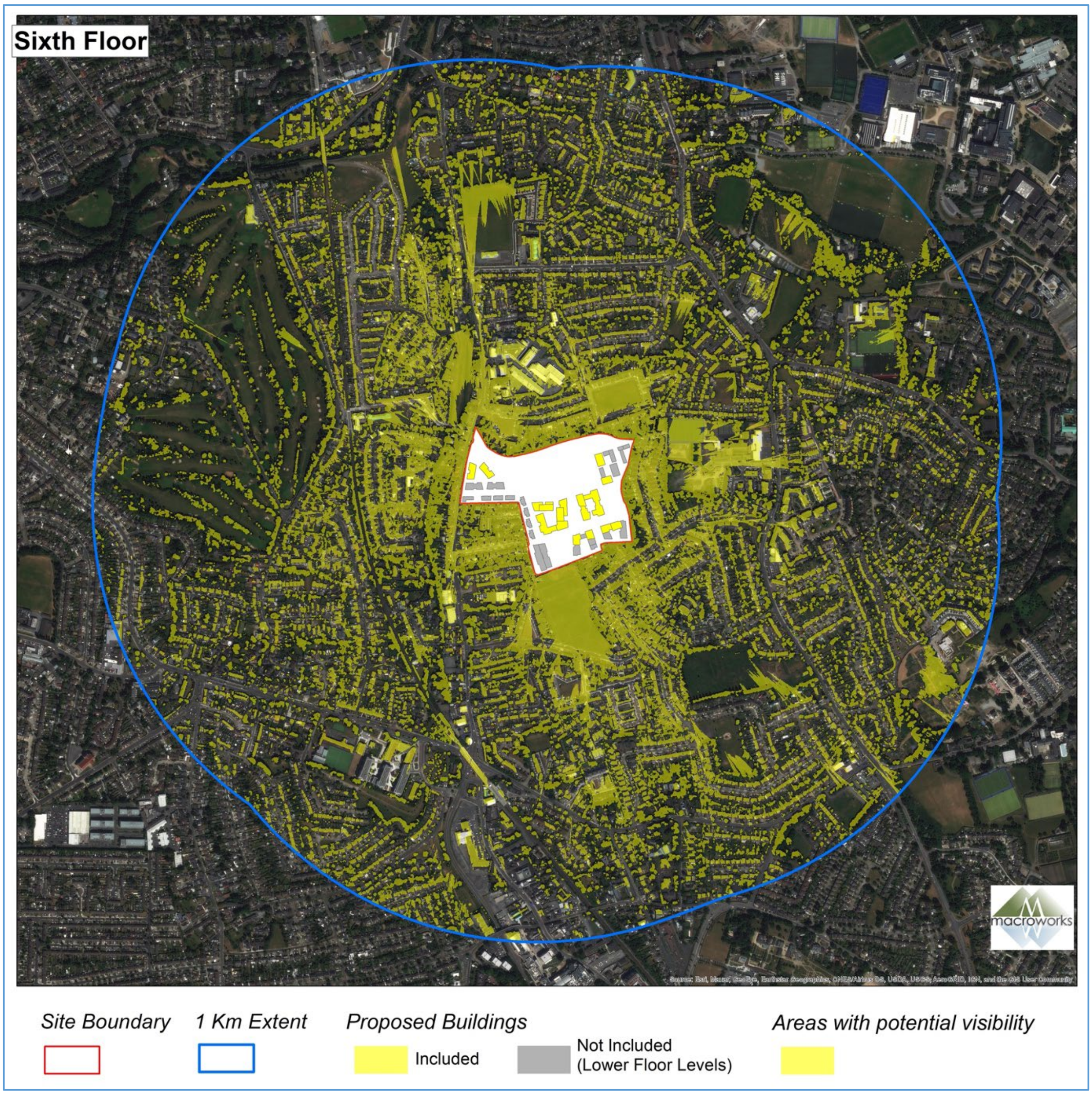

Figure 13.12: Zone of Theoretical Visibility (ZTV) map based on Digital Surface Model (DSM) data generated for the highest 6 storey elements.

In comparison to 2 storey elements covered by Figure 13.9, 6 storey elements covered by Figure 13.10 will be more visible from the ground plain within approximately 200m of the site. Rather than just from open spaces within adjacent housing estates (with clear foreground) the 6 storey elements will be visible from many of the roads, particularly those that run perpendicular to the site. There is also a general increase in the visibility pattern for the remainder of the wider study area with some small sections of ground level visibility associated with open spaces. More rooftops are struck by the visibility pattern, implying not only an increased number of dwellings with potential views from upper level windows, but that more of the development (upper floors) will rise into view above intervening buildings and vegetation.

13.3.6 Identification of Viewshed Reference Points as a Basis for Assessment

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

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

The Viewshed Reference Points selected in this instance are set out in Table 13.5 and shown on Figure 13.10 below.

Figure 13.13: Viewpoint Selection Map.

Table 13.5: Outline Description of Selected Viewshed Reference Points (VRPs).

VRP No.	***Location***	***Direction of view***
VP1	Dundrum LUAS Bridge / Stop	N
VP2	Mount Carmel Avenue	N
VP3	Mount Carmel Road	N
VP4	Roebuck Shopping Centre	NW

VP4a	Larchfield Road	NW
VP5	Friarsland Road	W
VP6	Goatstown Road / Our lady's Grove	W
VP7	Mulvey Park	SW
VP8	Entrance to Mulvey Park Housing Estate	SE
VP9	Glasson Court Park	SE
VP10	Annaville Park	E
VP11	Dundrum Road (adjacent to NW site boundary)	E
VP12	Taney Crescent	NW
VP13	Dundrum Road (adjacent to north-western site entrance)	SE
VP14	Dundrum Road (adjacent to W site boundary)	E
VP15	Mulvey Park north of site	S
VP16	Annaville Grove	N/E
VP17	Cnr Larchfield Road and Farmhill Drive	NW

13.4 Potential Landscape/townscape Impacts of the Proposed Project

13.4.1 Landscape/townscape value and sensitivity

In accordance with Section 5.5 of the GLVIA-2013, a townscape character assessment requires a particular understanding of, among other criteria, "the context or setting of the urban area and its relationship to the wider landscape." In a city that has evolved over millennia, the study area is a relatively recent addition.

The site itself is fully deserving of the 'Institutional' designation overlying its residential zoning as it contains many of the features associated with institutional settings described in the DLR CDP. It consists of a large centralised stately building surrounded by various ancillary structures that have emerged over the life of the CMH facility, all within the context of a parkland style landscape incorporating occasional formal and food gardens. There are some stands of mature trees within the site, the crowns of which, serve as a containing skyline feature providing some amenity and respite from built form for surrounding residents.

A key element of the CMH facility and the only one that is readily apparent to those who live or pass by in close proximity to the site is its tall and comprehensive stone wall perimeter. This is not only an imposing physical barrier - it also represents protection and not only for those within the site, but those outside of it. For those who live adjacent to the site it forms a distinctive and enclosing feature typically located at the end of rear yards. It has a long established aesthetic and provides a strong sense of privacy and security.

The other strong perceptual quality associated the CMH perimeter wall is that it reinforces the sense of a 'void' within the otherwise typical and consistent urban fabric of the Dundrum area. There is little sense of what lies within, but there is the perception that it is a vast and inaccessible area, around which, normal urban life revolves, but within which, there is relative stasis. There is also a clear comprehension that the CMH facility was here before the vast majority of built development that surrounds it and that the residential housing estates and suburban form has enveloped it over the last century.

Whilst there are strong perceptual townscape associations with the CMH facility, these are not the positive recreational and visual amenity ones that might be associated with other institutional facilities such as schools as hospitals or large parkland demesnes associated with stately houses. These associations are more akin to a large prison facility.

In landscape fabric terms and as discussed above, the CMH facility reads as a slightly anomalous void protected by stark and severe stone walls that generate a sense of foreboding. However, the facility also offers distinctive respite from the surrounding and relatively unremarkable residential housing estates. It represents a feature that is entwined with the sense of place for Dundrum, even if this is without wholly positive connotations.

In terms of the townscape values and sensitivities associated with the surrounding study area, the most notable feature is Dundrum Town Centre, which is essentially a large modern shopping mall with high density apartment dwellings and other commercial uses surrounding it. This is also served by the LUAS light rail service, which has its own iconic tension bridge marking the northern entrance to this distinctly modernised precinct. The presence of the Dundrum shopping centre and its associated facilities have made Dundrum a popular suburb to live, which is aided by its general proximity and accessibility to Dublin City centre. Most of the remainder of the study area could be best be described as typical mid-low density residential housing estates services by pocket parks, playing pitches and neighbourhood service centres. These have generally evolved in a radial fashion out from Dublin city centre over the course of the past 60 - 80 years.

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

13.4.2 Magnitude of Landscape/townscape effects - Construction Phase

Townscape effects are considered in the context of physical changes to landcover and buildings as well as the resultant effects to townscape fabric and character within the site and wider study area.

There will be permanent physical effects to the land cover of the site, which are not readily reversible. During the construction stage of the proposed development, which is estimated to take c.10 years, there will be periods of intense construction-related activity within and around the site, including approach roads. This will include, but is not limited to:

- HGVs transporting materials to and from the site;
- Movement of heavy earth-moving machinery and tower cranes on-site;
- Temporary storage of excavated materials and construction materials on-site;
- Gradual emergence of the proposed apartment buildings, and associated works;

In most urban areas, ground level site activity, material stockpiling, security fencing and worker welfare facilities would all be key components of the construction stage effects contributing to visual clutter, complexity and movement. However, in this instance, the existing c.5m high perimeter stone wall around the site will preclude visibility of much of this activity. It is only as the taller buildings begin to rise into view above the perimeter wall that construction stage landscape and visual effects will begin to become material.

The physical impacts to the site's land cover will be permanent and not readily reversible. Whilst the main CMH building will remain as an integral part of the development along with the walled garden and some areas of open space and associated mature trees, much of the current parkland setting will be removed and replaced by high density residential development, albeit 34% of the site will be contained in public open space (new and existing). This represents a dramatic change to the physical landscape of the site with the loss of some key elements and the retention of others, albeit in a dramatically altered setting.

Construction stage impacts on landscape/townscape character will be 'medium-term' (i.e. lasting 7-15 years), in accordance with the EPA definitions of impact duration. Whilst major construction projects associated with Dundrum Town Centre and the LUAS line have been characteristic of the wider study area in the past two decades, lesser scale apartment / housing developments associated with our Lady's Grove and Trimblestown are more typical of the residential area closer to the site. The construction stage works, will be of a noticeably greater scale and intensity than those developments, but with the buffering / screening effect of the existing perimeter wall around the site.

On the basis of the reasons outlined above, the magnitude of construction stage landscape/townscape impacts is deemed to be **Medium**. When combined with the Medium-low sensitivity of the receiving landscape, **the overall significance of construction stage landscape/townscape impacts** is considered to be **Moderate,** in accordance with the criteria contained in Section 1.5. The quality of construction stage effects will be **Negative**.

13.4.3 Magnitude of Landscape/townscape effects - Operational Phase

Following the completion of the proposed works, landscape/townscape impacts will relate entirely to the development's impact on the character of the receiving landscape/townscape and whether this is positive or negative.

The proposed development represents a marked and comprehensive change to the land use of the site, the scale and nature of development within the site and its perception within its receiving environment. The completely insular CMH site, which currently serves as something of a perceptual void in the landscape fabric of Dundrum, will be transformed into a modern, outwardly bold, high density residential precinct. And yet, for those that live and move around the local area of the site, especially where the perimeter walls will be substantially retained and new vehicular accesses are not proposed (north, west, southeast, southwest) the change to townscape character will not be as dramatic. Instead, it is likely to be manifest as some of the taller centrally located apartment blocks within the site rising just into view above the perimeter wall and between intervening treetops.

The masterplan design of the proposed development allows for a terracing up in the intensity of development and buildings heights from the mid-low density housing estates that surround the site, to the tallest centrally located apartment blocks. This is an appropriate design response as it allows the development merge into its setting without an abrupt transition of scale, which would read awkwardly in terms of adjacent low-rise residential neighbourhoods and avoids an overbearing presence for those that live adjacent to the site.

Due to the 'Institutional' designation on this residential zoned site, there is generous spacing between buildings and a campus / parkland aesthetic that serves to soften and downplay the intensity and height of apartment buildings within the development. Open spaces are varied and connected, both internally and externally with some retention of existing features such as the walled garden and mature parkland trees through the central portions of the site, particularly surrounding 'the Avenue' which forms the main entrance into the site. The main external open space connection is with Rosemount Green to the south of the site and there are also pedestrian/ cycle connections to Mulvey Park (north) and Annaville Grove (west). The main physical and visual connection with the external townscape fabric will be at the north-western boundary of the site where it connects with Dundrum Road. The site perimeter wall will be punctuated twice along this section of road to allow vehicular access to and from the site and further sections of the wall between the vehicle accesses, will also be removed and replaced with sections of railing to allow visual connectivity with the site. Aside from being functional connections to the site these external connections are important for the integration of the proposed development with the surrounding urban context. A delicate balance of retained privacy and connectivity appears has been achieved by the proposed layout.

In the wider urban context, there is a strong functional and thematic relationship between the proposed development and the nearby Dundrum Town Centre. They both represent intensive contemporary design responses to the needs of a rapidly growing urban population. This is an appropriate and recognised node for such development intensity as the Dundrum Town Centre is zoned as a 'Major Town Centre' in the DLR CDP. Not only is this area well served in its own right in terms of commercial and retail uses, it is also well connected to the city centre via the LUAS light rail system.

The proposed development is not alone in terms of mid to high density apartment developments in the immediate area with the nearby apartment developments at Our Lady's grove, Trimblestown and Fernbank setting some precedent for higher intensity nodes within the general matrix of mid-low intensity housing estates.

Aside from a larger scale than these other apartment developments in terms of both extent and buildings heights another key variation for the proposed development is the eclectic design of the various buildings contained within it. Whereas most apartment developments have a deliberately consistent design language, the proposed development design celebrates diversity of form, colour and texture. Some of this diversity is thrust upon it by the retention of the existing 'infirmary' building of the CMH (to be repurposed for community / amenity / enterprise use), which forms part of the masterplan for the site, but is outside the redline boundary for this application for permission. The rest is a deliberate and successful attempt to have the proposed development read as a residential mixed used campus almost like it might have evolved organically over time like traditional urban centres. A more homogenous design palette would appear much more like a discrete, singular and insular apartment development and would not work as well at this scale and in this setting as the proposed design does.

For the reasons outlined above, the **<u>magnitude of operational stage landscape/townscape impacts</u>** is considered to be **<u>High</u>** in terms of its effect on the landscape 'fabric' of the area and its comprehensive filling of a perceptual void in the predominant residential suburban setting of the area. In terms of its perceived effect on the townscape character of the area, the change is deemed to be slightly less marked – **<u>High-medium</u>**. This is on the basis that the development does not represent an overt visual change to the urban setting as it remains largely contained behind the existing perimeter stone walls of the site. The study area will remain a townscape setting defined by mid-low density residential housing estates and the Dundrum Town Centre, albeit with an additional node of higher density residential mixed use development contained within it. Effects on urban fabric and townscape character would not normally be differentiated, but in this somewhat unique context, it is considered appropriate.

13.4.4 Significance of Landscape/townscape effects

In accordance with the Landscape/Visual significance matrix contained in Table 13.3, the combination of a 'Medium-low' townscape sensitivity judgement and a 'High / High-medium' townscape impact magnitude judgment results in a 'Moderate' significance of townscape impact. On balance of the factors outlined above, the quality of that impact is generally considered to be Positive. Thus the overall significance is **Moderate** / **Positive**.

13.5 Potential Visual Impacts of the Proposed Project

13.5.1 Visual Receptor Sensitivity

In consideration of the visual receptor criteria set out in section 1.4.1, the main variation in the nature of views and those availing of those views, in this instance, relates to whether they are located in busy areas of the public domain such as major transport routes or quieter residential enclaves. In all cases the setting is a completely modified anthropogenic one that is mainly valued for residential amenity as opposed to scenic or naturalistic value. It is also important to remember that urban visual receptor sensitivity judgements are contained on the same spectrum as wild and remote mountain tops and rugged coastlines, for example, where values relate tourism, scenic and recreational amenity and which may be designated for protection.

On the basis of the factors outlined above, the visual receptor sensitivity of busy transport route views is deemed to be **Low** and for housing estate views the sensitivity is deemed to be **Medium-low**.

13.5.2 Magnitude of Visual Effect

The assessment of visual impacts at each of the selected viewpoints is aided by photomontages of the proposed development (contained at Volume 3 of this EIAR). Photomontages are a 'photo-real' depiction of the scheme within the view, utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. For each viewpoint, the following images have been produced:

1. Existing View
2. Montage View

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP1	Dundrum LUAS Bridge / Stop	571m	N

Representative of:

- A major transport node

Receptor Sensitivity **Low**

Existing View

This is an elevated view from the western end of the Dundrum LUAS stop where the bridge across the Dundrum Taney Road intersection commences. It provides a worst case-scenario in terms of potential visual exposure in respect of the proposed CMH development from Dundrum Town centre due to its elevation and relative proximity to the site. The northerly view takes in a wooded embankment and then the rear of a line of terraced dwellings.

Visual Impact of proposed development

The proposed development will not be visible from here due to a combination of both terrain screening and terrestrial screening from intervening vegetation and houses. The visual impact magnitude is **Negligible** by default and this view has been retained as an 'illustrative view. i.e. to illustrate the absence of effect from a well-known receptor.

Summary Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP2	Mount Carmel Avenue	205m	N

Representative of:

- Local Community views
- A neighbourhood recreational amenity area

Receptor Sensitivity **Medium low**

Existing View

This is a northerly view across Rosemount Green playing pitches, which represents one of the most open views of the CMH infirmary building and site from the surrounding area due to the absence of foreground screening. The park is flanked by two storey dwellings from surrounding housing estates and at the far end is the tall, stone perimeter wall of the CMH site. Beyond the wall can be seen the gothic style, stone infirmary building within a general parkland setting of both mature deciduous and evergreen specimen trees.

Visual Impact of proposed development

The proposed development represents a substantial visual change to this scene and a considerable increase in the scale and intensity of development within it. There is a slightly increased sense of visual enclosure, but without the development feeling overbearing in terms of vertical scale. Residential development is now presented in both high density apartment buildings as well as the traditional mid-to-low density terraced and semi-detached dwellings that exist around the other sides of the park. As well as the marginally taller centrally located apartment buildings within the site, which occupy the centre of the depicted view, lower apartment buildings will be seen to rise slightly above foreground existing dwellings to the left and right of the park.

Aesthetically, the proposed development presents with a broad array of design styles, tones, textures and finishes between each building. There are also some notable gaps between buildings, which are occupied by existing and proposed planting. These attributes serves to break down the scale and intensity of the development giving it an evolved campus feel (much like UCD). An open space courtyard at the southern extent of the site also opens and connects onto Rosemount Green. This increases the perceived extent of greenspace, providing a much more appropriate transition than the existing high stone wall. It also affords a higher degree of passive surveillance to the open space.

Whilst the degree of visual change is considerable, the factors outlined above have both negative and positive connotations for the view experienced by park users and local residents. Due to these distinct, competing factors (rather than an immaterial effect on the scene) the quality of the impact is balanced. Therefore the magnitude of effect is deemed to be **High-medium** and the quality of that effect is **Neutral** (on balance).

Seasonal effects

This view was replicated for summer and winter seasons to examine if there would be a distinction in cross-season effects (due to the altered screening effects of deciduous trees). It is not considered that there will be a material difference in effect between summer and winter.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Medium low	High-medium	**Moderate / Neutral**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP3	Mount Carmel Road	174m	N

Representative of:

- Local community views

Receptor Sensitivity **Medium low**

Existing View

This is a view near the northern end of Mount Carmel Road, which is directed towards the site. This is a relatively enclosed street scene flanked on either side by generously sized semi-detached dwellings and substantially contained in the near distance by similar dwellings on the northern side of the Larchfield Road corner. The scene is punctuated throughout by street and garden trees as well as some taller specimens within the CMH site which rise above the Larchfield rooflines.

Visual Impact of proposed development

Proposed Apartment Block 5 will be seen rising between and just above the dwellings at the end of the street with a fraction of the Block 4 roofline also rising into view to the right. This will result in a marginal, but noticeable change to the street scene in terms of general enclosure, as well as the diversity, intensity and scale of development relative to the mid-to-low rise dwellings of the foreground. However, the development is far from imposing or overbearing in this scene – even for those dwellings lining the northern side of Larchfield Road. Nor does it impart a sense of undue overlooking in respect of those dwellings partly due to the offset angle of the proposed apartment blocks.

Unlike for VP2, where a clear understanding of the eclectic, open campus style of the proposed development is readily apparent, the proposed buildings mainly contribute intensity and complexity to this scene.
Overall, the magnitude of the visual impact is deemed to be **Low** and the quality of that effect is **Negative**.

Seasonal effects

This view was replicated for summer and winter seasons to examine if there would be a distinction in cross-season effects (due to the altered screening effects of deciduous trees). It is not considered that there will be a material difference in effect between summer and winter.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP4	Roebuck Shopping Centre	187m	NW

Representative of:

- Local Community Node

Receptor Sensitivity **Medium low**

Existing View

This view is from the front of the Roebuck Shopping centre, which is a neighbourhood service centre of retail premises below offices with a car park and small greenspace to the front. It is located at the corner of Larchfield Road and Farmhill Road and is enclosed by semi-detached dwellings on the opposing sides of the roads.

Visual Impact of proposed development	From here the Block 3 apartment building can just be seen partially rising into view between the roofs of intervening dwellings and in the same complex context of the foreground shopfronts. The view of the development is oblique to the general orientation of the shopping centre and its associated green space, which is the northeast. Although the proposed development only presents a very minor intrusion into this scene, the partial view of it lacks context within a setting that is otherwise dominated by mid-low intensity housing estates and their neighbourhood shops. In this regard it appears slightly ambiguous. On balance of the limited visual presence coupled with the slightly ambiguous view of the development, the magnitude of effect is deemed to be **Low-negligible** and the quality of that impact is judged to be **Negative**.
Summary	Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP4a	Larchfield Road	90m	NW

Representative of:

- Local community views

Receptor Sensitivity	**Medium low**
Existing View	This view is across the intersection of Larchfield Road and Friarsland Road. Its takes in a typical suburban housing estate street scene that is contained by generous, two storey, semi-detached dwellings. The view is also interspersed with an array of street and garden trees as well as tall, mature tree tops from the CMH site periphery that rise into view between the roof tops.
Visual Impact of proposed development	From here the nearest corner roof profile of the Block 4 apartment building rises just into view between the perimeter tree tops of the CMH site, which in turn are seen between intervening dwellings. In a similar manner to VP4, the proposed building represents a very minor addition to the street scene,

but one that lacks a degree of context and may not be expected in this low rise residential area.

Again, the minor visual presence coupled with the slightly ambiguous view of the development results in a magnitude of effect that is deemed to be **Low** and the quality of that impact is judged to be **Negative**.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP5	Friarsland Road	52m	W

Representative of:

- Local community views

Receptor Sensitivity

Medium low

Existing View

This is a view across Friarsland Road, which runs parallel to the CMH site boundary. Indeed, the perimeter wall of the site and a portion of the main infirmary building can be glimpsed between dwellings on the opposite side of the road. At this point on Friarsland Road the dwellings step down from two storey detached to detached single storey and dormer bungalows allowing a slightly greater degree of visibility towards the CMH site. There is a notable band of vegetation lining the rear boundaries of these properties, much of which is contained with the CMH site.

Visual Impact of proposed development

Apartment Blocks 2 and 3 from the proposed development will rise a short distance beyond the rear boundaries of these properties resulting in a distinct change to the street scene. There will be a more consolidated degree of enclosure as the space between pitched foreground rooflines is filled by flat roof apartments just beyond.

There is not a sense of overbearing from the modest height apartment buildings, which only fill space between foreground buildings rather than rising above them when viewed from here. There is an initial sense of potential overlooking for the rear yards of the Friarsland properties, but on closer examination of the proposed apartment design it is clear that the main outlook and balconies of these apartments is not in the direction of Friarsland.

Furthermore, the retained and supplemented boundary trees will serve as a more effective screen (due to relative scale in relation to distance) as a viewer approaches the site.

There is a minor degree of visual ambiguity relating to the partial emergence of higher density apartment blocks into a street scene that was heretofore governed by low rise mid-low density dwellings and without a stronger sense of the overall design of the CMH development. However, it is a circumstance that currently occurs and will continue to occur within Dublin suburbs, particularly those that are a focus of essential services.

For the reasons outlined above the magnitude of visual impact is deemed to be **Medium-low** and the quality of the effect is deemed to be **Negative**.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Medium low	Medium low	**Moderate-slight / Negative**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP6	Goatstown Road / Our lady's Grove	403m	W

Representative of:

- Local Community Views

Receptor Sensitivity **Low**

Existing View

This is a view from the busy Goatstown Road at the entrance to Our Lady's Grove. It consists of a primary school on the right hand side of the entrance road and an apartment development on the school's former lands on the left hand side. Just beyond the apartments building can be seen a terraced line of two storey dormer dwellings with associated amenity planting to the fore. A focus of the Avenue view into the site is the former convent buildings, which at the time the image was captured was being refurbished (for apartments).

Visual Impact of proposed development

The upper floors of the proposed Block 3 apartment building and the roofline of the marginally nearer (and lower) Block 2 apartments can just be seen rising in the middle distance beyond and to the sides of the former convent building from Our Lady's Gove site. The dark tone of Block 3 stands in distinct contrast to the current pale colour of the convent building and also against the backdrop of sky. Due to its lighter tone and lower stature, block 2 is considerably less noticeable.

This is a varied and complex vista of a range of development types, scales and eras that has clearly changed dramatically in recent years. There is a fractional increase in the intensity of high density residential development within the background of this scene and the intervening convent building will have a slightly more complex and crowded setting. These factors are not considered to have a marked impact on visual amenity at this locality and consequently the magnitude of visual impact is deemed to be **Low-negligible**. The quality of the effect is marginally negative – i.e. **Neutral / Negative**.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Low	Low-negligible	**Slight-imperceptible / Neutral - Negative**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP7	Mulvey Park	142m	SW

Representative of:

- Local Community Views

Receptor Sensitivity **Medium low**

Existing View

This is a view across the main green amenity space of the Mulvey Park housing estate, which due to the absence of foreground buildings and vegetation affords relatively open views in the direction of the CMH site. On the far side of the green it is contained by terraces of two storey dwellings. To the southwest can be seen the multi-chimneyed roofline of the CMH infirmary building and mature treetops within that site rising just above the Mulvey Park dwellings.

Visual Impact of proposed development

The proposed Block 2 apartment building will be seen to rise in the middle distance above the intervening residential rooftops and vegetation just to the left of the retained infirmary building. It will be the vertical focus of an otherwise horizontally stratified view and will be a prominent feature, but without a sense of overbearing or over-scaling relative to the other elements of the view. Indeed, there is a clear terracing of height in from the CMH boundary, which is made legible by the retention of the infirmary building as this provides a scale transition and also a distance reference.

Whilst there is something of an eclectic mix of architecture between the foreground housing estate, the infirmary building and the proposed block 2 apartments, this is generally in line with the organic design approach for the development. Furthermore, from this location there is a stronger sense of transition than from some of the previous viewpoints where proposed apartment blocks rise into view with less contextual legibility.

There is not an overt sense of overlooking generated by the proposed apartment block due to the angular and distance offset from Mulvey Park. Overall, the magnitude of visual impact is judged to be **Low** and the quality of the effect is **Neutral / Negative**.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Medium low	Low	**Slight / Neutral - negative**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP8	Entrance to Mulvey Park Housing Estate	59m	SE

Representative of:

- Local Community View

Receptor Sensitivity **Medium low**

Existing View

This view is obtained from a slightly elevated green space at the confluence of Mulvey Park road and a pedestrian and cycle route only a short distance from the intersection with the busier Dundrum Road. The view across the green consists of car parking and terraced houses from a small crescent. The dwellings are backed by a tall and mature tree line of both deciduous and coniferous species, which rises just above the roofline.

Visual Impact of proposed development

Only a partial view of Block 10 through dense tree cover (right of centre) will be afforded from here through coniferous tree cover and beyond the roofline of foreground residences. Whilst the visual change is very subtle there is a stronger sense of the bulky presence of the substantial building just beyond the foreground setting. Nonetheless, much of the tree cover is coniferous providing year round screening and there will not be a sense of overbearing or overlooking.

Aesthetically, the proposed development adds marginally to the quantum and diversity of built development within the scene thereby adding to visual complexity. The very limited view of the proposed development, whilst tempering its overall visual presence, also leads to a minor sense of contextual ambiguity in this otherwise typical housing estate scene.

Overall, it is considered that the residential and visual amenity of local residents in this setting will not be unduly reduced by the proposed development. The magnitude of visual impact is deemed to be **Low-negligible** and the quality of that effect is marginally negative i.e. **Neutral-Negative**.

Seasonal effects

This view was replicated for summer and winter seasons to examine if there would be a distinction in cross-season effects (due to the altered screening effects of deciduous trees). It is not considered that there will be a material difference in effect between summer and winter.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Medium low	Low-negligible	**Slight-imperceptible/ Neutral-Negative**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP9	Glasson Court Park	142m	SE

Representative of:

- Local Community Views

Receptor Sensitivity **Medium low**

Existing View

This is a slightly elevated view from Glasson Court where it abuts a small linear park. The grassed area slopes steeply down to a small stream and the linear park continues on the other side. Just beyond on the opposing slopes are a series of 2-3 storey residential and commercial buildings, which present their rear facades to the viewer because they front the Dundrum Road on the other side. There is a dense band of mature riparian vegetation flanking those buildings to the south and generating a vegetated skyline in this section of the view.

Visual Impact of proposed development

The visual change here is very subtle and like for VP8 it comes more in the sense of a bulkier presence of built development through vegetation screening (marginally less noticeable in summer). This will be barely discernible in this diverse and complex setting and thus, the magnitude of impact is **Negligible**.

Seasonal effects

This view was also replicated for summer and winter seasons. It is not considered that there will be a material difference in effect between summer and winter due to leaf loss from deciduous trees.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP10	Annaville Park	85m	E

Representative of:

- Local community views

Receptor Sensitivity **Medium low**

Existing View

This is a view along Annaville park, which is a small residential enclave that runs parallel to the CMH boundary. Indeed, the stonewall perimeter boundary of the CMH site can be seen at the end of the cul-de-sac backed by several mature trees. The street is otherwise pleasantly enclosed by semi-detached dwellings and associated amenity planting within front yards.

Visual Impact of proposed development

There will be a relatively clear view of proposed Apartment Blocks 6 and 7 to the right and left of the street alignment respectively. Block 6 is the smaller of the two and is marginally closer to the site boundary, whereas Block 7 is taller and more centrally located with proposed two storey perimeter dwellings (out of view) between it and the boundary. The proposed buildings will serve to enclose the end of the street, where heretofore there had been a relative sense of openness. Nonetheless, the sense of enclosure is similar to that of the street in general and the proposed apartment buildings do not appear overbearing or generate an undue sense of overlooking.

The campus style of the proposed development is apparent from here with diverse building design and a degree of visual permeability between them. It is also clear that the alignment of Annaville Park been carried into the development in the for of a treelined avenue that runs east – west through the site. In terms of physical access, there will be a pedestrian entrance into the site from Annaville Park, but the perimeter wall will remain as a visual separation between the existing and proposed residential quarters.

The visual change is distinct here and there is a marked increase in the scale, intensity and form of built development. Thus, the magnitude of visual impact is deemed to be **High-medium**. In terms of the quality of the effect, it is likely that the residents of Annaville Park would prefer to retain the open / vegetated aspect at the end of the street and the sense of a tucked-away residential enclave. However, in urban design terms the proposed development addressed the alignment of Annaville Park and has a legible and diverse campus style. Whilst it falls short of opening fully onto the end of the street and interconnecting the existing and proposed residential areas physically and visually (as would likely be advocated by urban design purists), this represents a balance of retaining the more subdued residential amenity for those living in Annaville Park. On balance, the quality of effect is deemed to be marginally negative (i.e. **Neutral-Negative**)

Summary Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Medium-low	High-medium	**Moderate / Neutral-Negative**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP11	Dundrum Road (adjacent to NW site boundary)	11m	E

Representative of:

- A major transport route

Receptor Sensitivity **Low**

Existing View	This is essentially a blank view of a tall and imposing stonewall that hints at protection of those within or those outside of it. Even though it is long established and familiar to those that view or pass by on a regular basis, it is still an anomalous urban feature. It represents a strong and abrupt barrier / edge that is undesirable in a predominantly residential area near a major urban node (Dundrum Town Centre). Residential dwelling line the other side of the busy Dundrum Road.
Visual Impact of proposed development	The proposed development will completely transform this view / setting by opening up sections of the existing boundary wall and incorporating ornamental railings in those spaces. There is essentially no baseline visual context beyond the wall, so all that can be assessed is whether the scale and nature of the proposed design is appropriate to this street scene. The nearest Block 10 apartment building will front the Dundrum Road with a prominent yet elegant built form incorporating a deep façade of balconies that will bring dynamism and life to this street scene. The remnants of the perimeter stone wall serves as a scale transition to the new buildings behind it as well as a partial privacy screen to ground and first floor apartments, which will be further supplemented by tree planting. Directly across the road can be seen an internal open space that leads the eye towards the internal components of the site - corner of Block 7, Block 3, perimeter housing units and existing infirmary building. Aside from the adjacent Block 10 apartment building which unapologetically fronts the main entrance and road frontage of the site, other buildings are seen to terrace up and away from the site boundary with the tallest buildings concentrated in the middle of the site. There is a loose arrangement of diverse architectural scale, form and finish, which lends to the campus aesthetic of the development. For those dwellings facing the development across the Dundrum Road, there will be marked contextual change. The scale of the apartments will be more overbearing than the existing CMH perimeter wall, but not uncomfortably so. There may also be some sense of overlooking from the road frontage apartments, but in this context it relates to front yards / facades that already abut the busy Dundrum Road. Thus, there is unlikely to be a loss of privacy. The magnitude of visual impact on this street scene is unreservedly considered to be **High**. On balance of mainly positive factors and localised slightly negative factors, the quality of the effect is deemed to sway in the direction of Positive (**Neutral-Positive** on balance).

Summary Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Low	High	**Moderate-slight / Neutral-Positive**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP12	Taney Crescent	577m	NW

Representative of:

- Local Community Views

Receptor Sensitivity **Medium low**

Existing View This is a slightly elevated view in the direction of the CMH site along the sinuous alignment of Taney Crescent. In the immediate foreground to the right of the depicted view is a neighbourhood open space amenity area with a playground and grassed kickabout space. Otherwise the setting is contained to a modest degree by terraced and semi-detached mid- to low density housing with associated amenity planting occupying the street and front yards. To the rear of the terrace of dwellings facing the viewer is a line of mature Poplar trees.

Visual Impact of proposed development None of the proposed development can be seen from here due to intervening screening from vegetation (winter) and buildings. Consequently the magnitude of visual impact is **Negligible** by default.

Summary Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP13	Dundrum Road (adjacent to north-western site entrance)		SE

Representative of:

- Local Community Views

- A major transport route

Receptor Sensitivity **Low**

Existing View This is a view from immediately opposite the site entrance into the CMH site. This consists of a vehicle step-in before tall wrought iron gates flanked on either side by imposing stone walls of 5m in height. Just beyond the gate is a stand of mature conifers which add to the sense of enclosure.

Visual Impact of proposed development The most visible element of the proposed development will be the uppermost floors of the Block 10 apartment buildings that flank the Dundrum Road just to the south of this location. They will rise just above the remaining elements of the roadside wall and will also be partially visible through those sections of the wall that will be replaced by more permeable and less imposing railings. The existing trees inside the gate will be retained and afford considerable screening of the proposed buildings further into the site.

Whilst there will be marked visual change to the street scene, it will be less imposing without the full extent of the perimeter wall and with the life and diversity introduced by the proposed apartment buildings that from address it. Consequently, the magnitude of visual impact is deemed to be **Medium**, but the quality of that impact, **Positive**.

Summary Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP14	Dundrum Road (adjacent to W site boundary)		E

Representative of:

- Local Community Views
- A major transport route

Receptor Sensitivity **Low**

Existing View This is a view from directly opposite the perimeter wall that runs along Dundrum Road and encloses the CMH site. Indeed this imposing stone structure (5m high) is the sole feature of the eastward view for both road users and residents on the western side of the road.

Visual Impact of proposed development

There will be a fundamental change to the street scene here with a large section of the existing perimeter wall being removed (and some remaining sections being lowered) to accommodate a second entrance to the site from the Dundrum Road. A welcoming street scene into the site is presented to the viewer where the multi-modal street is flanked by five storey buildings to the north and 2-3 storey buildings to the south. The carriageway is also separated from the buildings by shrub and street tree planting and existing retained trees cn be seen further along the street within the heart of the site. There is some awkwardness in the retention of much of the existing stone wall to the left and right of the entrance and the sense that ground floor units will look directly onto it. However, there is landscaped pedestrian access between these units and the wall, which is most notable to the north of the entrance. Furthermore, the wall is a heritage asset and it is considered a reasonable compromise of design and conservation to see much of it retained.

Whilst there will be considerable visual change, the street scene will be less imposing and bland without the full extent of the perimeter wall. The life and diversity introduced by the proposed apartment buildings that will address Dundrum Road and the new site access road with overlooking windows and balconies brings a positive contribution to the urban form. Consequently, the magnitude of visual impact is deemed to be **High**, but the quality of that impact, **Positive**.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Low	High	**Moderate-slight/ Positive**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP15	Mulvey Park north of site		S

Representative of:

- Local Community Views

Receptor Sensitivity **Medium low**

Existing View

This is a view across a residential street with a median of grass, street trees and parallel car parking that divides the east and west bound carriageways. On the opposite side of the road is a series of two storey terraced houses with an eclectic array of façade colours and materials. Some mature trees can be seen between the terraced dwellings, highlighting the CMH site.

Visual Impact of proposed development

None of the proposed development will be visible from here due to screening by foreground buildings and vegetation and thus, the magnitude of visual impact will be **Negligible**.
Based on the wireline image, it would not appear that the proposed development will be particularly visible from within the rear yards of the dwellings on the opposite side of the road.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

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

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP16	Annaville Grove		N/E

Representative of:

- Local Community Views

Receptor Sensitivity **Medium low**

Existing View

This is a small residential enclave that is enveloped to both the north and east by the CMH site with the most noticeable evidence of this being the stonewall at the end of the street to the east. From this location at a right-angle bend in the street there are brief channelled views along streets of terraced, two storey dwellings to the east and north. Three storey apartment buildings rise behind the viewer immediately to the west.

Visual Impact of proposed development

The Block 10 and Block 7 apartment buildings will rise into view within the street scenes to both the north and east respectively. Even though these apartment blocks are stepped into the CMH site beyond perimeter three storey dwellings and internal access roads, they will noticeably contribute to an increased sense of enclosure for this residential setting, which will now be surrounded on three sides by apartment buildings. Despite the increased degree of enclosure, there is a sense of the internal setback and spatial separation to the apartment buildings. This prevents an undue degree of overbearing and/or overlooking, albeit in the context of a considerably increase intensity and scale of surrounding built development.

Overall, the magnitude of visual impact is deemed to be **High-medium** and of a **Negative** quality.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Medium low	High-medium	**Moderate / Negative**

Viewshed Reference Point		**Viewing distance to site boundary**	**Direction of View**
VP17	Cnr Larchfield Road and Farmhill Drive		NW

Representative of:

- Local Community Views

Receptor Sensitivity

Medium low

Existing View

This is a northward view across Larchfield Road towards a line of semi-detached dwellings that otherwise truncate views further beyond. The road is also lined by street trees and the landscape planting contained within front yards.

Visual Impact of proposed development

A relatively close, but partial view of the Block 4 Apartment building is afforded between foreground dwellings and there is also a glimpse of the Block 5 roofline in another gap further to the west (left). The proposed buildings will add to the sense of enclosure without appearing overbearing or generating an undue sense of overlooking. They will also contribute to the diversity and intensity of built form within the street scene. As the proposed buildings rise partially into view from a context that is not otherwise clear to the viewer, their contribution to the view is slightly ambiguous.

For the reasons outlined above, the magnitude of visual impact is deemed to be **Medium** and the quality of the effect, **Negative**.

Summary

Based on the assessment criteria and matrices outlined at **Section 1.3** the significance of residual visual impact is summarised below.

Impact Significance

Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance / Quality of Visual Impact**
Medium-low	Medium	**Moderate-slight/ Negative**

13.5 Mitigation Measures

It is not considered necessary to introduce specific Townscape and Visual mitigation measures as the main siting, design and landscaping measures are all deemed appropriate and are integral to the design of the development as already assessed.

13.6 Residual Impacts

As there are no specific Townscape and Visual mitigation measures proposed, residual impacts are deemed to be the same as those already assessed in section 13.4 and 13.5.

13.7 Monitoring

Monitoring measures are not required in respect of Townscape and Visual effects, particularly as there are no specific mitigation measures proposed.

13.8 Reinstatement

There will not be any aspects of this permanent development that will result in reinstatement or associated effects form a Townscape and Visual Perspective.

13.9 Interactions

The main interactions associated with the Townscape and Visual assessment relate to;

- Cultural and Architectural Heritage – Design treatment of perimeter wall and visual relationship of newly proposed and retained structures.
- Architectural design - Scale, massing, setback and façade treatments and how these contributes to / ameliorates landscape and visual impacts.
- Landscape design – Retention of existing mature trees / provision of new planting and how this contributes to / ameliorates landscape and visual impacts
- Population and Human Health - Potential effects arising from visual effects upon surrounding existing dwellings

13.10 Cumulative Impacts

In this instance there are two cumulative scenarios to consider. The first relates to the Section 34 application within the CMH site, which seeks to redevelop the hospital building in accordance with the detailed description contained in Chapter 3 of the EIAR.

The above development will be considered first in respect of the proposed SHD site and then they will be considered together relative to other relevant developments within the surrounding study area. A cumulative scoping exercise was undertaken in respect of a wide range of cumulative developments across each of the EIA factors including Townscape and Visual. The following projects were scoped-out of further Townscape and Visual cumulative assessment on the basis that the separation distance, relative scale or nature of that development would not result in material cumulative effects with the proposed development;

1. Permitted residential development Green acres Convent Drumahill House and the Long Acre, Upper Kilmacud Road
2. Permitted residential development at Knockrabo, Mount Anville Road
3. Partial permission of student accommodation at University College Dublin, Belfield
4. Series of permitted car park and sports pitch developments, University College Dublin, Belfield

The following developments are considered relevant from a cumulative TVIA perspective;

1. Permitted Residential development at Mount Saint Mary's and Saint Joseph's Dundrum Road
2. Permitted Residential development at former Shell Garage, Roebuck Road
3. Permitted Student Accommodation development at former Victor motors site, Goatstown Road
4. Permitted Student Accommodation development at Our lady's Grove, Goatstown Road
5. Proposed Residential development Highfield Park / Frankfort Castle
6. Proposed SHD Residential development at Knockrabo
7. Potential Planned residential development Old Dundrum Shopping Centre
8. Potential Planned residential development Sommerville House Dundrum Road

13.10.1 Cumulative Impacts with CMH future Section 34 Application

In regards to the CMH S34 development it is important to note that it is only the planning mechanism that distinguishes this development from the masterplan for the overall CMH site that also encompasses the SHD development. Consequently, they have been designed in conjunction with each other to be compatible in terms of function and appearance. From a townscape perspective, this ensures a consolidated and cohesive design for the overall CMH site.

From a visual impact perspective, the S34 development principally relates to refurbishment and repurposing of the existing hospital building and the provision of comparatively lower height / density residential development to the north of it, but still contained within the CMH perimeter wall. This will result in very little noticeable visual change for external receptors. This is evident within the photomontage set where the outline views depict the SHD development and the S34 development in different colours to aid cumulative comprehension. Whilst portions of the uppermost storeys of apartment blocks within the SHD development rise into view from the majority of viewpoints, there are no instances where new buildings relating to the S34 development are visible above the perimeter wall and/or intervening vegetation and buildings. Whilst the existing hospital building occasionally rises into view from the likes of VP7, its roof profile and external form will not be materially changing. Mainly because the S34 development will contribute in such a minor way towards TVIA impacts in its own right, it is considered that there will not be significant cumulative impacts in conjunction with the proposed SHD development. Indeed, there are no instances in which the S34 development contributes to higher visual impacts at any of the selected viewpoints than would occur for the SHD development in its own right.

13.10.2 Cumulative Impacts between CMH developments (SHD and S34) and surrounding developments

As evidenced by the cumulative project list in Section 13.10.1 above, the Dundrum / Bellfield area is currently experiencing considerable infill development, generally in the form of brownfield site redevelopment for medium to high density apartment schemes and student accommodation. Strategically speaking, this is appropriate given the proximity to UCD and also Dundrum Town Centre which is a commercial and public transport hub, which is zoned for Major Town Centre use. For the same reason the proposed developments are an appropriate scale and form of infill development, so are the other listed developments. The cumulative effect is one of general intensification and increased scale of built form, which is of a modern and high quality nature in terms of design and materials. Whilst this contrasts slightly with the mid-century medium to low density residential housing estates that form the general matrix of this area, there are appropriate transitions of scale and intensity, provision of new and accessible open space and a welcome variety of compatible form and function.

In terms of cumulative visual impacts, there will be occasional views from the likes of Goatstown Road and Dundrum Road where one or more of the listed cumulative developments may rise into view in conjunction with the proposed CMH SHD development. However, this is seldom likely to be in the same portion of the view and given the generally low order visual impacts of the SHD development, such cumulative effects will not be significant. One of the most likely combined views will be afforded from Rosemount Green immediately to the south of the CMH site with which the proposed development will open onto. Looking south across the open space, it may be possible to also obtain views of the potential future residential development of the Old Dundrum Shopping centre site in the core of Dundrum Town Centre, albeit in the opposite direction. It is not considered that at such separation distances and in opposite viewing directions will there be a cumulative visual impact that has any material detriment to visual amenity at this location or any others where similar effects may be experienced.

For the reasons outlined above, it is not considered that the proposed SHD development, whether in conjunction with the adjacent S34 development within the CMH site, or collectively with external permitted, proposed or future potential developments, will result in any significant townscape and visual cumulative impacts. Instead, such cumulative impacts are likely to be low.

13.11 'Do-Nothing' Effect

In this instance the do-nothing consequence for the CMH site is that it will remain for the short term to medium term as an institutional facility becoming progressively underutilised. Townscape and visual impacts will remain unchanged from the current baseline scenario, particularly as the site is contained behind a tall perimeter wall. It is likely that the site will remain in high demand for future development and this is recognised by both the current and draft Dun Laoghaire Rathdown Development Plans, which promote sustainable redevelopment of the site rather than retention of the status quo.

13.11 Conclusion

There will be substantial physical change to the CMH site that will involve both the introduction of new mid to large scale buildings and associated infrastructure along with the loss /replacement of much of existing buildings, open space and trees. However, there will also be a retention of key elements within the site, which include the gatelodge, a walled garden and some of the mature specimen trees. These physical changes will result in a marked change to the character of the site and the way in which it integrates with the surrounding urban fabric, particularly in comparison to its current insular use.

Townscape effects have been assessed for both construction and operational phases and due to the intensity and rapidly evolving nature of the former, construction stage effects are deemed to be Moderate and Negative. However, once operational, the proposed development represents a marked and comprehensive change to the scale and nature of development within the site and its perception within its receiving environment. The completely insular CMH site, which currently serves as something of a perceptual void in the townscape fabric of Dundrum, will be transformed into a modern, outwardly bold, high density residential precinct. In the wider urban context, there is a strong functional and thematic relationship between the proposed development and the nearby Dundrum Town Centre as both represent intensive contemporary design responses to the needs of a rapidly growing urban population.

The design of the development intends to strike a balance between the surrounding lower intensity residential neighbourhoods by terracing up in scale away from the site boundaries and retaining perimeter tree cover where possible. There are also direct open space connections to Rosemount Green to the south and the Dundrum Road to the northwest with sections of the imposing perimeter stone wall removed to facilitate this. The campus style of the development allows for physical and visual permeability thorough the site where tree planting can be retained and supplemented. Furthermore, the architectural design style varies between buildings giving an organic / evolved feeling that helps to integrate it more readily with the surrounding context. It is considered that these design objectives are successful in integrating this development within its townscape setting particularly in a relative sense against the existing baseline of a 'perceptual void'. Consequently, the operational phase townscape impact is deemed to be Moderate / Positive.

In terms of visual impacts, seventeen representative viewpoints were used for the assessment from a range of viewing distances, angles and receptor contexts around the site. Most of these were within 1km as the Digital surface Model (DSM) based ZTV map (Figure 13.9) indicated that visibility of the proposed development reduces rapidly with increased viewing distance due to intervening screening from surrounding built development and vegetation. The majority of viewpoint assessments were in the lower range of visual impact magnitude due to limited visibility of the taller / closer elements of the proposed development rising just above intervening vegetation and buildings. In such cases there is not a strong sense of visual/ contextual legibility and the quality of the effects is generally considered to be Negative. The highest negative impact judgement (Moderate) occurs in the small residential enclave of

Annaville Grove where there are views to both the north and east of Apartment Blocks 10 and 7 respectively rising above and between foreground roof tops. This generates a stronger sense of enclosure and intensity / scale of development, but without being overbearing or incongruous. Conversely, where the proposed development is more readily visible within its surrounding context (e.g. VP2, VP11, VP13 and VP14) and the design objectives are manifest (diverse campus style) the magnitude of impact is deemed to be in the higher range, but the quality of effect is deemed to be Neutral or Positive.

13.11 Overall Significance of Impact

Based on the assessment contained herein, the proposed development is considered to be appropriately designed to integrate a higher intensity and scale of residential development into the surrounding matrix of predominantly mid-low density residential housing estates. Where impacts are negative they tend to be in the mid to low range and of a localised nature, whereas effects tend to be more pronounced but positive where the design approach is more readily apparent. Overall, it is not considered that the proposed development will give rise to Significant Adverse townscape, visual or cumulative impacts.

13.12 Difficulties Encountered in Compiling this Chapter

There were no particular difficulties encountered in the undertaking of this Townscape and Visual impact assessment.

13.13 References

- Dun Laoghaire Rathdown County Development Plan 2016-2022, and Draft 2022-2028.
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013, Landscape Institute and Institute of Environmental Management and Assessment.
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2017, Environmental Protection Agency.
- Townscape Character Assessment, Technical Information Note 05/2017, Landscape Institute.
- Urban Design Manual – A Best Practice Guide, Department of Environment, Heritage and Local Government, 2009.
- Urban Development and Building Height Guidelines for Planning Authorities, December 2018, Department of Housing, Planning and Local Government.

14.0 CULTURAL HERITAGE AND ARCHAEOLOGY

14.1 Introduction

IAC Archaeology Ltd has prepared this chapter on behalf of the Land Development Agency to assess the impact, if any, on the archaeological and cultural heritage resource of a proposed development at the Central Mental Hospital, Dundrum Road, Dublin. The report was undertaken by Grace Corbett of IAC Ltd. Grace is a Senior Archaeological and Cultural Heritage Consultant with IAC Ltd. She holds an MA in Landscape Archaeology from the University of Sheffield and a BA in Archaeology and Classics from the University College Cork. She is also a member of the Institute of Archaeologists of Ireland and the Chartered Institute for Archaeologists and has over 17 years' experience working in the commercial archaeological sector, both in Ireland and the U.K. Grace has an in-depth understanding of the legislative and planning frameworks governing heritage in Ireland and specialises in the production and delivery of archaeological and built heritage desktop assessments, EIAR, master plans, and management plans across all sectors of development. Grace has worked on a number of EIARs and assessments across Dublin including Parnell Square Development, Vic Motors Site Goatstown Road, Taylor's Lane Ballyboden and Connolly Station Redevelopment.

14.2 Methodology

This study determines, as far as reasonably possible from existing records, the nature of the archaeological and cultural heritage resource in and within the vicinity of the proposed development using appropriate methods of study. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic, and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets (CIfA 2014). This leads to the following:

- Determining the presence of known archaeological assets that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Determining the impact upon the setting of known cultural heritage sites in the surrounding area;
- Suggested mitigation measures based upon the results of the above research.

An impact assessment and a mitigation strategy have been prepared. The impact assessment is undertaken to outline potential impacts that the proposed development may have on the cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset any adverse impacts.

Definitions

In order to assess, distil and present the findings of this study, the following definitions apply. 'Cultural Heritage' where used generically, is an over-arching term applied to describe any combination of archaeological, architectural and cultural heritage features, where –

- the term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places);
- the term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations.

Baseline Assessment Methodology

Research for this report was undertaken in four phases. The first phase comprised a paper survey of all available archaeological, historical and cartographic sources. The second phase involved a field inspection of the site. The third and fourth phases comprised a programme of geophysical survey, followed by targeted archaeological testing.

Paper Survey

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Dublin;
- National Monuments in State Care Database;
- Preservation Orders List;
- Topographical files of the National Museum of Ireland;
- Cartographic and documentary sources relating to the study area;
- Dun Laoghaire Rathdown County Development Plan 2016–2022;
- Draft Dun Laoghaire Rathdown County Development Plan 2022–2028;
- Aerial photographs;
- Excavations Bulletin (1970-2021)

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section of the Department of Housing, Local Government and Heritage, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on a website maintained by the Department of Housing, Local Government and Heritage (DoHLGH) – www.archaeology.ie.

National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the DoCHG may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

The Topographical files of the National Museum of Ireland are the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

- Down Survey Map, Barony of Rathdown, Parish of Donnybrook and Taney, 1655-6
- John Rocque's Exact survey of the city and suburbs of Dublin, 1756
- Ordnance Survey maps of County Dublin, 1837, 1872, 1911 and 1938

Documentary sources were consulted to gain background information on the archaeological, architectural and cultural heritage landscape of the proposed development area.

Development Plans contain a catalogue of all the Protected Structures and archaeological sites within the county. The Dun Laoghaire Rathdown County Development Plan (2016-2022), and draft plan (2022-2028) were consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed development area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey, Bing Maps, and Google Earth.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970-2021.

Geophysical Survey

Geophysical survey is used to create ‘maps’ of subsurface archaeological features. Features are the non-portable part of the archaeological record, whether standing structures or traces of human activities left in the soil. Geophysical instruments can detect buried features when their electrical or magnetic properties contrast measurably with their surroundings. In some cases, individual artefacts, especially metal, may be detected as well. Readings, which are taken in a systematic pattern, become a dataset that can be rendered as image maps. Survey results can be used to guide excavation and to give archaeologists insight into the pattern of non-excavated parts of the site. Unlike other archaeological methods, the geophysical survey is not invasive or destructive.

A geophysical survey was undertaken to inform this assessment in April 2021 within the proposed development area (Leigh 2021, Licence Ref.: 21R0015; Figure 14.4). A summary of the geophysical report is presented in Section 14.3.1 and the full text included in Appendix 14.1.

Archaeological Test Excavations

Archaeological Test Excavations can be defined as ‘a limited programme... of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land or underwater. If such archaeological remains are present test trenching defines their character and extent and relative quality’ (CIfA 2014a, 4). A program of archaeological testing was carried out within the proposed development area in October 2021. This was undertaken by Marc Piera of IAC Archaeology under licence 21E0610 (Piera 2021, Figure 14.5). Detailed results of the archaeological testing are included in Section 14.3.1 and the full report is reproduced in Appendix 14.2 of this chapter.

Please note that the architectural heritage assessment is included in Chapter 15 of this EIAR.

14.3 Baseline Environment

The proposed development area is located at the Central Mental Hospital campus, directly east of Dundrum Road, County Dublin. There are no recorded monuments located within the site, with the closest being the site of an ecclesiastical enclosure located c. 540m to the southwest (DU022-016001).

The proposed development area is surrounding by residential development on all sides, with a soccer pitch also located directly to the south. The site itself is occupied by a range of buildings associated with the Hospital at its northern end, with open green spaces at the east, west and south and a small formal garden towards the southeast (Figure 14.1).

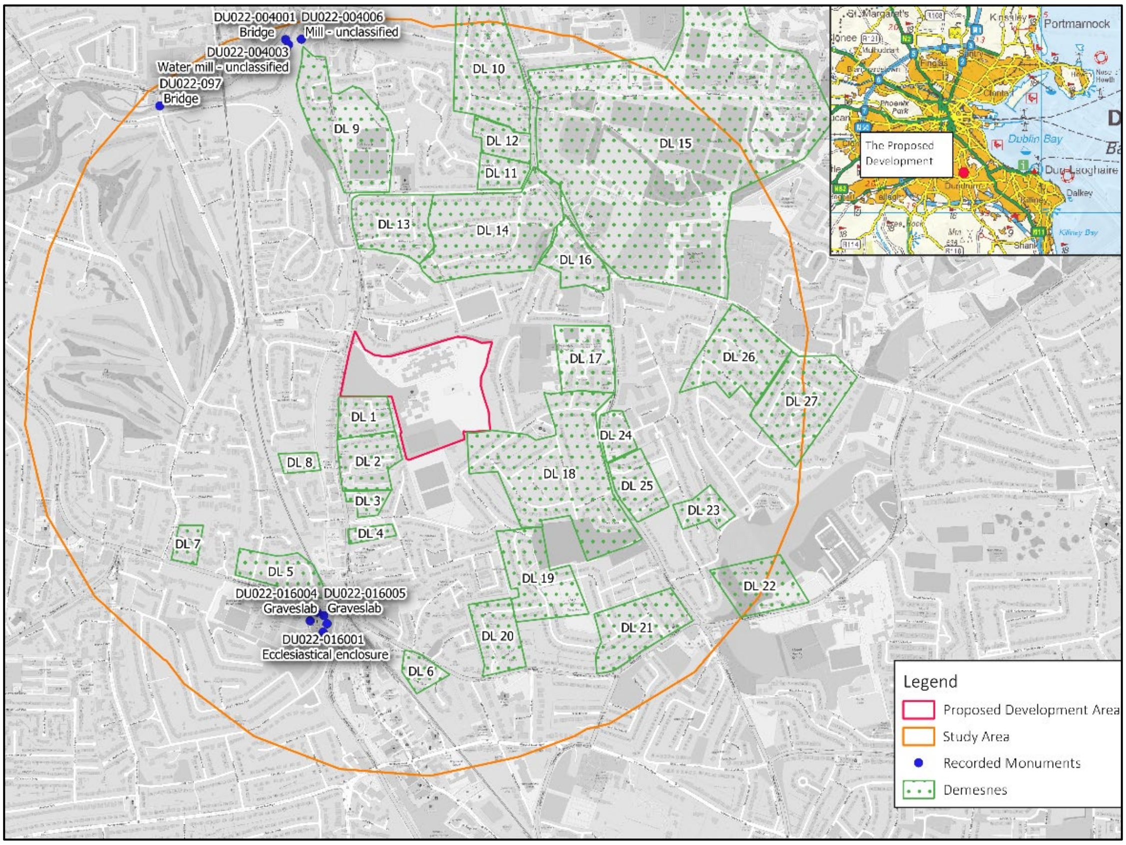

Figure 14.1: Archaeological and Cultural Heritage Sites within 1km of the Proposed Development.

Mesolithic Period (6000-4000 BC)

Although very recent discoveries may push back the date of human activity by a number of millennia (Dowd and Carden, 2016), the Mesolithic period is the earliest time for which there is clear evidence for prehistoric activity in Ireland. During this period people hunted, foraged and gathered food and appear to have had led a primarily, but not exclusively, mobile lifestyle. The presence of Mesolithic communities is most commonly evidenced by scatters of worked flint material, a by-product from the production of flint implements.

The current archaeological evidence suggests that the environs around Dublin were first inhabited towards the later part of this period. At this time people made crude flint tools known as Larnian (or Bann) Flakes. Small numbers of these flakes have been found along coastal areas of County Dublin such as Dun Laoghaire, Dalkey Island, and Loughlinstown and may indicate small-scale transient settlement along the riverbanks and seashores (Corlett, 1999). Several Larnian Flakes are recorded in the Topographical Files of the National Museum of Ireland from along the Dodder suggesting that the river, its tributaries and the surrounding landscape, including Milltown to the north of the proposed development area, may have been exploited for their natural resources during this time.

Neolithic Period (4000–2500 BC)

During the Neolithic period communities became less mobile and their economy appears to have become based on the rearing of stock and cereal cultivation. This transition was accompanied by major social change. Agriculture demanded an altering of the physical landscape, with forests rapidly cleared and field boundaries constructed.

There are no previously recorded Neolithic sites within the immediate vicinity of the area of proposed redevelopment, however a stone axehead of possible Neolithic date was found to the northeast of the site (NMI No. 1935:38). It is likely that this area was inhabited during the prehistoric period due to the proximity of the River Dodder to the north and the Slang Stream to the west.

Bronze Age (2500–800 BC)

The Bronze Age was marked by the widespread use of metal for the first time in Ireland. As with the transition from Mesolithic to Neolithic the transition into the early Bronze Age was accompanied by changes in society. The construction of megalithic tombs went into decline and the burial of the individual became typical. Cremated or inhumed bodies were often placed in a cist, which is a stone-lined grave, usually built of slabs set upright to form a box-like construction and capped by a large slab or several smaller lintels (Buckley & Sweetman, 1991). Barrows and pit burials are also funerary monuments associated with this period. There is no firmly dated evidence for Bronze Age activity within the immediate vicinity of the proposed redevelopment area.

Iron Age (800 BC–AD 500)

Until recently, the dearth of evidence representing the Irish Iron Age led to it being among the most enigmatic and least understood periods in Irish prehistory. However, large scale commercial excavations carried out over the past two decades have produced large quantities of new data relating to Iron Age settlement and industry across the country. This raw excavation data is still being analysed and a picture of life during the Iron Age is being assembled (Becker 2012, 1). There is no firmly dated evidence for Iron Age activity within the immediate vicinity of the proposed redevelopment.

Early Medieval Period (AD 500–1100)

An early name given to the whole of Dublin and Wicklow Mountains was *Cualu*. There is a tradition that the area was famous for its ale and was controlled by the *Dal Messin Corb*, a leading Leinster tribe. St. Kevin of Glendalough was a member of this tribe and also responsible for helping to spread Christianity during the 6th century. During the 8th century it was the *Ui Briuin* tribe that ruled much of southeast Dublin. They arrived from the north of Kildare, bringing with them the influence of the famous monastery in Kildare, which was devoted to St. Brigid c. AD 500.

This period was also characterised by the introduction of Christianity to Ireland. An early medieval ecclesiastical enclosure is recorded c. 540m southwest of the proposed redevelopment area (DU022-016001). The earlier church at this location was associated with St. Ossian and St. Lucan and an Early Christian grave slab (DU022-016005) was exposed within the graveyard (DU022-016003) of the present Church.

The Vikings arrived in Ireland in the 9th century and founded Dublin, their most important town, in AD 917. The development of Dublin as a major centre of trade and industry had implications on the lands to the south, which were known as *Dyflinarskiri* and extended as far as Greystones. Many Vikings settled in this area and by AD 980 most had converted to Christianity. Although there were attacks on the Vikings by the native Irish, it appears that the Scandinavians left a lasting impression within the Rathdown area, located to the immediate south of St. Vincent's Hospital. Many place names such as 'Windgates' and 'Coolnagad' preserve the Norse word gata, meaning 'street'.

Secular habitation sites in the early medieval period include crannógs, cashels, and ringforts in addition to unenclosed settlements which are more difficult to identify in the archaeological record. The ringfort or rath is considered to be the most common indicator of settlement during the early medieval period. Ringforts are strongly associated with agricultural land and, as such, are rarely situated at higher altitudes. It is therefore surprising that there is not greater evidence for settlement in the form of ringforts, within the Rathdown area; however, owing to the consistent use of this land up to the modern period it is likely that above surface expressions of these monuments have been long since removed.

Medieval Period (AD 1100–1600)

The beginning of the medieval period is characterised by political unrest that originated from the death of Brian Borumha in 1014. Diarmait MacMurchadha, deposed King of Leinster, sought the support of mercenaries from England, Wales and Flanders to assist him in his challenge for kingship. Norman involvement in Ireland began in 1169, when Richard de Clare and his followers landed in Wexford to support MacMurchadha. Two years later de Clare (Strongbow) inherited the Kingdom of Leinster and by the end of the 12th century the Normans had succeeded in conquering much of the country. The initial stage of the invasion of the country is marked by the construction of Motte and Bailey castles.

The earliest evidence of occupation in this area is Dundrum Castle which was constructed in the 13th century and possibly occupies the site of an earlier Dun or fort from which the place takes its name. After the landing of the Anglo-Normans in Ireland in 1169, inner and outer fortifications were established throughout Dublin. Dundrum Castle was part of this outer defence system and lead to the establishment of the suburb of Dundrum itself.

Following the Anglo-Norman conquest, the lands at Dundrum became the property of lay owners while those in other parts of Taney (currently Churchtown) became the property of the Church. The lands at Dundrum were assigned to the family of De Clahull, a family whose possessions extended to Kerry.

The lands at Dundrum were situated on the very extremity of the lands to the south of Dublin, afterwards enclosed within the pale and an earthwork that survives in the townland of Balally (which adjoins Dundrum to the southeast) may represent part of the Pale Boundary Earthwork. The area suffered frequently from attacks committed by enemies of the Irish Crown. Following the invasion of Edward Bruce at the beginning of the 14th century the lands around Dundrum were completely devastated.

The Fitzwilliam family subsequently assumed residency of the lands around the area and remained there until the latter half of the 17th century. The next major family to occupy the area were the Dobson family who undertook the restoration of Dundrum Castle during the 18th century and during this period many of the village activities centred on the castle itself.

Post-Medieval Period (AD 1600–1800)

The 18th century witnessed a more pacified Ireland and during this time industry was developed in the landscape. In the area of Milltown to the north of the site, the water power of the River Dodder was utilised and fed numerous millraces to operate a multitude of mills. Deeds from 1718 and 1724 mention an ancient mill trace and watercourse leading to an iron mill at Milltown and a brass mill at Bankside Cottages that shared its water supply with a paper mill. These mills are not marked on the first edition OS map of 1843 and this may represent the beginning of the economic decline of the region mentioned by Lewis, possibly caused by the 1738 famine. Mills were also present along the Slang Stream to the west of the proposed development area, which are recorded on Rocque's map of 1760 (Figure 14.2).

From the beginning of the 18th century onwards Dundrum gained a reputation as a health resort and it was noted for its numerous herds of goats which 'browsing among the mountain pastures, afford milk of very excellent quality' (Lewis 1837, 164). In 1852, the population of Dundrum had grown to 550, with its one street boasting 94 houses most of which were cottages. The opening of the Bray-Harcourt Street Railway line in Dundrum had a major economic influence on the village. Large villas were constructed on the properties around the area and Dundrum became a hub of business and social activity.

The Central Lunatic Asylum was established at the site in 1850 and was the first secure hospital in Europe. The building was designed by Jacob Owen (1778-1870) and Frederick Villiers Clarendon (1820-1904) of the Board of Public Works. It was established as a result of recommendations of a parliamentary committee set up in 1843 un the Lord Chancellor. While the hospital is still functioning today, it is intended to relocate residents to a new purpose-built facility in 2022.

Full detail on the history of the Central Lunatic Asylum is given in Chapter 15 of this EIAR. It is acknowledged that the original asylum structures and its associated designed landscape are on cultural heritage value, especially from a social history perspective. Specific assets include (as detailed in Table 15.3) the main hospital building, perimeter wall, gate lodge, chapel, airing yards (20th century), hay barn and pig yards, farmyard buildings, walled garden including two covered entrances and the historic landscape. Whilst the overall cultural heritage of the site is considered in this chapter, the architectural heritage of the site, and potential impacts on same, is detailed in Chapter 15 and not repeated here.

Summary of Previous Archaeological Fieldwork

A review of the Excavations Bulletin (1970–2021) has revealed that while no previous archaeological investigations have been carried out within the site boundary, seven have taken place within the wider study area.

Archaeological geophysical survey (Bolger and Harrison 2005, Licence Ref. 05R063) two phases of testing (Bolger and Harrison 2005, Licence Ref. 05E0847 and Lohan 2007, Licence Ref. 06E1153) and archaeological excavation (O'Donovan 2007, Licence Ref. 07E0116) at Notre Dame de Missions School, Dundrum 650m south southwest of the proposed development area revealed remains of a partially truncated ditch dating to the early medieval period and associated with the ecclesiastical enclosure to the east (DU022-016001). The remains of a second ditch were also identified which is thought to date to the 12th-15th centuries (O'Donovan 2007 p.2). Subsequent archaeological monitoring for a renewed planning application in this area in 2017 did not reveal anything of archaeological significance (Bennett 2017:144, Licence Ref. 17E0308).

Nothing of archaeological significance was identified during monitoring on Churchtown Road, c. 540m south of the proposed development area (Bennett 2015:151, Licence Ref. 15E0231) or on Dundrum Main Street, c. 750m south of the site (Sheehan and Halpin 2012, Licence Ref. 12E219).

Cartographic Analysis

Down Survey Map, Barony of Rathdown, Parish of Donnybrook and Taney, 1655-6
A castle is depicted in Dundrum, with a path leading form there to Milltown bridge to the north. The precise location of the proposed development area is not clear on this map.

John Rocque's Map of the City and County of Dublin, 1756 (Figure 14.2)
By the time of this map, it appears that the proposed development area is located across agricultural fields to the east of Dundrum Road and the Slang Stream. A paper mill is depicted along the Slang Stream, to the northwest of the site.

First Edition Ordnance Survey Map, 1837, scale 1:10,560 (Figure 14.2)
This is the first accurate historic mapping coverage of the area containing the proposed development area. The site is located across a number of agricultural fields to the east of Anna Villa and its associated demesne. There are no features of note located within the site boundary.

Figure 14.2: Extract from the John Rocque's map (1756) and first edition OS map (1837) showing the proposed development.

Ordnance Survey Map, 1872, scale 1:10,560 (Figure 14.3)

By the time of this map the Central Lunatic Asylum has been constructed at the northern end of the site, with associated formal gardens extending from the building southwards. The east and west sides of the site appear to be open ground.

Ordnance Survey Map, 1907, scale 1:2,500 (Figure 14.3)

By the time of this map there have been a number of additions to the Central Lunatic Asylum, including a Roman Catholic chapel to the west of the main building, extensions to the main building itself and the addition of a number of out buildings. A mortuary building is labelled at the northwest corner of the site, in the location of a smaller building recorded on the 1872 map. A new tree lined access road has been added which leads from Dundrum Road south eastwards towards the Asylum, while the formal gardens at the southern end of the site appear to have been removed.

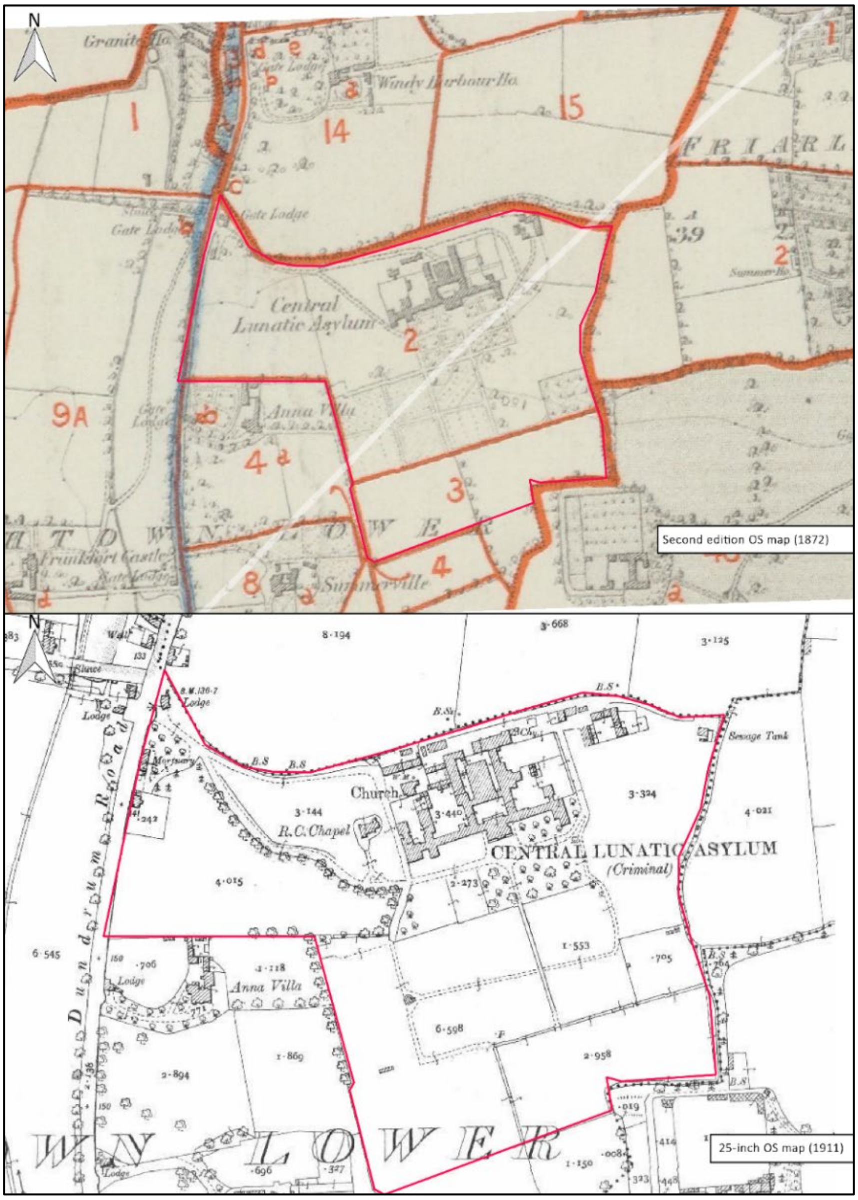

Figure 14.3: Extract from the second edition OS map (1872) and 25-inch OS map (1911) showing the proposed development.

County Development Plan

The Dun Laoghaire Rathdown Development Plan (2016-2022) and draft 2022-2028 plan, recognise the statutory protection afforded to all Record of Monuments and Places (RMP) sites under the National Monuments Legislation (1930–2014). The development plan lists a number of aims and objectives in relation to archaeological heritage.

There are 10 archaeological sites within a 1km radius of the proposed development. These are summarized in the table below.

Table 14.1: Archaeological Sites within 1km of Proposed Development.

RMP NO.	LOCATION	CLASSIFICATION	DISTANCE TO SCHEME
DU022-016001	Churchtown Road Upper	Ecclesiastical Enclosure	c. 540m southwest

DU022-016003	Churchtown Road Upper	Graveyard	c. 540m southwest
DU022-016005	Churchtown Road Upper	Graveslab	c. 570m southwest
DU022-016004	Churchtown Road Upper	Graveslab	c. 570m southwest
DU022-016002	Churchtown Road Upper	Church	c. 580m southwest
DU022-004006	Dundrum Road	Mill – unclassified	c. 920m north northwest
DU022-004003	Dundrum Road	Water mill – unclassified	c. 925m north northwest
DU022-097	Churchtown Road Lower	Bridge	c. 940m northwest
DU022-004002	Dundrum Road	Water mill – unclassified	c. 940m north northwest
DU022-004001	Dundrum Road	Bridge	c. 950m north northwest

Aerial Photographic Analysis

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995-2013), Google Earth (2005-2021) and Bing Maps (2020) revealed that the present structures on site have remained unchanged since at least 1995. The greenfield areas of the site contain a number of small garden areas, nature trees and larger open green spaces.

Satellite imagery from 2018 shows a circular enclosure feature with a diameter of 25m in the northwest corner of the site (Plate 14.1). The slightly earlier coverage from 2016 shows the same feature accompanied by at least seven other circular features that vary in diameter from 5-20m. A sub-rectangular feature is also depicted to the northeast of the larger possible enclosure (Plate 14.2), which was also identified during the geophysical survey. It was deemed initially that the circular features may be of archaeological potential, but following the results of the geophysical survey and archaeological testing it is likely that the anomalies were caused by decaying fungal colonies that leave circular growth patterns within areas of pasture or lawn.

Plate 14.1: 2018 Google Satellite image, showing circular features.

Plate 14.2: 2016 Google Satellite image, showing circular features.

Geophysical Survey

An archaeological geophysical survey was carried out across the proposed development area in April 2021 (Leigh 2021; Licence No. 21R0015; Figure 14.4; Appendix 14.1). The survey successfully identified traces of a possible rectilinear enclosure measuring c. 12m x 9m, which was also identified in satellite imagery. An area of possible rubble material, which may represent a former building was also identified during the survey. Linear features that correspond to field boundaries shown on historic mapping, as well as an additional field boundary not shown on historic mapping, were also noted within the proposed development area.

Figure 14.4: Results of geophysical survey (Leigh 2021).

Archaeological Test Excavations

Archaeological test excavations were carried out at the site in October 2021 under licence no. 21E0610 (Piera 2021; Figure 14.5; Appendix 14.2). The trenches targeted geophysical anomalies and open green space to fully investigate the archaeological potential of the site. A total of 21 trenches (T1-5 and T23-38) were excavated. A further 17 trenches (T6-22), which were proposed, were located in areas of current use for the Central Mental Hospital patients and were not excavated.

Testing revealed five areas of archaeological significance, which have been designated as Archaeological Areas AA1-AA5. These comprise two small enclosures dating to the post-medieval era (AA1-2), a kiln (AA3), an isolated pit (AA4) and a cluster of hearths with postholes (AA5).

Table 14.2: Results of archaeological test excavations (Piera 2021).

Archaeological Area	Description
AA1	Two shallow linear features were identified in this area. Small sherds of brown glazed pottery and red fabric pottery were observed from the fills, suggesting a post-medieval date. The identified features broadly correspond to the location of a curvilinear geophysical anomaly which was targeted in this area. The plan of the geophysical anomaly indicates a penannular feature circa 4.5-5m in diameter. This feature may represent a small post-medieval penannular enclosure of unknown function.
AA2	Two linear features were identified in this area. Sherds of pottery were observed within the fills of the features suggesting a post-medieval date. Staffordshire slipware sherds (late 17th or early 18th century in date) and a tin glazed earthenware sherd pottery (18th Century) were identified. The features broadly correspond to the location of the rectangular geophysical anomaly which was targeted in this area. It may represent a post-medieval rectangular enclosure/building footing.
AA3	An isolated kiln was identified in this area. Remnants of scorched burnt clay was observed on the edges and base of the feature and substantial quantity of charcoal was evident in the fill.
AA4	An isolated pit was identified in this area. It was filled by dark silty clay with shattered orangish red burnt stones and substantial among of charcoal. This fill consisted of material usually associated to Fulacht fiadh/Burnt mound site activity. This type of site usually comprises large spreads or low mound of pyrotechnic refuse material with a trough and pits around. While no associated mound was identified during test excavations there is a possibility of further Burnt Mound/Fulacht fiadh remains in the vicinity of the pit.
AA5	A cluster of small possible postholes and an area if in situ burning, possibly a hearth, were identified in this area. These features produced evidence of scorched burnt clay and charcoal and may indicate a localised area of burning activity.

Figure 14.5: Location and results of archaeological test excavations 2021 (Piera 2021).

Topographical Files

Information on artefact finds from the study area in County Dublin has been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area.

One stray find is recorded from the vicinity of the proposed development area, which relates to the discovery of the stone axehead (NMI 1935:38), c. 225m north of the proposed development area.

Demesne Landscapes

The settled political climate of the 18th century saw a dramatic rise in the establishment of large residential houses around the country. This was largely due to the fact that after the turbulence of the preceding centuries, the success of the Protestant cause and effective removal of any political opposition, the country was at peace. The large country house was only a small part of the overall estate of a large landowner and provided a base to manage often large areas of land that could be dispersed nationally. During the latter part of the 18th century, the establishment of a parkland context (or demesnes) for large houses was the fashion. Although the creation of a parkland landscape involved working with nature, rather than against it, considerable construction effort went into their creation. Major topographical features like rivers and mountains were desirable features for inclusion into, and as a setting, for the large house and parkland. Multiple demesne landscapes and large houses were established throughout County Dublin during this period, due to the proximity of the city.

A large number of demesnes landscape are recorded on the first edition OS map of 1843 (Figure 14.2); however, the majority are now occupied by modern residential developments. All demesnes within 1km of the proposed development area are shown on Figure 14.1 and listed in the Table 14.3 below.

Table 14.3: Demesne landscapes within 1km of the proposed development.

Demesne No.	**Name**	**NIAH Survey No.**	**Description**
DL 1	Anna Villa	N/A	Site completely covered by residential development
DL 2	Summerville	N/A	Site completely covered by residential development
DL 3	Larchfield	N/A	Site completely covered by residential development
DL 4	Annmount	N/A	Site completely covered by residential development
DL 5	Churchtown Cottage	N/A	Site completely covered by residential development
DL 6	Anna Field	N/A	Site completely covered by residential development
DL 7	Lyndhurst	N/A	Site completely covered by residential development
DL 8	Frankford Lodge	N/A	Elements of small demesne remain visible.
DL 9	Casino	2396	Northern area of parkland covered by residential buildings, complex of institutional buildings built around the site of the principal building. Playing fields occupy southern half of demesne.
DL 10	Springfield	N/A	Site completely covered by residential development
DL 11	Oak Lawn	N/A	Site completely covered by residential development
DL 12	Roebuck	N/A	Site completely covered by residential development
DL 13	Farranboley Cottage	N/A	Site completely covered by residential development
DL 14	Bloomville	2401	Site completely covered by residential development.
DL 15	Roebuck and Rosemount	5675	A number of modern buildings have been constructed on this site; however, the majority of the demesne is occupied by greenfield areas used as playing pitches at the north. Some small areas of woodland survive around Roebuck Grove
DL 16	Friarland	N/A	Site completely covered by residential development

Demesne No.	Name	NIAH Survey No.	Description
DL 17	Roebuck Grove	N/A	Site completely covered by residential and commercial development
DL 18	Roebuck Park	2404	Site completely covered by residential development
DL 19	Roebuck Lodge	N/A	Site completely covered by residential development
DL 20	Tany Hill	2403	Site completely covered by residential development.
DL 21	Farmhill	N/A	Site completely covered by residential development
DL 22	Morganville Lodge	N/A	No evidence for demesne survives
DL 23	Castleview	N/A	Site completely covered by residential development
DL 24	Rosemont	N/A	Site completely covered by residential development
DL 25	Prospect	N/A	Site completely covered by residential development
DL 26	Moorfield	2424	Site completely covered by residential development.
DL 27	Roebuck Hall	2437	Site completely covered by residential development

The proposed development area itself is formed by a 'designed landscape', established at the same time as the asylum (as was the fashion), with key features such as a recessed entrance, gate lodge, tree-lined drive, ornamental planting, footpaths and a stone perimeter wall (albeit taller than most enclosing demesne walls usually established as part of a large county house). The design of the landscape was an important part of the asylum and its function, as detailed in Chapter 15.

Townlands

The townland is an Irish land unit of considerable longevity as many of the units are likely to represent much earlier land divisions. However, the term townland was not used to denote a unit of land until the Civil Survey of 1654. It bears no relation to the modern word 'town' but like the Irish word 'baile' refers to a place. It is possible that the word is derived from the Old English *tun land* and meant 'the land forming an estate or manor' (Culleton 1999, 174).

Gaelic land ownership required a clear definition of the territories held by each sept and a need for strong, permanent fences around their territories. It is possible that boundaries following ridge tops, streams or bog are more likely to be older in date than those composed of straight lines (ibid. 179). The vast majority of townlands are referred to in the 17th century, when land documentation records begin. Many of the townlands are mapped within the Down Survey of the 1650s, so called as all measurements were carefully 'laid downe' on paper at a scale of forty perches to one inch. Therefore, most are in the context of pre-17th century landscape organisation (McErlean 1983, 315).

In the 19th century, some demesnes, deer parks or large farms were given townland status during the Ordnance Survey and some imprecise townland boundaries in areas such as bogs or lakes, were given more precise definition (ibid.). Larger tracks of land were divided into several townlands, and named Upper, Middle or Lower, as well as Beg and More (small and large) and north, east, south, and west (Culleton 1999, 179). By the time the first Ordnance Survey had been completed a total of 62,000 townlands were recorded in Ireland.

The proposed development area is located within the townland of Churchtown Lower, County Dublin. The townland boundary between the townlands of Churchtown Lower and Farranboley forms the northern boundary of the proposed development area.

Placename Analysis

Townland and topographic names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on history; archaeological monuments and folklore of an area. A place name may refer to a long-forgotten site and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830's and 1840's, when the entire country was mapped for the first time. Some of the townland names in the study area are of Irish origin and through time have been anglicised. The main references used for the place name analysis is Irish Local Names Explained by P.W Joyce (1870) and www.logainm.ie.

The name Churchtown relates to the church (DU022-016002) located at the southern end of the study area. The present St. Nahi's Church of Ireland church (1760) in this location occupies the site of an earlier church and ecclesiastical enclosure. Farranaboley, immediately to the north of the proposed development area derives from the Irish '*Fearann na Buaile'*, meaning 'land of the cattle fold or summer pasture'.

14.4 Potential Impacts of the Proposed Project

The archaeological and cultural heritage resource within the study area has been assessed in terms of its sensitivity, the type of potential impact, magnitude of same and the potential significance of the effect/impact.

The quality and type of an impact can be classed as one of the following (as per the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2017)):

- **Negative Impact:** A change which reduces the quality of the environment, for example a change that will detract from or permanently remove an archaeological/architectural monument/structure from the landscape;

- **Neutral Impact:** A change which does not affect the quality of the environment; or

- **Positive Impact:** A change which improves the quality of the environment, for example a change that improves or enhances the setting of an archaeological/architectural monument/structure.

The below terms are used in relation to the archaeological and cultural heritage and relate to whether a site will be physically impacted upon or not:

- **Direct Impact:** Where an archaeological/cultural heritage feature or site is physically located within the footprint of the proposed development and entails the removal of part, or all, of the monument or feature; and
- **Indirect Impact:** Where a feature or site of archaeological or cultural heritage merit or its setting is located in close proximity to the footprint of a development.

Significance of Effects

(as defined by the EPA (draft) 2017 Guidelines):

1. **Imperceptible:** An effect capable of measurement but without noticeable consequences.
2. **Not significant:** An effect which causes noticeable changes in the character of the environment but without noticeable consequences
3. **Slight Effects:** An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
4. **Moderate Effects:** An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.
5. **Significant Effects:** An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
6. **Very Significant:** An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
7. **Profound Effects:** An effect which obliterates sensitive characteristics.

14.4.1 Construction Phase

There will be a direct negative profound impact on the identified archaeological features in AA1-AA5. This will be caused by ground disturbances associated with the proposed development, which will truncate or remove the identified archaeological remains.

There may be a direct negative impact on previously unrecorded archaeological features or deposits that have the potential to survive beneath the current ground level and outside the footprint of the excavated test trenches. Impacts may range from moderate to profound negative dependant on the nature, extent and significance of any such identified remains. This will be caused by ground disturbances associated with the proposed development.

The Central Mental Asylum, as a complex of historic structures of social history significance (with some modern additions/alterations) within a designed landscape, will be affected by the construction of the proposed development due to alterations to some of the existing structures and construction within what was a private designed setting. The impact on the existing campus, from a cultural heritage perspective is considered to be direct, negative and significant.

14.4.2 Operational Phase

There are no predicted impacts to any archaeological assets during the operation of the proposed development. This is due to the fact that any recorded monuments within the study area are located over 500m from the proposed development and will not visually be affected by the operation of the development. In addition, the operation of the development will not affect any of the surrounding former demesne landscapes due to the fact that they have been fully developed and have lost their designed landscape character.

The operation of the proposed development will have a direct impact on the campus of the Central Mental Asylum, given its change of use, the additional of modern development and change from a private complex, to one that is publicly accessible. Given that the architectural heritage of the site will be accessible to the public, this does mitigate the impact, which is considered to be moderately negative.

14.5 Mitigation Measures

14.5.1 Construction Phase

CH_1: The archaeological features identified in AA1-AA5 will be preserved by record through full archaeological excavation. The work should be carried out under licence to the National Monuments Service of the DoHLGH.

CH_2: All topsoil stripping associated with the proposed development will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DHLGH.

14.5.2 Operational Phase

Detailed mitigation is provided in Chapter 15 in relation to the architectural heritage resource and historic landscape and is not repeated here. Aspects of the landscape have been retained as part of the proposed development, including the hospital buildings, access drive and gate lodge, walled gardens, farm outbuildings, chapel and the perimeter wall.

14.6 Residual Impacts

Following the implementation of the above mitigation measures, there would be no residual impacts on the archaeological resource as the remains will be fully preserved by record.

Following the implementation of the mitigation measures laid out in Chapter 15, in relation to the architectural heritage resource, there would be a remaining moderate negative residual impact on the cultural heritage of the original asylum complex. This is offset by the fact that the site and its heritage, at operation, will be publicly accessible.

14.7 Monitoring

The mitigation measures recommended above would also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the recommended mitigation measures.

14.9 Interactions

Chapter 15 Architectural Heritage represents the key interaction. This chapter has been fully reviewed and cross referenced in this assessment, where relevant.

14.10 Cumulative Impacts

The following developments, both proposed and those granted permission, in the surrounding area have been considered in the assessment of cumulative impacts:

Table 14.4: Cumulative impact assessment.

Reg. Ref.	Name
D16A/0818	Greenacres, Kilmacud Road Upper, Dublin 14
ABP31013821	Mount St Mary's and Saint Joseph's, Dundrum Road, Dundrum
D19A/0162	Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14
ABP30835320	Vector Motors, Goatstown Road, Dublin 14
D20A/0328	University College Dublin, Belfield, Dublin 4
ABP30943021	Our Lady's Grove, Goatstown Road, Dublin 14
ABP31128721	No. 97A Highfield Park ad No. 1 Frankfort Castle and Frankfort Lodge, Old Frankfort, Dublin 14
ABP31182621	Lands at Knockrabo, Mount Anville Road, Goatstown, Dublin 14
ABP31293522	Sommerville House, Dundrum Road, Dublin 14.
TC06D.311553	Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum
CMH Future S34	Lands at Central Mental Hospital

There are no predicted cumulative impacts to the archaeological or cultural heritage resource. Should any archaeological remains be identified on the site, they will be preserved by record, mitigating any negative impacts and adding to the understanding of the historical development of this area. Where proposed and granted developments in the surrounding area have the potential to impact on archaeological remains, mitigation measures have also been proposed to preserve by record any identified archaeological remains.

14.11 'Do-Nothing' Effect

If the development were not to proceed, there would be no impact upon the archaeological or cultural heritage resource.

14.12 Difficulties Encountered in Compiling the Chapter

14.12.1 Archaeological and Cultural Heritage

No difficulties were encountered during the compilation of this chapter with the exception that access for archaeological testing was limited due to ongoing patient use.

14.13 Overall Conclusions

There are no recorded monuments located within 500m of the proposed development area. As part of this assessment, a programme of geophysical survey and archaeological testing was carried out in order to assess the impacts on the archaeological resource. This work identified five areas of archaeological potential, including post medieval remains, a kiln and clusters of possible pits or postholes. Prior to mitigation, the development of the site would result in a direct negative profound impact on these remains, due to their proposed removal. As such, all the areas of archaeological potential will be preserved by record (archaeological excavation) prior to development going ahead. Furthermore, it is possible that ground disturbances associated with the development may result in a direct negative impact on archaeological features that have the potential to survive within site without surface expression and outside of the footprint of the excavated trenches. In order to mitigate this impact all topsoil stripping will be monitored by a suitably qualified archaeologist. Further mitigation may be required (subject to agreement with the National Monuments Service of the DoHLGH) dependant on whether any additional archaeological remains are discovered.

The cultural heritage significance of the overall original asylum complex and its built heritage and designed landscape is acknowledged in this assessment, which includes its significant social history. The development will result in direct impacts at construction and operation stages, which are detailed in full in Chapter 15 of this assessment. There will be a moderate negative residual impact upon the cultural heritage of the complex following the completion of all mitigation measures laid out in Chapter 15. This impact is considered to be offset by the fact the architectural heritage and designed landscape elements will become publicly accessible, which is a positive effect of the development going ahead.

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<u>Cartographic</u>
Down Survey Map, Barony of Rathdown, Parish of Donnybrook and Taney, 1655-6

John Rocque's Exact survey of the city and suburbs of Dublin, 1760

Ordnance Survey maps of County Dublin, 1837, 1872, 1911 and 1938

<u>Electronic Sources</u>
www.excavations.ie – Summary of archaeological excavation from 1970-2021.

www.archaeology.ie – DoHLGH website listing all SMR/RMP sites.

www.osiemaps.ie – Ordnance Survey aerial photographs dating to 1995-2013 and 6-inch/25-inch OS maps.

www.heritagemaps.ie – The Heritage Council web-based spatial data viewer which focuses on the built, cultural and natural heritage.

www.googleearth.com – Satellite imagery of the proposed development area.

www.bingmaps.com - Satellite imagery of the proposed development area.

APPENDIX 14.1 – GEOPHYSICAL SURVEY

APPENDIX 14.2 – ARCHAEOLOGICAL ASSESSMENT REPORT

See Volume 2 – Appendices

15.0 ARCHITECTURAL HERITAGE

15.1 Introduction

15.1.1 Terms of Reference

Alastair Coey Architects have been commissioned by Reddy Architecture & Urbanism ('The Architects'), acting on behalf of the Land Development Agency ('The Applicant'), to provide heritage-focused advice on the development of the Central Mental Hospital in Dundrum, Dublin ('The Site'). During the design process Alastair Coey Architects has assisted the Applicant's wider design team by providing assessment of the developing masterplan, advising on the limitations inherent in working with heritage assets in an extensive and historic demesne, and drawing attention to the potential impacts of the Development on the heritage structures and landscape.

15.1.2 Scope and Extent

Alastair Coey Architects have been asked to prepare this heritage focused chapter of the Environmental Impact Assessment in support of the Strategic Housing Development ('The Development') of the Dundrum CMH Site.

In this chapter, Alastair Coey Architects have set out a summary of the known history of the Site and assessed the effects of the Development. This includes the assessment of: the contribution of the Site to the immediately surrounding area; the nature and character of buildings and landscapes within the Site; Protected Structures within the site and in the wider area; the effect of the development on the Site and wider area. Requirements of local, regional and national planning policy beyond those contained in the Department of the Arts, Heritage and the Gaeltacht 'Architectural Heritage Protection Guidelines for Planning Authorities' (2011), are addressed in other chapters of this EIAR.

This chapter has been prepared by Erl Johnston, a RIBA chartered architect with over eight years' experience of working on Protected Structures in Ireland and Listed Buildings in the UK; and by Alastair Coey, a RIAI Grade 1 conservation architect with over thirty years' experience of working on Protected Structures in Ireland and Listed Buildings in the UK. Alastair holds a Master's Degree in Urban and Building Conservation from University College Dublin.

15.1.3 The Site

The site is bounded to the north by the Main Hospital complex and areas of residential housing; to the east by areas of residential housing; to the south by Rosemount Green playing fields and areas of residential housing, and to the west by areas of residential housing and the Dundrum Road (R117).

The site encloses an area of approximately 9.6 hectares within a perimeter of approximately 1800m. Please refer to architect's schedules for detailed area schedules.

Notable heritage features inside and outside the site, as referenced in figure 15.1 below, include:

1. The Perimeter Wall
2. The Main Hospital complex including ancillary buildings
3. The Gate Lodge
4. Open paddocks
5. Historic Landscape
6. Walled Garden

Figure 15.1: Outline of the Site (in red) is illustrative only. Please refer to the Architect's drawings.

15.2 Methodology

15.2.1 Introduction

This section describes the methodology used by Alastair Coey Architects to assess the likely effects of the Development on the heritage value of the Site and its surroundings. Environmental Impact Assessment guidance as listed below have been used to guide the assessment process.

- Guidelines on the Information to be Contained in the Environmental Impact Assessment Reports, prepared by EPA Draft, August 2017.

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Commission, 2017)

15.2.2 Establishing the Baseline Condition

In order to establish an understanding of the baseline physical and cultural conditions of the Site as existing, a range of activities have been undertaken by Alastair Coey Architects. These have included:

a. desktop-based research;

b. archival research at the Irish Architectural Archive and the National Archives;

c. walkover surveys of the open grounds within the site carried out on 19th June 2020, 30th November 2020, 12th-14th April 2021 and 28th July 2021;

d. surveys of the surrounding residential areas carried out on the 19th June 2020 and 14th April 2021; and

e. limited surveys of the occupied Central Mental Hospital buildings carried out on the 19th June 2020 and 24th August 2021.

These activities have informed:

i. An understanding of the basic characteristics of the site; topography, landscape, principal structures, landscape features, access, surrounding context, views into and out of the Site.

ii. An understanding of the historical development of the site, the impetus for its creation and its relationship in design and detail to preceding and contemporary institutions in Ireland and the British Isles.

iii. An understanding of the location, significance and sensitivity to change of the Protected Structures and other buildings within and without the Site.

iv. An understanding of the interdependency between the Central Mental Hospital buildings and the historic landscape within the Site.

These elements of understanding the Site, individually and collectively, allow Alastair Coey Architects to make an informed assessment of the heritage factors which are impacted by the Development, the specific effects of the Development on those heritage factors, possible alternatives, and mitigation/compensation measures which may be put in place.

15.2.3 Identifying the Heritage Assets to be Assessed

Heritage assets are physical places that have Evidential, Historical, Aesthetic or Communal value, and which will be subject to change as a result of the Development. With reference to the Historic England publication 'Conservation Principles, Policies and Guidance':

> **EVIDENTIAL VALUE** derives from the potential of a place to yield evidence about past human activity. Physical remains of past human activity are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them. These remains are part of a record of the past that begins with traces of early humans and continues to be created and destroyed. Their evidential value is proportionate to their potential to contribute to people's understanding of the past.
>
> **HISTORICAL VALUE** derives from the ways in which past people, events and aspects of life can be connected through a place to the present. It tends to be illustrative or associative. The idea of illustrating aspects of history or prehistory – the perception of a place as a link between past and present people – is different from purely evidential value. Illustration depends on visibility in a way that evidential value (for example, of buried remains) does not. Places with illustrative value will normally also have evidential value, but it may be of a different order of importance. An historic building that is one of many similar examples may provide little unique evidence about the past, although each illustrates the intentions of its creators equally well. However, their distribution, like that of planned landscapes, may be of considerable evidential value, as well as demonstrating, for instance, the distinctiveness of regions and aspects of their social organisation.
>
> Illustrative value has the power to aid interpretation of the past through making connections with, and providing insights into, past communities and their activities through shared experience of a place. The illustrative value of places tends to be greater if they incorporate the first, or only surviving, example of an innovation of consequence, whether related to design, technology or social organisation. The concept is similarly applicable to the natural heritage values of a place, for example geological strata visible in an exposure, the survival of veteran trees, or the observable interdependence of species in a particular habitat. Illustrative value is often described in relation to the subject illustrated, for example, a structural system or a machine might be said to have 'technological value'.
>
> The historical value of places depends upon both sound identification and direct experience of fabric or landscape that has survived from the past, but is not as easily diminished by change or partial replacement as evidential value. The authenticity of a place indeed often lies in visible evidence of change as a result of people responding to changing circumstances. Historical values are harmed only to the extent that adaptation has obliterated or concealed them, although completeness does tend to strengthen illustrative value
>
> **AESTHETIC VALUE** derives from the ways in which people draw sensory and intellectual stimulation from a place. Aesthetic values can be the result of the conscious design of a place, including artistic endeavour. Equally, they can be the seemingly fortuitous outcome of the way in which a place has evolved and been used over time. Many places combine these two aspects – for example, where the qualities of an already attractive

landscape have been reinforced by artifice – while others may inspire awe or fear. Aesthetic values tend to be specific to a time and cultural context, but appreciation of them is not culturally exclusive.

Design value relates primarily to the aesthetic qualities generated by the conscious design of a building, structure or landscape as a whole. It embraces composition (form, proportions, massing, silhouette, views and vistas, circulation) and usually materials or planting, decoration or detailing, and craftsmanship. It may extend to an intellectual programme governing the design (for example, a building as an expression of the Holy Trinity), and the choice or influence of sources from which it was derived. It may be attributed to a known patron, architect, designer, gardener or craftsman (and so have associational value), or be a mature product of a vernacular tradition of building or land management. Strong indicators of importance are quality of design and execution, and innovation, particularly if influential.

COMMUNAL VALUE derives from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical (particularly associative) and aesthetic values, but tend to have additional and specific aspects.

The social values of places are not always clearly recognised by those who share them, and may only be articulated when the future of a place is threatened. They may relate to an activity that is associated with the place, rather than with its physical fabric. The social value of a place may indeed have no direct relationship to any formal historical or aesthetic values that may have been ascribed to it.

Social value is associated with places that people perceive as a source of identity, distinctiveness, social interaction and coherence. Some may be comparatively modest, acquiring communal significance through the passage of time as a result of a collective memory of stories linked to them. They tend to gain value through the resonance of past events in the present, providing reference points for a community's identity or sense of itself. They may have fulfilled a community function that has generated a deeper attachment, or shaped some aspect of community behaviour or attitudes.

EIA guidance recognises "material assets, cultural heritage and the landscape" as an environmental resource and the assessment therefore encompasses all of these whether they are designated as Protected Structures or otherwise. Where prior designations of value exist (e.g. the Register of Protected Structures, the National Inventory of Architectural Heritage) these are given cognisance in the assessment. Where such designations do not currently exist, value judgements have been determined by new survey work and analysis.

15.2.4 Establishing Sensitivity to Change

Understanding the sensitivity of any Heritage Asset to changes introduced directly or indirectly by the Development is an important part of the assessment process. The determination of sensitivity is not a wholly empirical process, and relies to a degree on the professional judgement of the assessors. Alastair Coey Architects is a RIAI Grade 1 accredited conservation practice and have the necessary experience to make a balanced and informed judgement.

Statutory and non-statutory guidelines also play a significant role in determining the sensitivity to change. Assessing the heritage asset includes the following:

i. Is the asset listed in the Record of Protected Structures?

ii. Is the asset listed in the Record of Monuments and Places?

iii. Does the asset sit wholly or partly in an Architectural Conservation Area?

iv. Is the asset listed in the National Inventory of Architectural Heritage?

v. Do the DHLGH 'Architectural Heritage Protection Guidelines for Planning Authorities' (2011) provide specific guidance (e.g. on the curtilage of a Protected Structure)

vi. Does the National Monuments Act provide specific and relevant guidance?

It is also recognised that different groups (e.g. local residents) will have differing views on changes introduced by the Development, and differing perceptions of what might constitute significantly positive or negative changes. These different viewpoints must also be given due consideration in making a balanced assessment of sensitivity to change.

15.2.5 Establishing the Degree of Change

The degree to which a Heritage Asset is changed by the Development is a compound measure based on:

- The physical extent of the modifications to the Heritage Asset. How much of it is altered, removed or obscured? Is it being extended – to what extent?

- Do the changes reverse modifications that were made to the Heritage Asset at a date later than its original construction, and which in themselves are detracting features? Examples of this might include the reinstatement of lost features such as chimneystacks, replacement of uPVC or aluminium windows with period-appropriate timber or cast-iron windows.

- Changes to the setting and context of the Heritage Asset. What proximal changes are being introduced and how significantly do they change the context and setting? This includes views towards and from the Heritage Receptor.

- The reversibility of the changes. Can the changes introduced be reversed at a later date, with what level of difficulty and with what degree of success? Are the changes wholly irreversible?

For the purposes of comparative assessment, the degree of change can be classified as 'low', 'medium' or 'high'. The presumed status of the change as being positive or negative is not a factor at this stage.

15.2.6 Establishing the Degree of Change

The assessment of sensitivity to change and the degree of change allows a determination of how significant the effects of the Development will be on a Heritage Receptor. It is taken as-read that the mitigation measures identified are in place.

For the purposes of comparative assessment, the effects on a Heritage Receptor are classified shown in Table 1 below.

Table 15.1: Assessing the Effect of Development.

EFFECT OF DEVELOPMENT	Sensitivity to Change		
Degree of Change	**High**	**Medium**	**Low**
High	Profound	V. Significant	Moderate
Medium	V. Significant	Significant	Slight
Low	Moderate	Slight	Insignificant

The process of determining the effect of the Development is not wholly empirical, and relies on the assessor's expert judgement of each circumstance. For that reason the grading of an effect may be higher or lower than the sensitivity of the receptor and/or the magnitude of the change might otherwise suggest.

When it is considered that effects may be negative, neutral or positive, a comparative hierarchy can be established as shown in table 2. However, it is important to recognise that each effect must be judged individually on its merits and that a ''trade-off' of beneficial and negative effects should not be a consideration. It must also be considered that the cumulative nature of the effects might in itself lead to a re-evaluation of each component (e.g. removing structure A or structure B might individually be assessed as having a moderately neutral effect, but in conjunction the removal of both structure A and structure B might be assessed as having a major negative effect).

Table 15.2: Hierarchy of the effects of development.

EFFECT
A profound or significant benefit is achieved
A moderate benefit is achieved
A minor benefit is achieved
There is no effect

There is a minor effect but it is neither positive nor negative
There is a moderate effect but it is neither positive nor negative
There is a profound or significant effect but it is neither positive nor negative
A minor negative effect is experienced
A moderate negative effect is experienced
A profoundly or significantly negative effect is experienced

15.2.7 Mitigation & Residual Effects

The design of the Development has been undertaken with due consideration on how the impacts to Heritage assets can be minimised. Opinions have been obtained from the Conservation Officer in DLRCC and from ABP to guide and inform measures that can be taken to mitigate or eliminate adverse effects before the design has been finalised. Mitigation measures are therefore 'designed-in' to the process.

Mitigation measures are defined for each adverse effect and the residual effect, once those measures have been effected, is assessed.

15.2.8 Probability and Frequency of Effects

In Heritage terms the source of change within the Development overwhelmingly arises from changes to built structures and designed landscapes. For the purposes of assessment the identified effects, inclusive of mitigation measures, are considered to be certain to occur. For the same reason, frequency of the effects is not a consideration as it may be, for example, for air quality. The effects are considered to be permanent.

15.3 Baseline Environment

15.3.1 Introduction

This history of the Site is drawn from the Historic Landscape Analysis prepared for Alastair Coey Architects by Dr. Sarah Rutherford.

Dr Rutherford, Dip. Hort. Kew, M.A., Ph.D., is a professional historic environment consultant specializing in designed landscapes based in England and with international experience. Her MA in landscape conservation (York University) is supplemented by a Ph.D. based on pioneering research into the landscapes of Victorian and Edwardian lunatic asylums (de Montfort University, 2003). Dr Rutherford has previously carried out Historic Landscape Analysis for or the West London Mental Health Trust on Broadmoor Hospital Berkshire, the first English State Criminal Lunatic Asylum, opened in 1863, following the pioneering example of Dundrum. She is the author of books on designed landscapes and relevant subjects including 'The Victorian Asylum'.

15.3.2 Setting the Scene for the Erection of the Asylum

In 1817 a Select Committee on the Lunatic Poor in Ireland found very poor conditions for lunatics. There were few specific facilities, only the privately funded St Patrick's Hospital, Dublin, and the publicly funded Richmond Asylum (opened 1815), two small asylums at Cork and Wexford, and some beds attached to Houses of Industry and to gaols in other large towns.

In the same year Dublin Castle's Chief Secretary, Robert Peel, instituted legislation creating the world's first system of public lunatic asylums, throughout Ireland. Planning of the Irish asylums was delegated to a central 'Commission of General Control and Correspondence', dealing with districts, locations and sites of the new institutions, and advised its architects, Francis Johnston, helped by his nephew, William Murray (1787-1849), on their design. By the mid-C19, ten district asylums provided over 3,000 beds in total.

In 1831 Hanwell Asylum opened in Middlesex. John Conolly was its influential superintendent who wrote extensively on treatment and design of asylums. This was influential on the construction of asylums and treatment of patients in Britain, Ireland and beyond. In 1847 his influential book The Construction and Government of Lunatic Asylums was published and his thoughts were firmly incorporated into the next series of Irish asylums 1845-50s.

In 1838 The Criminal Lunatics (Ireland) Act was passed, one of a series of Lunacy (Ireland) Acts passed between 1821 and 1890. When a person was detained under circumstances suggesting that they were of deranged mind and had the intention of committing a crime, then two justices were empowered to call in a physician to examine the suspect. If the physician determined that the person was a "dangerous lunatic" he could be committed to gaol until either discharged by order of two justices or removed to a lunatic asylum by order of the Lord Lieutenant.

15.3.3 Initiation of the Criminal Lunatic Asylum

A House of Lords' committee in 1843 urged the creation of further asylum accommodation. In 1845 a seminal Act of Parliament was passed which permitted a State Criminal Lunatic Asylum to be set up in Ireland entirely funded by Government for which £6,000 was allotted. The type of institution was based on the form of the district asylums already in use, adapted to the criminal patients.

> *'the greater proportion of the inmates … being destined to remain in it for life, it is proposed to have the structural arrangement as cheerful as circumstances will admit, so as to afford every possible facility for the recreation and occupation of the patients. It is not designed that the building should partake of the character of a 'prison'; more especially as experience has proved that in the district asylums … such are not more inclined to attempt to escape than other patients.'*

Jacob Owen, Chairman of the Board of Works and a renowned public architect, was asked to develop plans for new types of establishments to house respectively 'incurable lunatics', and 'criminal lunatics'. Plans were made for a Criminal Lunatic Asylum to contain up to 120 patients as a hospital not a prison. This was part of a campaign to build asylums in Ireland in which 'Great care has been taken to provide for the best modern improvements in such buildings, without losing sight of economy, the expense of construction, from the necessity of classification, being very great'.

This emerging differentiation of Irish asylum care suggests that Ireland retained the leading edge over Britain in terms of asylum design. Thus a new phase enlarged the district asylum system with 6 new establishments with a total of 1750 beds to be erected at Cork, Sligo, Killarney, Omagh, Kilkenny and Mullingar. These supplemented the 8 built in the 1820s-30s

15.3.4 Construction of the Criminal Lunatic Asylum, 1845-53

Settlement in the Dundrum area south-west of Dublin expanded after the C16. Large houses, villas and associated demesne landscapes were established from the C18 onwards making it a desirable area of countryside for the wealthy and aspiring wealthy.

In 1846 a 30 acre agricultural site was bought at Dundrum, 3 miles from Dublin for the proposed criminal lunatic asylum. This was cultivated as 7 small fields east of the main road. It stood in an area of detached villas of varying sizes in landscaped grounds, with Anna Villa, Summerville, Roebuck Park and Grove adjacent (see Figure 15.2). The north site boundary followed the Church Town Lower townland boundary.

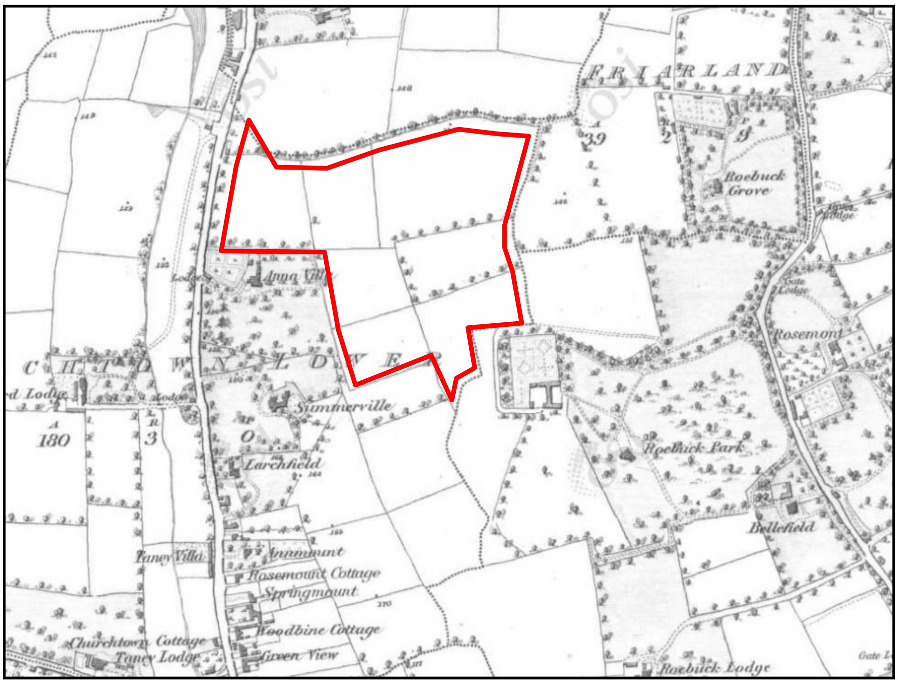

Figure 15.2: 1836 1st edition 6" scale Ordnance Survey map of the site.

The isolated rural character of the site was a key consideration in the selection of the site for any Irish or British asylum at this point. Medical theory and an enlightened attitude to the housing of patients dictated that they should not be the object of ridicule or public gaze as had been the case at Bethlem in London in the C18. Thus a building in extensive grounds sited well out of the pressures of urban life was believed to be both humane and help the patients to recover, if possible with the benefit of extensive views to lift their mood. A roadside wall prevented prying eyes from the public realm, and helped ensure patients did not escape, although the whole site was not necessarily walled, particularly against agricultural land. At

Dundrum the dramatic views south towards the Wicklow Mountains would have been regarded as beneficial for the patients.

Structures

Plans were prepared in 1846 for the building for 120 male and female convict lunatics by OPW Architect Jacob Owen who was regarded at the time as an ‘eminent architect in Ireland’. The planning of the asylum coincided with the publication in 1847 of the influential book by the Superintendent of Hanwell Asylum near London, John Conolly, The Construction and Government of Lunatic Asylums whose thoughts were firmly incorporated into this series of Irish asylums built in the 1840s-50s including Dundrum. The layout indicates the maturity of Irish asylum planners. Owen designed a special asylum and not a prison. It was a roughly symmetrical, three-storey building accommodating 120 lunatics. The main differences from the earlier Irish asylums were its chapel, a separate ‘hospital’ (infirmary) with its own yard, and increased dormitory accommodation.

Tenders were sought for the erection of the asylum building, to designs made by Owen shortly beforehand i.e. 1846-early 1847. His preliminary plans and elevations were published in 1848 and demonstrate the approach taken (Figures 15.3 and 15.4). Some differences are evident in the planned grounds around the building between the layout and that as executed, published in 1850, e.g. triangular womens’ airing courts were modified by 1850 to become rectangular. By 1848, ‘The buildings have been contracted for’ and the works were ‘proceeding satisfactorily.’

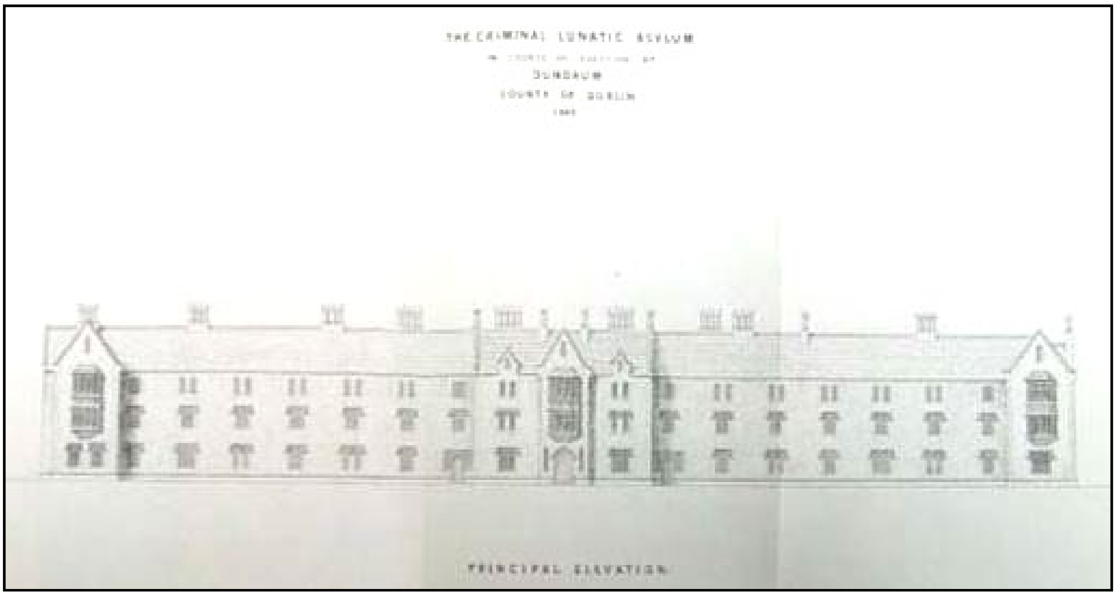

Figure 15.3: 1848 Criminal Lunatic Asylum plan, proposed principal elevation.

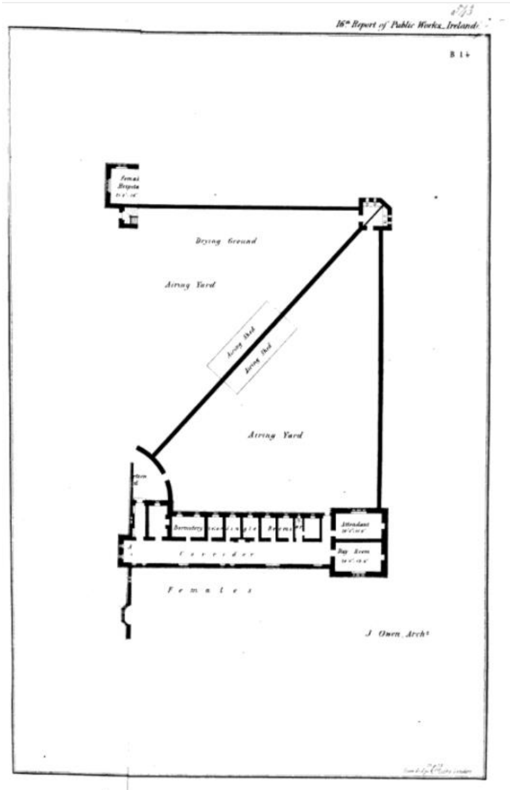

Figure 15.4: 1848 Criminal Lunatic Asylum part plan of airing courts and yards.

By 1850 the buildings had been completed. The asylum opened as the first forensic mental hospital in Britain or Ireland and possibly worldwide. The plan and view was published in 1851 (Figures 15.5 and 15.6) with a report in the periodical 'The Civil Engineer'. The asylum was intended to contain 80 male and 40 female patients at a total cost of £15,000. The main building was constructed of blackstone or Calp rubble with granite dressings, both local materials, in so-called Early English (but in reality more Tudorbethan) style. The single-storey ornamental lodge at the gateway echoed the style of the main building and was in the same materials.

Figure 15.5: 1850, Engraving of Main Elevation, Jacob Owen Architect.

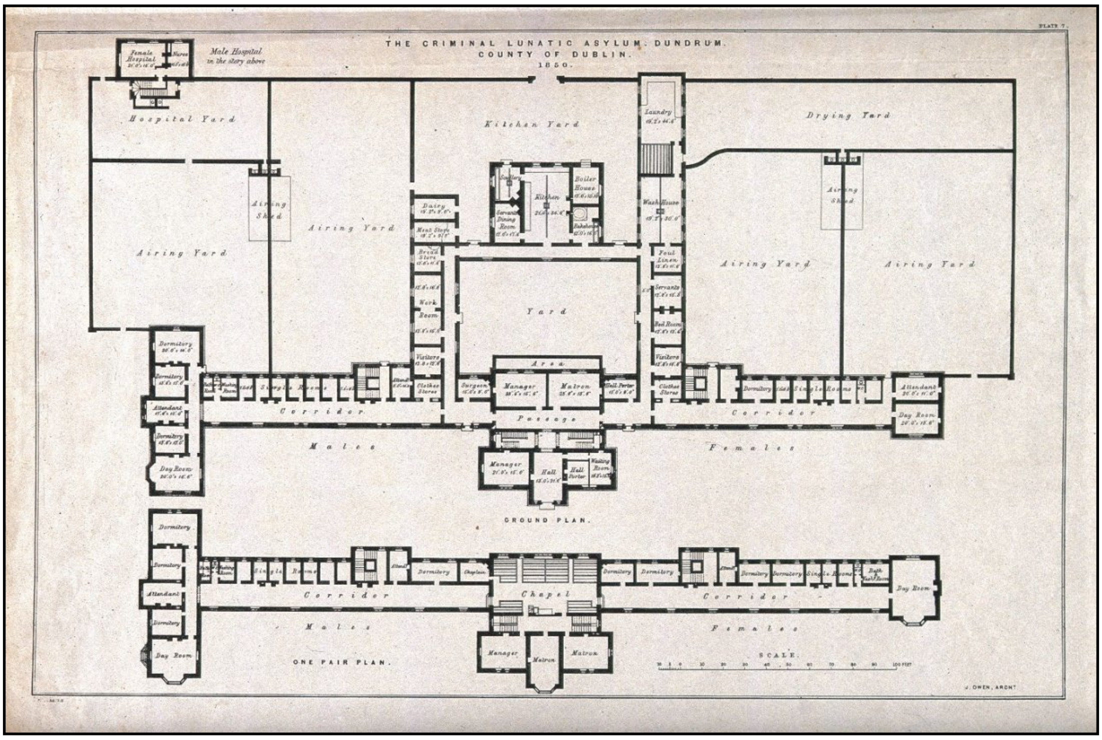

Figure 15.6: 1850, Engraving of Floor Plan and Annotated Layout, Jacob Owen Architect.

__The Country House Model__

The 21 acres as laid out largely reflect the components of a typical Irish district asylum of this mid-C19 period (1840s-50s), as shown on the 1871 OS (Figures 15.7 and 15.8). These were, in turn, based on the features of the well-established ornamental country house demesne adapted for therapeutic use and included many of those features recommended by Conolly in 1847. Particular features of this sort included the gateway, ornamented gate lodge, drive through parkland, forecourt, kitchen garden, farm and service areas. Adaptations for the asylum use included the disproportionately large area of the kitchen garden (c.8 acres) designed to make the institution with its large number of residents self-sufficient in these crops, and the absence of gardens around the main building. Gardens were replaced by the airing courts to the rear, although ornamental pleasure ground-style planting enhanced the setting of the forecourt to make an ornamental arrival. The character was expansive, ornamental and therapeutic as a humane regime to encourage recovery. This contrasted with the starkly punitive layout of grounds in prisons and workhouses where the grounds were purely utilitarian and tightly drawn around the buildings.

The Layout

It is unclear who designed the wider grounds. The layout displays considerable quality and a thorough understanding of contemporary landscape principles. Owen designed the enclosed environs of the hospital including the walled spaces behind the building as shown by the published plans, but probably not the wider grounds. The quality of design and the planting suggests that a professional designer was employed, perhaps a locally based Dublin practitioner or a nurseryman.

Owen's plan (1850, Figure 15.6) shows walled spaces behind the hospital building, to the north, divided into therapeutic airing courts for secure patient exercise and functional service yards. The hospital building was divided, typically, axially into male and female halves respectively to west and east, with the related open spaces adjacent to the accommodation of the respective genders. The male side had two airing courts for different classes of patients with lean-to shelters and privies serving each class straddling a single wall (now no. 1C West Wing outdoor area). This was reflected on the female side (now no. 1J East Wing outdoor area). The airing court layout, both spaces and structures are of great significance as one of the most specific, defining features of a C19 asylum.

North of the male courts was the detached yard serving the adjacent infirmary, serving both sexes. North of the female airing courts was the drying yard serving the adjacent laundry in which the female patients worked. Adjacent to the west of the drying yard was the kitchen yard, again a preserve of female patients and adjacent to the kitchen. A central yard behind the main entrance was enclosed by buildings. The courts and working yards were enclosed by walls to prevent escapes. Further analysis is required to establish the survival of the original pattern of courts and yards and associated structures.

The position of the airing courts differed from the model used in England as they were north of the building rather than to the south which was favoured in England in order to maximise patients' exposure to long views, fresh air and sunshine. Furthermore the airing courts were walled where in England the preference was instead to use sunk walls and banks known as ha-has against open boundaries to provide a secure area which allowed the uninterrupted views into the wider landscape and if possible beyond. The arrangement at Dundrum may have been a more secure adaptation to the criminal occupants, but other Irish District Asylums of this period had a similar arrangement with airing courts to the north, such as Sligo, Kilkenny and Mullingar.

A medical journal noted that the situation of the asylum was 'most cheerful and picturesque, and its whole management most ably and humanely conducted …' The need for a similar asylum in England was noted, following the example of Ireland and a resolution was passed to this effect by the Association of Medical Officers.

The 1851 Civil Engineer report noted 15 acres of grounds to be tilled by the patients, presumably including the kitchen garden and perhaps in the East Paddock. This was typically both for economic and therapeutic purposes for those male patients who were well enough to work. The drains emptied into a tank distant from the building, and were then discharged by pipes over a considerable portion of the grounds.

As the whole of the 30 acres that the Board was 'obliged to purchase was not required for the immediate use of the asylum, it had not been enclosed within its boundary walls.' Nine acres [to the south] was to be let for 7 years at a rent of £45 a year after which the ground could again be disposed of, or added to that for the use of the asylum, should it be required. Although this area was not brought into the site until considerably later (by 1908) it always formed the open frame for the views beyond the kitchen garden of the distant mountains and was later laid out with the current playing fields.

Works to the grounds continued and by 1853 the ornamental entrance lodge (now the gatehouse) was completed within the wall at the north-west corner, along with other works which had been 'postponed until the experience in working the institution proved the necessity for them'.

15.3.4 Development in the 1850's and 1860's

The asylum had reached capacity by 1863 when a 50 bed extension was proposed. In 1863 building works included many to the main building. In the grounds alterations were made to the 'out-offices and enclosure walls' for a total sum of over £4,000. In 1866 a chapel for Protestant patients was built within the main complex. In 1868 part or all of the boundary was rebuilt.

Meanwhile in England in 1863 the English State Criminal Lunatic Asylum opened at Broadmoor, Berks, designed by prison architect Joshua Jebb, but again modelled on the established district (in England known as County) asylum precedent.

The first detailed published plan of the layout of Dundrum asylum is the Ordnance Survey 2nd edition at 6" scale, surveyed c.1871 (Figures 15.7 and 15.8). It shows the original layout completed c.1850 and reflects building alterations executed in the 1860s.

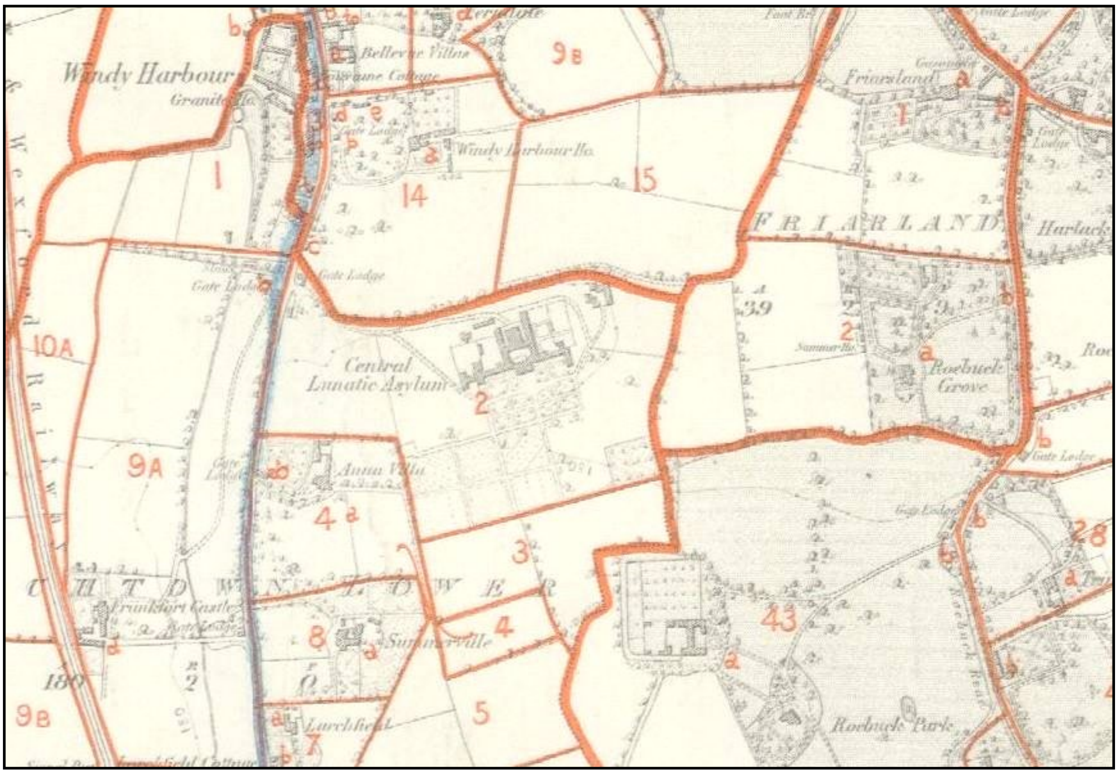

Figure 15.7: 1871, 2nd edition 6" scale Ordnance Survey.

Typically the 30 acre grounds were divided into several main areas as follows:

1. The approach to the hospital building from the gateway and the lodge off Dundrum Road along a drive sweeping through the west paddock. The lodge was in fashionable Picturesque style, single storey with ornamented barge boards and other features. The drive led to the forecourt and ornamental grounds on the south side in front of the building, giving access to the main entrance. Leading south from the main entrance the central axial path was framed by woody planting and enjoyed a view of the distant mountains, a key view which survives.

2. Walled airing courts for secure patient exercise to the north of the building, and working yards reflecting domestic activities. Each court had a lean-to shelter against the wall (called Airing Sheds on the 1850 plan) for the patients as well as privies.

3. Productive kitchen gardens and walled orchard in the south section of the hospital site.

4. Further parkland east of the building an including the East paddock.

5. Service areas north and east of the yards and airing courts including farmstead and stables with yards and gateways in the north-east corner. As well as having a productive purpose for the institution, male patients would have worked on the farm for therapeutic purposes.

6. Farmland south of the productive gardens. This 9 acres remained let to a farming tenant.

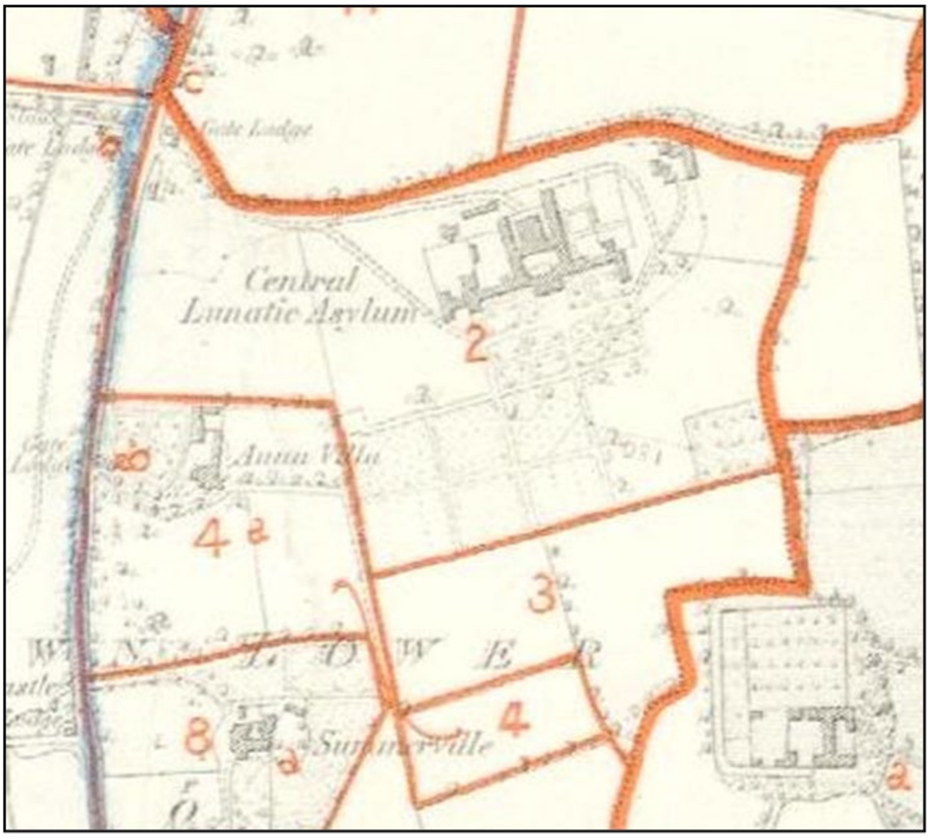

Figure 15.8: 1871, 2nd edition 6" scale Ordnance Survey, detail of grounds.

The BMJ in 1874 noted the similarity of the criminal asylum with a district asylum as, '*there is nothing distinctive in its general aspect from what is observable in ordinary hospitals for the insane; … the grounds of 28 acres may be considered quite open, surrounded by a wall of from 8 to 10 feet. …Up to the present time, but 6 patients permanently escaped'*. This indicates that the originally tenanted land to the south (now playing fields) had been incorporated into the main site and the wall extended around it.

15.3.5 Further Development Phase, 1860's to c1908

The layout is shown in greater detail on the 1908 OS surveyed in 1908 (Figure 15.9). By this point the landscape design had reached its zenith. It remained largely as shown on the 1871 OS with some differences, one major, but the rest relatively minor, including:

1. The greatest change was to move the drive south-west away from the north boundary on a new line to give a more sweeping serpentine approach to the south front of the building and forecourt. This avoided the detached Catholic chapel in the parkland which formed a feature along this new line of the drive. The drive was lined on the south side by a line of specimen trees. It is likely that it was realigned c.1901 when the chapel was built.

2. A circular or octagonal gazebo had been added towards the west end of the kitchen garden. This may have been relocated to its present position (no. 35, the bandstand) and if so it echoes those found in the airing courts at Broadmoor.

3. The boundary wall reached its current configuration, including the construction of a section along the realigned south boundary where the formerly tenanted farmland had been taken into the hospital grounds.

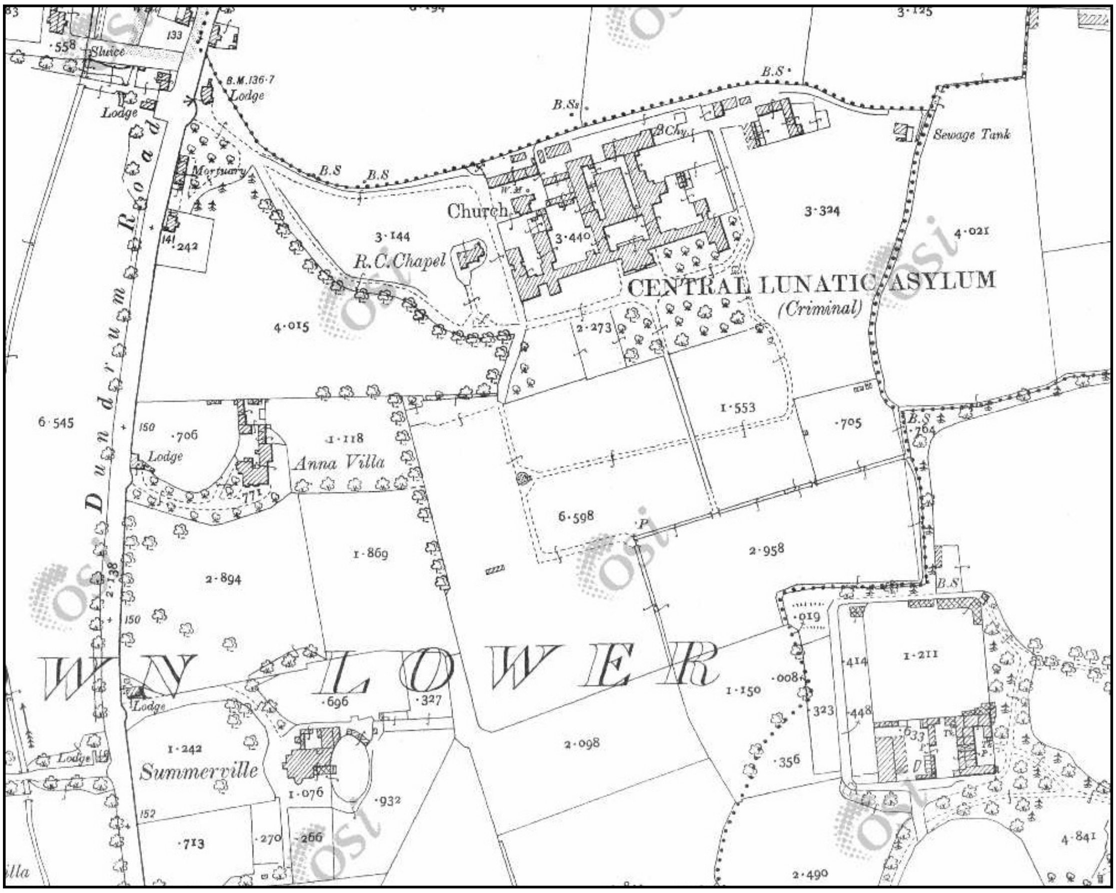

Figure 15.9: 1908, 1st edition 25" scale Ordnance Survey.

15.3.6 Development in the c20 and c21

After World War II various buildings were added to the grounds. The largest were localised in a group on the west half of the former kitchen garden. These, while damaging, did not irreversibly damage the special qualities of the original character or layout, nor obscure the important south axis from the entrance to the main hospital that bisected the kitchen garden and offered dramatic views of the distant Wicklow Mountains. Various smaller structures were erected but these did not greatly damage the overall significance.

A car park was laid out on the east half of the former kitchen garden. Most of the historic buildings and features were left in situ. Losses included the mortuary against the roadside wall and a small building nearby to the south. The circular or octagonal building in the west half of the kitchen garden, in the area now built on, seems to have been relocated to a position north of the walled garden (no. 35, Bandstand), but has recently been relocated off site.

Today, many of the key buildings, features and spaces survive reflecting the layout and character established by c.1910 to a considerable degree.

15.3.6 The Site as found in 2021

The site as it has existed in the period 2018 to the time or writing in February 2022 has been extensively photographed and surveyed. Those surveys of particular relevance to the Heritage Assets (including the Historic Landscape) include but are not limited to:

- Topographical survey carried out in 2018.
- Aerial photography from drone surveys carried out in June 2020.
- Photography from walk-round surveys carried out in June 2020 and July 2021.

In addition to the historic landscape, a quantity of eight heritage structures have been identified in the site, or sufficiently close it, to potentially be affected. These are identified in Figure 15.10 (with site boundary outlined in red) and scheduled in Table 15.3.

Table 15.3: Heritage Assets.

ID	Description	Image
1	Main Hospital Building	
2	Perimeter Wall	

3	Gate Lodge	
10	Chapel	
24	Airing yards (20th Century)	
26	Hay Barn & Pig Yards	

27	Farmyard buildings	
39	Walled Garden including 2x covered entrances	 
45	Historic Landscape	

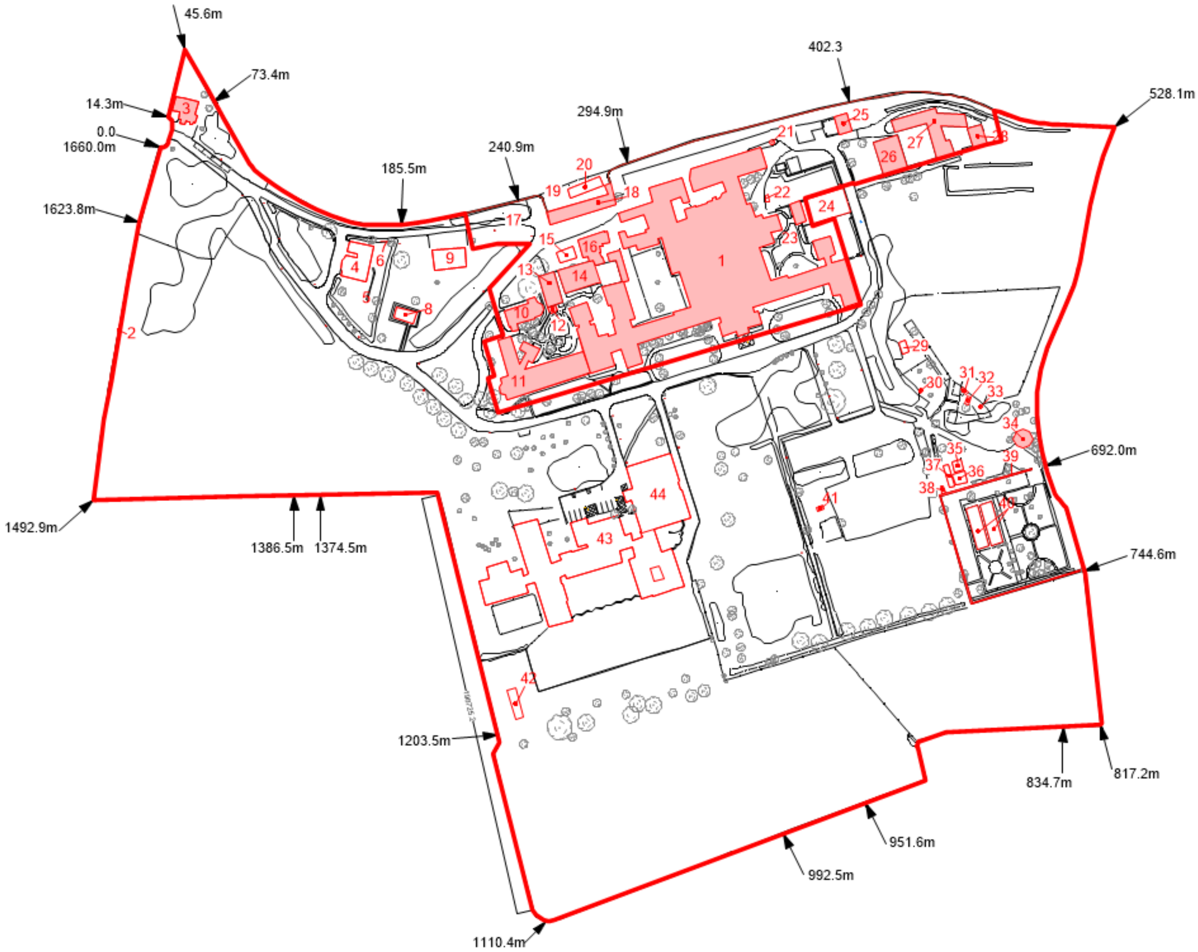

Figure 15.10: Location of Heritage Assets.

15.4 Potential Impacts of the Proposed Project

15.4.1 Structure No.1 – Main Hospital Building

Figure 15.11: Main Hospital Building.

15.4.1.1 Baseline Condition

The Main Hospital Building is recorded in The National Inventory of Architectural Heritage (NIAH) under reference 60220001 and is assessed to have National importance (on a scale of International, National, Regional and Local). Although not on the current Register of Protected Structures (RPS) the building is identified for inclusion on the RPS in the Draft County Development Plan and as-such is afforded the protections that apply should that designation be ratified.

The value attached to the Main Hospital Building arises from it being a rare example of the typical asylum provision of this period as adapted for criminal patients. As a dedicated and purpose-built criminal lunatic asylum it predates Broadmoor Hospital by some 15 years, making it among the first (if not the first) institution of its type in the world. It is a tangible representation of a major shift in the approach to criminality and mental illness in Ireland, and of an emerging new institutional design.

The Main Hospital Building has a strong association with a number of eminent architects – Jacob Owens and Frederick Villiers Clarendon. The built form is a development of the district lunatic asylum model, with the symmetrical layout and cellular form almost completely intact (full internal surveys have not been completed).

The Group Value that the Main Hospital Building and Historic Landscape have derive from their being conceived and executed as holistic approach to the treatment and recovery of those suffering from mental illness. The combination of the two elements provided not just for therapeutic treatments, but also for recreational and vocational activities intended for the enjoyment of the patients – all for the benefit of their recovery.

The hospital still fulfils the role for which it was designed and, although modified and extended as described in the site history, remains substantially intact. It demonstrates a continuous approach to the therapeutic treatment of a very specific sector of Irish citizenry, uninterrupted in the 170 years since its inception.

15.4.1.2 Sensitivity to Change

The Main Hospital Building is assessed to have a HIGH sensitivity to change. This assessment derives from the following factors:

- It is included in the National Inventory of Architectural Heritage.
- It is proposed to be on the Register of Protected Structures, with this outcome being highly probable if not certain.
- Its principal elevation is largely unaltered from its originally built form.
- Since its construction it has continuously performed its primary function of treating the criminally insane.
- It has substantial Group Value with the Historic Landscape, and therefore sensitive to changes not just to itself but to other elements of the group.

15.4.1.3 Degree of Change

The Development is assessed as having the potential to cause an overall change to the Main Hospital Building which is MEDIUM in degree. This assessment derives from the following factors.

- The hospital building itself lies outside the red-line for the Development and is not therefore modified in itself. However, elements of the Development are directly adjacent to the building and therefore change its setting (and ergo, views to and from the building). The changes comprise the construction of residential apartment blocks directly adjacent to the Main Hospital Building. Figure 15.12 illustrates.
- Although it is technically possible that the Development might at some future date be reversed, the probability of that happening is assessed as being so low as to be negligible. The changes are therefore considered to be permanent with no possibility of reversal.
- The Main Hospital Building enjoys Group Value with the Historic Landscape. The degree of change to that landscape that is introduced by the development is high.
- When the proposed Development is realised the Main Hospital Building will transition from being set in a private demesne to being set in a public landscape.
- The Development makes it all but certain that the Main Hospital Building must undergo a change of use, ceasing its 170-year role in the treatment of the criminally insane. In itself this factor would raise the degree of change from Medium to High, but is mitigated by the pre-existing situation where the change of use has been decided upon outside the scope of the SHD application.

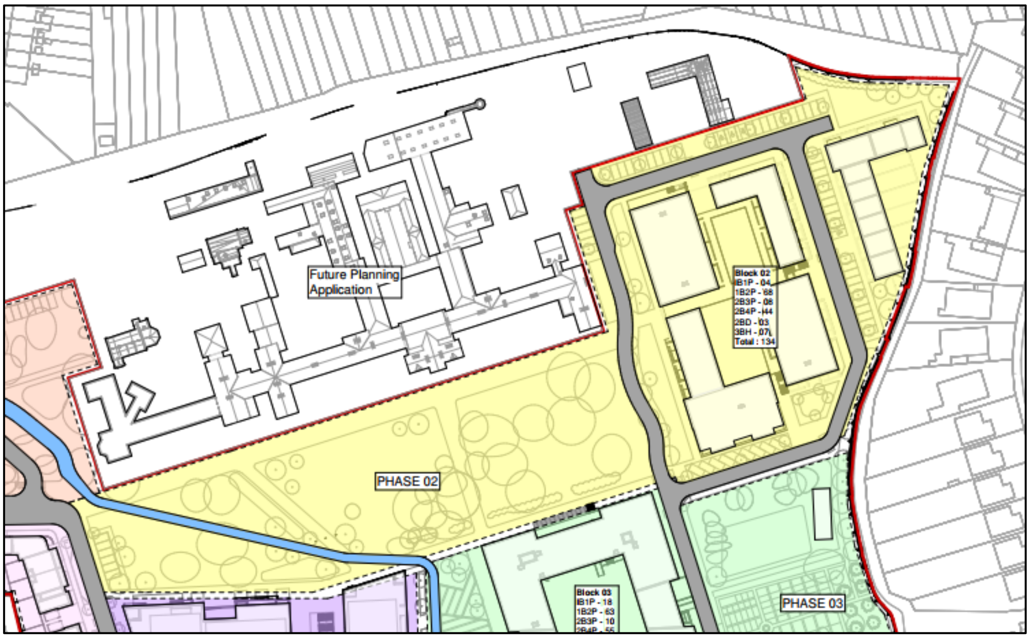

Figure 15.12: Apartment Block Construction to east of Main Hospital Building.

15.4.1.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Main Hospital Building to change is assessed as HIGH, and the degree of that change assessed as MEDIUM, the potential effect of the Development on it is therefore assessed to be VERY SIGNIFICANT.

15.4.2 Structure No.2 – Perimeter Wall

Figure 15.13: Perimeter Wall and Entrance on Dundrum Road.

Figure 15.14: Internal face of Perimeter Wall to west of the Site.

15.4.2.1 Baseline Condition

The perimeter wall (also referred to as the boundary wall) is part of the first phase of development of the site, being constructed contiguously with or very soon after the Main Hospital Building. With the exception of the main entrance to Dundrum Road, a gateway into the maintenance yard and some minor blocked pedestrian gateways, the wall is complete and to the greater extent unaltered. A section at the south-east has been replaced in mass concrete, and some sections have been given additional height in concrete blockwork, but these are isolated sections of limited extent.

At the time of survey the wall was found to be in excellent structural condition. The inside face of the wall has been comprehensively maintained to a high standard. External faces of the wall (where observable in detail) were also sound but not uniformly as well maintained as the inner face.

Although the wall would likely have originally had a complete cleared perimeter on the outside face, to facilitate inspection and repair, this situation does not currently exist. A high proportion of the residential properties constructed directly outside the wall have subsumed the space between their presumed rear boundary and the wall.

15.4.2.2 Sensitivity to Change

The Perimeter Wall is assessed to have a MEDIUM sensitivity to change. This assessment derives from the following factors:

- It is unbroken save for the openings which are consistent with its role as the boundary of a criminal lunatic asylum. This degree on intactness is a direct result of the CHM having been in continuous use as a secure mental hospital since its inception some 170 years ago.

- It represents a very clear and all-but impermeable boundary between the Site and the surrounding residential areas.

- It screens the existing site from the C20/C21 developments surrounding the site, maintaining the nature of the site as a private demesne.

15.4.2.3 Degree of Change

The Development is assessed to have the potential to cause an overall change to the Perimeter Wall which is MEDIUM in degree. This assessment derives from the following factors.

- A substantial section of the wall on Dundrum Road must be taken down or reduced in height to accommodate the necessary vehicular and pedestrian entrances to the site and to improve visual connectivity into/from the site.

- A substantial section of the wall is to be taken down to facilitate free access to the existing Rosemount Green playing fields and the proposed public amenity space adjacent to it within the Site (see Figure 15.14).

- Openings for pedestrian and cyclist access are to be made adjacent to Mulvey Park and Annaville Grove.

15.4.2.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Perimeter Wall to change is assessed as MEDIUM, and the degree of that change assessed as MEDIUM, the potential effect of the Development on it is therefore assessed to be SIGNIFICANT.

15.4.3 Structure No. 3 – Gate Lodge

Figure 15.15: The Gate Lodge.

15.4.3.1 Baseline Condition

Construction of the Gate Lodge followed very quickly the commencement of construction of the Main Hospital Building and it was present by 1853. Ornamental in character and constructed in the same material palette of dark grey calp stone with granite dressings.

The picturesque quality that the Gate Lodge undoubtedly possessed on its original construction has been eroded by the cumulative effect of poor maintenance, inappropriate repairs and the many accretions it has gained in terms of inappropriate extensions and signage. It does however retain to a large extent its original form and construction.

15.4.3.2 Sensitivity to Change

The Gate Lodge is assessed to have a MEDIUM sensitivity to change. This assessment derives from the following factors:

- Beneath the inappropriate accretions it retains its original form and construction.
- The presence of a Gate Lodge speaks very clearly to the 'County House' model that had been adopted for the creation of the asylum.

15.4.3.3 Degree of Change

The Development is assessed to have the potential to cause an overall change to the Perimeter Wall which is MEDIUM in degree. This assessment derives from the following factors.

- The Gate Lodge will undergo a conservation-led refurbishment and re-purposing into a café.

15.4.3.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Gate Lodge to change is assessed as MEDIUM, and the degree of that change assessed as MEDIUM, the potential effect of the Development on it is therefore assessed to be SIGNIFICANT.

15.4.4 Structure No.10 – Chapel

Figure 15.16: The Chapel.

15.4.4.1 Baseline Condition

The Chapel is recorded in The National Inventory of Architectural Heritage (NIAH) under reference 60220002 and is assessed to have Regional importance (on a scale of International, National, Regional and Local). Although not on the current Register of Protected Structures (RPS) the building is identified for inclusion on the RPS in the Draft County Development Plan and as-such is afforded the protections that apply should that designation be ratified.

The value attached to the Chapel arises from its Communal and Historical associations, but additionally from its Architectural quality and associations. It was constructed in 1901 to a design by James Franklin Fuller, an eminent Dublin architect who was prolific, particularly in respect of his ecclesiastical work. The exposed timber structure of its roof is noted in the NIAH as being of technical interest for its adoption of the scissor-truss.

The Chapel and Main Hospital Building derive Group value from their representing a holistic approach to the treatment and recovery of those suffering from mental illness, the presence of a Chapel being a notable development from earlier Irish asylums.

The Chapel still fulfils the role for which it was designed and remains substantially intact and unmodified. At the time of survey its condition was found to be very good, with continuous maintenance evident in the evident absence of serious deterioration.

15.4.4.2 Sensitivity to Change

The Chapel is assessed to have a MEDIUM sensitivity to change. This assessment derives from the following factors:

- It is included in the National Inventory of Architectural Heritage.
- It is proposed to be on the Register of Protected Structures, with this outcome being highly probable if not certain.
- It is largely unaltered from its originally built form.
- Since its construction it has continuously performed its primary function as a place of worship
- It has substantial Group Value with the Main Hospital, and therefore sensitive to changes not just to itself but to other elements of the group.

15.4.4.3 Degree of Change

The Development is assessed as having the potential to cause an overall change to the Chapel which is LOW in degree. This assessment derives from the following factors.

- The Chapel itself lies outside the red-line for the Development and is not therefore modified in itself.

- The new-construction apartment buildings in closest proximity to the Chapel are at a significant distance and separated from the Chapel by retained elements of the Historic Landscape.

15.4.4.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Chapel to change is assessed as MEDIUM, and the degree of that change assessed as LOW, the potential effect of the Development on it is therefore assessed to be SLIGHTLY NEGATIVE.

15.4.5 Structures No. 26 & 27 – Hay Barn, Pig Pens and Farmstead Buildings

Figure 15.17: Hay barn and pig-pens.

Figure 15.18: Farmyard Buildings.

15.4.5.1 Baseline Condition

The farmstead would have served the dual purposes of providing fresh food for the institution and providing a therapeutic activity for male patients.

The farm buildings retain much of their original form and fabric, though in various states of dilapidation.

15.4.5.2 Sensitivity to Change

The Farmyard Buildings are assessed to have a MEDIUM sensitivity to change. This assessment derives from the following factors:

- They are largely unaltered from their originally built form.
- The component parts of the farmstead have group value with each other – the assemblage retains all of the original components (hay barn, pig-pens, potato stores, stables and other machinery/produce stores).

15.4.5.3 Degree of Change

The Development is assessed as having the potential to cause an overall change to the Farm Buildings which is LOW in degree. This assessment derives from the following factors.

- The Farm Buildings lie outside the red-line for the Development and are not therefore modified in themselves.

15.4.5.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Farm Buildings to change is assessed as MEDIUM, and the degree of that change assessed as LOW, the potential effect of the Development on it is therefore assessed to be SLIGHTLY NEGATIVE.

15.4.6 Structure No. 39 Walled Garden

Figure 15.19: Walled Garden.

15.4.6.1 Baseline Condition

The walled garden to the east of the Site would have been originally an orchard, though it now exists primarily as an enclosed area of ornamental landscaping. Some areas remain under general cultivation by patients as a therapeutic activity.

The garden is enclosed by a wall having two ornamental gateways surviving. Overall condition of the lands and wall is good.

15.4.6.2 Sensitivity to Change

The Walled Garden is assessed to have a MEDIUM sensitivity to change. This assessment derives from the following factors:

- Its enclosure is largely intact and in good condition.

- Although no longer an orchard it has not been infilled with construction and therefore still a component of the designed landscape.

15.4.6.3 Degree of Change

The Development is assessed as having the potential to cause an overall change to the Walled Garden which is LOW in degree. This assessment derives from the following factors.

- The enclosure is to be retained.

- The enclosed area will continue in its current role of ornamental landscape.

- The context of the garden will be changed by the proposed adjacent apartment blocks (see figure 15.20).

Figure 15.20: Apartment blocks in proximity to Walled Garden.

15.4.6.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Walled Garden to change is assessed as MEDIUM, and the degree of that change assessed as LOW, the potential effect of the Development on it is therefore assessed to be SLIGHTLY NEGATIVE.

15.4.7 Asset No.45 – Historic Landscape

Figure 15.21: Historic Landscape.

15.4.7.1 Baseline Condition

The Historic Landscape within the site was largely established by 1910, and subsequent modifications were generally to the detriment of that (e.g. addition of the 20th century admissions block, creation of the main car-park, etc).

Significant group value attaches to the Historic Landscape with the Main Hospital Building. As a group they display the emergence of an enlightened attitude to the treatment of the criminally insane, with the practice of situating the hospital buildings in an ornamental landscape as a direct therapeutic measure. Comparable asylum complexes in Ireland that survive intact to such a degree as Dundrum are extremely rare, with the district asylums in Cork and Killarney being examples.

15.4.7.2 Sensitivity to Change

The Historic Landscape is assessed to have a HIGH sensitivity to change. This assessment derives from the following factors:

- With a few notable modifications such as the addition of the admissions unit and the car-park, the layout and un-developed nature of the grounds as designed still remains.

- The ornamental sweeping approach to the Main Hospital Building, flanked with mature trees, offering views across an open landscape and formally introducing the built forms of the Chapel and Main Hospital is a significant element of landscape design.

- The south-facing and principal elevation of the Main Hospital Building derives the key element of its setting and context from the Historic Landscape.

15.4.7.3 Degree of Change

The Development is assessed as having the potential to cause an overall change to the Historic Landscape which is HIGH in degree. This assessment derives from the following factors.

- The largely un-developed nature of the grounds will be permanently lost.

- The evident role of the Historic Landscape as a therapeutic element of the site will be permanently lost.

- Views of and from the Main Hospital Building will be changed by the proposed adjacent apartment blocks.

15.4.7.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Historic Landscape to change is assessed as HIGH, and the degree of that change assessed as HIGH, the potential effect of the Development on it is therefore assessed to be VERY SIGNIFICANTLY NEGATIVE.

15.4.8 Structure No. 24 – Airing Yards (20th Century)

Figure 15.22: Airing Yards.

15.4.8.1 Baseline Condition

These exercise areas or 'airing yards' are a later addition to the site, not apparent on the 25" 1st Edition OS maps of 1908. Constructed in rendered brickwork, partially atop earlier masonry walls, they speak to the historic operating procedures of the hospital, though obviously disused for some considerable period of time.

15.4.8.2 Sensitivity to Change

The Airing Yards are assessed to have a LOW sensitivity to change. This assessment derives from the following factors:

- They are later additions to the site and are not a primary reference for understanding the evolution of the hospital.

- The quality of execution is low and the present condition poor.

15.4.8.3 Sensitivity to Change

The proposals seek to remove these airing yards in their entirety. The degree of change is therefore assessed as HIGH.

15.4.8.4 Potential Effect of the Development (Before Mitigation)

As the sensitivity of the Airing Yards to change is assessed as LOW, and the degree of that change assessed as HIGH, the potential effect of the Development on it is therefore assessed to be MODERATELY NEGATIVE.

15.5 Mitigation Measures

15.5.1 Operation Phase

15.5.1.1 Structure No.1 – Main Hospital Building

As the Main Hospital Building is outside the SHD no measures are available to reduce its sensitivity to change.

The degree of change to which the Main Hospital Building will be subjected has been mitigated by the following measures:

CH_1: The heights of Block 2 to the immediate east of the Main Hospital Building have been set to ensure that the dominance of the Main Hospital Building is retained.

CH_2: The historic landscape to the immediate south of the Main Hospital Building will be retained and enhanced. The main car-park and the C20 swimming-pool building are both proposed for removal and the areas of landscaping reinstated.

It is assessed that these mitigation measures reduce the effect that the Development has on the Main Hospital Building from very significant to a residual level of MODERATELY NEGATIVE.

15.5.1.2 Structure No.2 – Perimeter Wall

The degree of change to which the Perimeter Wall will be subjected has been mitigated by the following measures:

CH_3: Where sections of the wall are being removed, and where it is feasible to do so, the wall will not be removed in full but reduced to a height of 1200mm.

CH_4: Where sections of wall are being removed completely, and where it is feasible to do so, the former position of the wall will be indicated in the landscaping by use of natural stone as the paving material.

CH_5: Where sections of the wall are removed completely, the retained sections will be terminated in such a fashion as to indicate that the wall did not merely terminate there but has been purposely interrupted, e.g. by the use of sensitively and appropriately detailed piers in masonry, concrete or metal.

It is assessed that these mitigation measures reduce the effect that the Development has on the Perimeter Wall from to a residual level of MODERATELY NEGATIVE.

15.5.1.3 Structure No.3 – Gate Lodge

As the potential effect of the development on the Gate Lodge is assessed to be positive, no mitigation measures are deemed necessary.

It is therefore assessed that the effect of the Development on the Gate Lodge is SIGNIFICANTLY BENEFICIAL.

15.5.1.4 Structure No.10 – Chapel

As the Chapel is outside the SHD no measures are available to reduce its sensitivity to change.

The degree of change to which the Chapel will be subjected has been mitigated by the following measures:

CH_6: The historic landscape in the immediate environs of the Chapel will be retained and enhanced.

CH_7: Changing the site from being a private demesne to a publicly accessible area brings with it the possibility of the Chapel acquiring a larger congregation and playing a productive part in the lives of more people.

It is assessed that these mitigation measures will reduce the effect that the Development has on the Chapel to NEGLIGIBLE or SLIGHTLY BENEFICIAL.

15.5.1.5 Structure No.26 & 27 – The Farmstead

As the Farm Buildings are outside the SHD no measures are available to reduce their sensitivity to change.

The degree of change to which the Farm Buildings will be subjected has been mitigated by the following measures:

CH_8: The proposed road alignment in proximity to the farmstead preserves the ability to view and appreciate the complex of buildings.

It is assessed that these mitigation measures will reduce the effect that the Development has on the Farm Buildings to NEGLIGIBLE.

15.5.1.6 Structure No.39 – The Walled Garden

The degree of change to which the Walled Garden will be subjected has been mitigated by the following measures:

- Currently present features which detract from the overall presentation of the area as ornamental landscaping will be removed and the landscaping enhanced.

It is assessed that these mitigation measures will reduce the effect that the Development has on the Walled Garden to NEGLIGIBLE.

15.5.1.6 Asset No.45 – The Historic Landscape

The degree of change to which the Historic Landscape will be subjected has been mitigated by the following measures:

- The ornamental sweeping approach road, one of the key aspects of the designed landscape, will be retained.

- The detrimental effect of the admissions unit and the main car-park will be reversed, with the area of landscaping to the south of the hospital being significantly enhanced.

- The walled garden, as noted above, will be retained and enhanced.

It is assessed that these mitigation measures will reduce the effect that the Development has on the Historic Landscape to SIGNIFICANTLY NEGATIVE.

15.5.1.6 Asset No.24 – The Airing Yards (20th Century)

The degree of change to which the Historic Landscape will be subjected has been mitigated by the following measures:

- The airing yards will be thoroughly recorded before removal. The contribution that they make to the understanding of the development and operation of the hospital complex will therefore be preserved. Retention of their physical aspects, beyond this, would add a limited amount when weighed against the benefits accrued from developing the site.

It is assessed that these mitigation measures will reduce the effect that the Development has on the 20th Century airing sheds to SLIGHTLY NEGATIVE.

15.6 Residual Impacts

The summary of potential impacts before and after mitigation are summarised in Table 15.4.

Table 15.4: Impacts before and after Mitigation Measures

Asset	Impact Before Mitigation	Impact After Mitigation
1 – Main Hospital Building	Very Significantly Negative	Moderately Negative
2 – Perimeter Wall	Significantly Negative	Moderately Negative
3 – Gate Lodge	Significantly Beneficial	Significantly Beneficial
10 – Chapel	Slightly Negative	Slightly Beneficial
26/27 – Farmstead	Slightly Negative	Negligible
39 – Walled Garden	Slightly Negative	Negligible
45 – Historic Landscape	Very Significantly Negative	Significantly Negative
24 – c20 Airing Sheds	Moderately Negative	Slightly Negative

15.7 Monitoring

Unlike other potential impacts, such as adverse effects to flora or fauna, the mitigation measures proposed for architectural heritage are deemed to fully achieve their intended effect when implemented. They are fully deterministic – e.g. in mitigation measure CH_1 the height of Block 2 is not subject to variability outside the control of the design and delivery team.

Mitigation measures as they relate to Architectural Heritage do not therefore require monitoring as they might do, say, for air-quality or hydrology.

15.8 Interactions

In respect of Heritage Assets, interactions with other topics are principally related to the development of the Historic Landscape:

- Population & Human Health – No interactions.
- Biodiversity – The Heritage Landscape provides a habitat for flora and fauna, and the loss of that habitat to development is an area of interaction. Mitigation measures in respect of Biodiversity are discussed in Chapter 5 of this report.
- Land, Soils, Geology and Hydrogeology – No interactions.
- Hydrology & Surface Water - The development of the historic landscape will increase the amount of surface-water run-off. Mitigation measures in respect of surface water are discussed in Chapter 7 of this report.

- Air Quality and Climate – No interactions.
- Noise and Vibration – No interactions.
- Landscape and Visual – The development of the historic landscape significantly changes the character of the Development Site, including views into and out of the site. Mitigation measures in respect of landscape and visual appearance are discussed in Chapter 10 of this report.
- Microclimate, Daylight & Sunlight – No interactions.
- Microclimate, Wind – No interactions.
- Roads & Traffic – No interactions.
- Waste Management – No interactions.
- Built Services – No interactions.

15.9 Cumulative Impacts

In respect of Heritage Assets, a cumulative impact would arise where there was:

- Clustering of developments in close proximity to a protected structure or a complex of protected structures.
- Clustering of developments in close proximity to a structure or site listed in the Record of Monuments and Places.
- Clustering of developments in an area of noted and historic townscape character (e.g. in an area where a substantial number of structures were identified on the National Inventory of Architectural Heritage)

A number of projects in the area of the Development require inclusion in an assessment of cumulative impact. These are:

- D16A/0818 – Site at Greenacres, Kilmacud Road Upper. Demolitions with construction of 120 apartments with 120 car-parking spaces and associated facilities.
- ABP31013821 – Mount Saint Mary's and Saint Joseph's, Dundrum Road. Demolitions with construction of 231 apartments with 118 car-parking spaces, child-care facility and café
- D19A/0162 – Former Shell Garage, Roebuck Road. Demolitions, with construction of 43 residential units with 47 car-parking spaces and associated facilities.
- ABP30835320 – Vector Motors Site, Goatstown Road. Demolitions, with construction of 239bed student accommodation with six car-parking spaces and associated facilities.
- D20A/0328 – University College Dublin, Belfield. Provision of 239 additional car-parking spaces.

- ABP30943021 – Our Lady's Grove, Goatstown Road. Construction of 698bed student accommodation with 9 car-parking spaces and associated facilities.
- ABP31128721 – 97A Highfield Park, 1-2 Frankfort Castle, Frankfort Lodge. Construction of 115 residential units and a creche.
- ABP31182621 – Lands at Knockrabo, Anville Road. – Construction of 227 residential units with 178 car-parking spaces and associated facilities.
- ABP312935 – Somerville House, Dundrum Road. Construction of 111 residential units with 39 car-parking spaces and associated facilities.
- TC06D.311553 – Old Dundrum Shopping Centre &c. Construction of 884 apartments and a creche.
- The Central Mental Hospital. S34 application for 73 residential units and 5,500sq.m. of non-residential uses.

Of these, the proposed development of the Central Mental Hospital buildings and their immediate grounds is the only one that requires cumulative assessment. At the time of writing no application for this development has been lodged and the scope and extent is therefore subject to change, but it is understood in outline that the proposals include:

a. Removal of a number of secondary structures within the curtilage of the Main Hospital Building, Chapel and Infirmary/Church.

b. Refurbishment, limited alteration, and re-purposing of the Main Hospital Building, Chapel and Infirmary/Church.

c. Creation of additional roadways and other civil works.

d. The construction of a number of apartment blocks to the North of the Main Hospital Building.

Taking each of the potentially affected structures in turn:

15.9.1 Structure 1 – Main Hospital Building

As noted in 15.4.1 above, the Main Hospital Building's sensitivity to change from the Strategic Housing Development arises from its relationship to the Historic Landscape. This landscape lies almost wholly to the south of the building, the north of the building comprising airing yards and other ancillary/service structures. The development of those lands would not therefore alter the impact of the SHD and the cumulative effect would therefore be unchanged.

15.9.2 Structure 2 – Perimeter Wall

As noted in 15.4.2 above, the Perimeter Wall's sensitivity to change arises from its unbroken continuity and the proposals in the SHD to remove sections of it for vehicular access and visual connectivity. On the basis that there is no anticipation that the degree of wall removal will be changed by the other development, the cumulative impact is unchanged.

15.9.3 Structure 3 – Gate Lodge

As noted in 15.4.3 above, the Gate Lodge's sensitivity to change arises from its role as a point of entry to the demesne and its architectural character. Development of the lands north of the hospital will not further affect the Gate Lodge beyond the SHD and the cumulative impact is therefore unchanged.

15.9.4 Structure 10 – Chapel

As noted in 15.4.4 above, the Chapel's sensitivity to change arises from its unaltered form and purpose and its group value with the Main Hospital Buildings. This relationship with the hospital buildings is unaltered by the SHD but has the capacity to be eroded by the proposed development of the Main Hospital Buildings. That development, of the hospital buildings and their immediate curtilage including that of the chapel, have the potential to negatively affect the chapel. However, the contribution to the cumulative impact would arise solely from that development, and the contribution of the SHD would remain unaltered. At the time of writing no application for the main hospital buildings has been formalised, and quantification of the possible impact is therefore not possible.

15.9.5 Structures 26/27 – Farmstead

As noted in 15.4.4 above, the Farmstead's sensitivity to change arises from the largely unaltered form and the relationship that the components have to each other. On the understood basis that the Farmstead is to be retained, refurbished and repurposed there is no cumulative impact with the SHD.

15.9.6 Structure 39 – Walled Garden

As noted in 15.4.5 above, the sensitivity to change of the walled garden arises from its intact nature and continuity of purpose. The development of the Main Hospital Buildings would make no material change to the impact of the SHD and the cumulative impact would therefore be unchanged.

15.9.7 Heritage Asset 45 – Historic Landscape

As noted in 15.4.7 above, the sensitivity to change of the Historic Landscape arises from its intact nature and the relationship that it has with the Main Hospital Buildings. With development of the building being limited to refurbishment, internal alteration and repurposing there will be no material change to the impact of the SHD and the cumulative impact would therefore be unchanged.

15.10 'Do-Nothing' Effect

The effects on the identified Heritage Assets from doing nothing are assessed to be:

- With the function of the Central Mental Hospital scheduled to move to Portrane, the CMH(Dundrum) grounds as a whole, including the SHD site, will inevitably become disused. There would then exist a very significant risk of the Heritage structures suffering deterioration from lack of use and maintenance, and from the increased susceptibility of the site to vandalism.

- The Historic Landscape of the site survives through active management, which would likely cease with the abandonment of the site as noted above.

- Should the site be abandoned as above, and the SHD development not proceed, the identification of a new and sustainable function for the Main Hospital Building and associated protected structures becomes exponentially more difficult.

15.11 Difficulties Encountered in Compiling the Chapter

None.

15.12 Conclusions

The Development has been assessed in terms of the potential impacts on Heritage Receptors within and external to the site boundary. Particular relevance has been attributed to the 'Country House Demesne' model that had been adopted for the complex, an important aspect of the site's pioneering attitude to the treatment of the criminally insane, and a model which survives to a significant extent. The elements within that demesne have been assessed in terms of their sensitivity to change and the degree to which the Development will effect change to them. In most instances the development of the lands results in the potential for a negative impact on the Heritage Receptors.

Mitigation measures have been proposed which will in all instances reduce the severity of the impact to Heritage Receptors, in some instances rendering the impact negligible, null or positive.

The 'Do Nothing' effect has highlighted that abandonment of the site by the HSE attaches real risks to the Heritage Receptors, as they require active management to preserve their physical condition and their significance.

15.13 References

15.13.1 Published References

15.13.1.1 Official Papers

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Wellcome Archive

The floor plan with scale of the Criminal Lunatic Asylum, Dundrum, Dublin, Ireland. Transfer lithograph by J.R. Jobbins, 1850, after J. Owen. (from Civil Engineer's Journal pub. 1851)
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The Criminal Lunatic Asylum, Dundrum, Dublin, Ireland. Transfer lithograph by J.R. Jobbins, 1850, after J. Owen. (from Civil Engineer's Journal pub. 1851)

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16.0 MICROCLIMATE – WIND

16.1 Introduction

B-Fluid Limited has carried out the Wind Microclimate Study for the Central Mental Hospital Development, Dundrum Road, Dundrum, Dublin 14. Figure 16.1 shows the proposed development site with the proposed developments within the redline.

Figure 16.1: Proposed Central Mental Hospital, Dundrum Road Development Site.

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Dr. Arman Safdari is a CFD Modelling Engineer who specialises in computational fluid dynamics applications. He is an expert in airflow modelling, heat and mass transfer and multi-phase flow simulations. He holds a PhD in Mechanical Engineering from Pusan National University, a M.Sc. and B.Sc. in Mechanical Engineering.

A Wind Microclimate Study identifies the possible wind patterns that form when wind moves through a built environment and evaluates how a new development is going to modify those patterns. Wind Microclimate is defined as the wind flow experienced by people and the subsequent influence it has on their activities. Wind can accelerate or re-circulate through buildings in such a way to compromise the comfort/safety of pedestrians and the capacity of using the public realm/ external places in accordance with their designated intended use.

A wind microclimate study considers the possible wind patterns formed under both mean and peak wind conditions typically occurring on the site area, accounting for a scenario where the proposed development is inserted in the existing environment (*potential impact*) and, for a scenario where the proposed development is analysed together with the existing environment and any permitted development (not constructed yet) that can be influenced by the wind patterns generated by the proposed one (*cumulative impact*).

The potential receptors include those areas, in the surrounding of the development, which can be exposed to potential risks generated by the elevated wind speed or building massing wind effects. In particular:

- Amenity areas (pedestrian level), areas likely to be utilised for leisure purposes and as such should be comfortable surroundings.
- Pedestrian routes and seating areas – to determine if locations are comfortable for leisure activities.
- Entrance to the buildings – to determine if there is potential for pressure related issues for entrances or lobbies.
- Landscaped areas – where there are sheltered areas.
- Impact to existing or adjoining developments – where the proposed buildings will cause discomfort conditions through proximity related issues.

The acceptance criteria which define the acceptable wind velocities in relation to the perception of comfort level experienced while carrying out a specific pedestrian activity is known as the "*Lawson Criteria for Pedestrian Comfort and Distress*". A wind microclimate study analyses the wind flow in an urban context (considering the wind conditions typically occurring on the site during a typical year) to develop the so called "Lawson Comfort and Distress Map"; the map identifies where a specific pedestrian activity can be carried out comfortably during most of the time.

The assessment can be performed by physical testing in wind tunnels or by performing "virtual wind tunnel testing" through numerical simulation using Computational Fluid Dynamics (CFD), as done for this project. The scope of the numerical study is to simulate the wind around the development this to predicting under which wind speeds pedestrians will be exposed and what level of comfort pedestrian will experience when carrying out a specific activity (i.e. walking, strolling, sitting).

The following sections details the methodology, acceptance criteria, CFD wind simulations and the impact of the proposed development on the local wind microclimate against best practice guidelines for pedestrian comfort and safety.

16.1.1 Guidance and Legislation

According to the '*Urban Development and Building Heights, Guidelines for Planning Authorities (Government of Ireland, December 2020)*' document, specific wind impact assessment of the microclimatic effects should be performed for '*buildings taller than prevailing building heights in urban areas'*. In the same guidance, standard buildings height is considered 6-8 storeys. Above this height, buildings are considered 'taller' for Dublin standards.

The recommended approach to wind microclimate studies is outlined in the "*Wind Microclimate Guidelines for Developments in the City of London* '(August 2020) and in the guidelines and recommendations contained in BRE Digest (DG) 520, "Wind Microclimate Around Buildings" (BRE, 2011). The Lawson Criteria of Comfort and Distress is used to benchmark the pedestrian wind microclimate.

The document also indicates how to use Computational fluid dynamics (CFD) to assess wind microclimate conditions and how to generate high quality outputs to provide a good understanding of the fundamental flow features around an urban context.

Building Height	Recommended Approach to Wind Microclimate Studies
Similar or lower than the average height of surrounding buildings **Up to 25m**	Wind studies are not required, unless sensitive pedestrian activities are intended (e.g. around hospitals, transport hubs, etc.) or the project is located on an exposed location
Up to double the average height of surrounding buildings **25m to 50m**	Computational (CFD) Simulations **OR** Wind Tunnel Testing
Up to 4 times the average height of surrounding buildings **50m to 100m**	Computational (CFD) Simulations **AND** Wind Tunnel Testing
High Rise **Above 100m**	**Early Stage Massing Optimization:** Wind Tunnel Testing OR Computational (CFD) Simulations **Detailed Design:** Wind Tunnel Testing **AND** Computational (CFD) Simulations to demonstrate the performance of the final building design

Figure 16.2: Recommended Approach to Wind Microclimate Studies based on Building Height, as prescribed by the Wind Microclimate Guidelines for Developments in the City of London (August 2020).

16.1.2 Urban Wind Effects

Buildings and topography affect the speed and direction of wind flows. Wind speed increases with increasing height above the ground, assuming a parabolic profile.

Flow near the ground level encounters obstacles represented by terrain roughness/buildings that reduce the wind speed and introduce random vertical and horizontal velocity components. This turbulence causes vertical mixing between the air moving horizontally at one level, and the air at those levels immediately above and below it. For this reason, the wind velocity profile is given by a fluctuating velocity along a mean velocity value. Figure 16.3 shows the wind velocity profile, as described above.

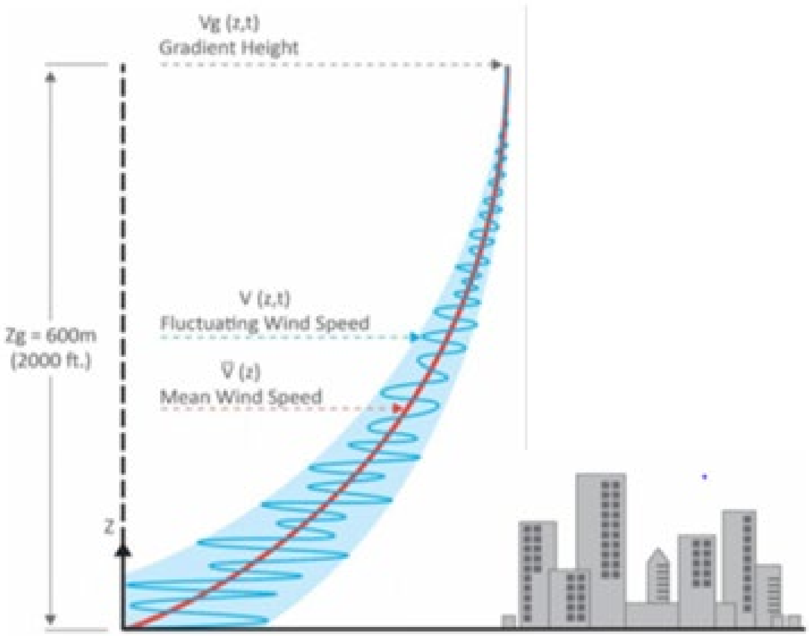


Figure 16.3: Atmospheric wind velocity profile.

In an urban context, wind speeds at pedestrian level are generally low compared with upper-level wind speeds, however, the wind can create adverse patterns when flowing in between buildings which can cause local wind accelerations or re-circulations (see Figure 16.4). This patterns effects pedestrian safety and comfort. In general, the wind effects to be avoided/mitigated in an urban context include the following:

- **Funnelling Effects:** The wind can accelerate significantly when flowing through a narrow passage between building structures. The highest speeds are experienced at the point where the restriction of the area is the greatest.

- **Downwash Effects:** The air stream when striking a tall building can flow around it, over it and a part can deflected towards the ground. This downward component is called downwash effect and its intensity depends on the pressure difference driving the wind. The higher the building, the higher this pressure difference can be.

- **Corner Effects:** Wind can accelerate around the corners of the buildings. Pedestrians can experience higher wind speeds as well as more sudden changes in wind speeds. The reason for this is that there are narrow transition zones between the accelerated flows and the adjacent quiescent regions. This effect is linked to the downwash effect as the downward stream component subsequently flows around the corners towards the leeward side of the building.

- **Wake Effect:** Excessive turbulence can occur in the leeward side of the building. This can cause sudden changes in wind velocity and can raise dust or lead to accumulation of debris. This effect is also dependent on the height of the building.

The anticipation of the likely wind conditions resulting from new developments are important considerations in the context of pedestrian comfort and the safe use of the public realm. While it is not always practical to design out all the risks associated with the wind environment, it is possible to provide local mitigation to minimise risk or discomfort where required.

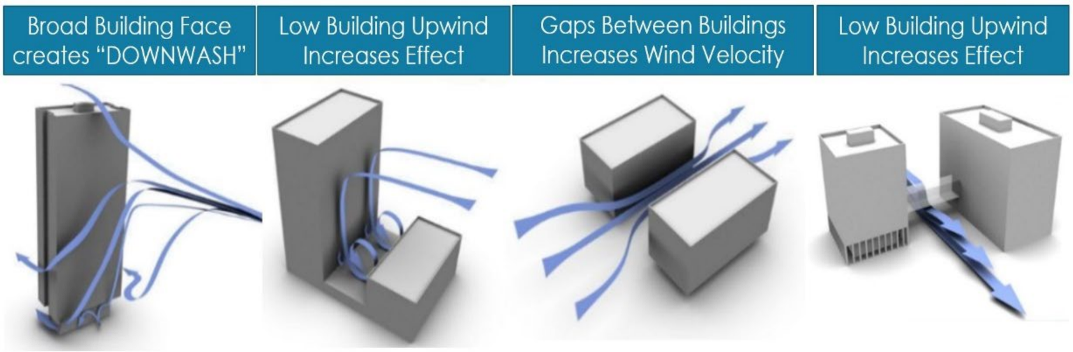


Figure 16.4: Wind patterns created around buildings showing typical wind microclimate in an urban context.

16.2 Methodology

The method for the study of wind microclimate combines the use of Computational Fluid Dynamics (CFD) to predict wind velocities and wind flow patterns, with the use of wind data from suitable meteorological station and the recommended comfort and safety standards (Lawson Criteria). The effect of the geometry, height and massing of the proposed development and existing surroundings including topography, ground roughness and landscaping of the site, on local wind speed and direction is considered as well as the pedestrian activity to be expected (sitting, standing, strolling and fast walking). The results of the assessment are presented in the form of contours of the Lawson criteria at pedestrian level.

The assessment has comprised the following scenarios:

- **<u>Baseline Existing Scenario</u>**: this consist of the existing wind microclimate at the site.

- **<u>Proposed Development in the Existing Scenario</u>**: this consist of the assessment of the wind microclimate of the site with the proposed development surrounded by existing buildings.

- **<u>Cumulative Scenario</u>**: this consist of the assessment of the wind microclimate of the site with the proposed development surrounded by existing and permitted buildings.

In accordance with the guideline cited in section 16.1.1, the wind microclimate study should consider the effect of the proposed development together with buildings (existing and/or permitted) that are within 400m from the centre of the site. Other taller buildings outside of this zone that could have an influence on wind conditions within the project site should be included for wind directions where they are upwind of the project site.

Figure 16.5: Extent of relevant area for the wind microclimate study.

In particular, the following has been undertaken:

- Topography of the site with buildings (proposed and adjacent existing/permitted developments massing, depending on the scenario assessed "*baseline, proposed or cumulative*") have been modelled using CFD OpenFOAM Software.

- Suitable wind conditions have been determined based on historic wind data. Criteria and selected wind scenarios included means and peaks wind conditions that need to be assessed in relation to the Lawson Criteria.

- Computational Fluid Dynamics (CFD) has been used to simulate the local wind environment for the required scenarios ('baseline, proposed, cumulative").

- The impact of the proposed development massing on the local wind environment has been determined (showing the wind flows obtained at pedestrian level).

- Potential receptors (pedestrian areas) have been assessed through review of external amenity/public areas (generating the Lawson Comfort and Distress Map).

- Potential mitigation strategies for any building related discomfort conditions (where necessary) have been explored and their effect introduced in the CFD model produced.

16.2.1 Assessment Criteria for Pedestrian Comfort and Distress

"Lawson Comfort and Distress Criteria" has been developed for wind microclimate studies as a means of assessing the long term suitability of urban areas for walking or sitting, accounting for both microclimatic wind effects (i.e. site location and prevailing winds) and microclimatic air movement associated with wind forces influenced by the localised built environment forms and landscaping effects.

The Lawson scale assesses pedestrian wind comfort in absolute terms and defines the reaction of an average person to the wind.

For the distress (safety) criterion, only gust winds are considered. These are usually rare events, but deserve special attention in city planning and building design due to their potential impact on pedestrian safety. Gusts cause most cases of annoyance and distress and are assessed in addition to average wind speeds. Gust speeds should be divided by 1.85 and these "*gust equivalent mean*" (GEM) speeds are compared to the same criteria as for the mean hourly wind speeds. This avoids the need for different criteria for mean and gust wind speeds.

The following criteria are widely accepted by local authorities as well as the international building design and city planning community:

- COMFORT CRITERIA: Relates to the activity of the individual.
  Onset of discomfort:
  - Depends on the activity in which the individual is engaged and is defined in terms of a mean hourly wind speed (or GEM) which is exceeded for 5% of the time.
- DISTRESS CRITERIA: Relates to the physical well-being of the individual.
  Onset of distress:
  - 'Frail Person or Cyclist': equivalent to an hourly mean speed of 15 m/s and a gust speed of 28 m/s (62 mph) to be exceeded less often than once a year (0.022% of the times). This is intended to identify wind conditions which less able individuals or cyclists may find physically difficult. Conditions in excess of this limit may be acceptable for optional routes and routes which less physically able individuals are unlikely to use.
  - 'General Public': A mean speed of 20 m/s and a gust speed of 37 m/s (83 mph) to be exceeded less often than once a year. Beyond this gust speed, aerodynamic forces approach body weight and it rapidly becomes impossible for anyone to remain standing. Where wind speeds exceed these values, pedestrian access should be discouraged.

Table 16.1: Lawson Pedestrian Comfort/Distress Criteria Details.

Pedestrian Comfort Category (Lawson Scale)	Mean and Gem wind speed not to be exceeded more than 5% of the time	Description
Long-Term Sitting	4m/s	Acceptable for frequent outdoor sitting use, i.e. restaurant /café
Standing	6m/s	Acceptable for occasional outdoor sitting use, i.e. public outdoor spaces
Walking/Strolling	8m/s	Acceptable for entrances/bus stops /covered walkaways
Business Walking	10m/s	Acceptable for external pavements, walkways
Unacceptable/Distress	>10m/s	Start of not comfortable/distress level for pedestrian access

Table 16.2: Lawson Pedestrian Comfort/Distress Criteria Details of Unsafe Conditions.

Pedestrian Safety Category (Lawson Scale)	Mean and Gem wind speed not to be exceeded more than 0.0022% of the time	Description
Unsafe for public	>20m/s	Distress/safety concern for pedestrian
Unsafe for cyclists or frail person	>15m/s	Distress/safety concern for cyclist/frail person

These criteria for wind forces represent average wind tolerances. They are subjective and variable depending on thermal conditions, age, health, clothing, etc. which can all affect a person's perception of a local microclimate. Moreover, pedestrian activity alters between winter and summer months. The criteria assume that people will be suitably dressed for the time of year and individual activity. It is reasonable to assume, for instance, that areas designated for outdoor seating will not be used on the windiest days of the year. Weather data measured are used to calculate how often a given wind speed will occur each year over a specified area.

Pedestrian comfort and distress criteria are assessed at 1.5m above ground level as required by the guideline cited in section 16.1.1. If the predicted wind conditions exceed the threshold, then conditions are unacceptable for the type of pedestrian activity and mitigation measures should be implemented into the design.

16.2.2 Significance Criteria

The significance of on-site measurement locations are defined by comparing the wind comfort/safety levels with the intended pedestrian activity at each location, using the table provided by the Lawson Comfort and Distress Criteria.

Table 16.3: On-site Receptors Significance Criteria extracted by Wind Microclimate Guidelines for Developments in the City of London (August 2019).

Significance	Trigger	Mitigation required?
Major Adverse	Conditions are "unsafe"	Yes
Moderate Adverse	Conditions are "unsuitable" (in terms of comfort) for the intended pedestrian use.	Yes
Negligible	Conditions are "suitable" for the intended pedestrian use.	No
Moderate Beneficial	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	No

The significance of off-site measurement locations are defined by comparing the wind comfort/safety levels with the intended pedestrian activity at each location, prior and after the introduction of the proposed development.

Table 16.4: Off-site Receptors Significance Criteria extracted by Wind Microclimate Guidelines for Developments in the City of London (August 2020).

Significance	Trigger	Mitigation required?
Major Adverse	Conditions that were "safe" in the baseline scenario became "unsafe" because of the Proposed Development. *OR* Conditions that were "suitable" in terms of comfort in the baseline scenario became "unsuitable" because of the Proposed Development. *OR* Conditions that were "unsafe" in the baseline scenario are made worse because of the Proposed Development.	Yes
Moderate Adverse	Conditions that were "suitable" in terms of comfort in the baseline scenario are made windier (by at least one comfort category) as a result of the Proposed Development but remain "suitable" for the intended pedestrian activity.	No

Negligible	Conditions remain the same as in the baseline scenario.	No
Major Beneficial	Conditions that were “unsafe” in the baseline scenario became “safe” because of the Proposed Development.	No
Moderate Beneficial Potential Receptors	Conditions that were “unsuitable” in terms of comfort in the baseline scenario became “suitable” because of the Proposed Development. *OR* Conditions that were “unsafe” in the baseline scenario are made better as a result of the Proposed Development (but not so as to make them “safe”.	No

16.2.3 Potential Receptors

Potential receptors for the wind assessment are all pedestrian circulation routes, building entrances and leisure open areas within the site and in neighbouring adjacent areas. The pedestrian level is considered at 1.5m above ground.

In addition to the roads and entrances, some sensitive receptors for this assessment are highlighted in the following image and relate to the “Community Park”, “Central Parkland”, “Walled Garden” which will be used by public for long term sittings and need to be particularly comfortable/safe.

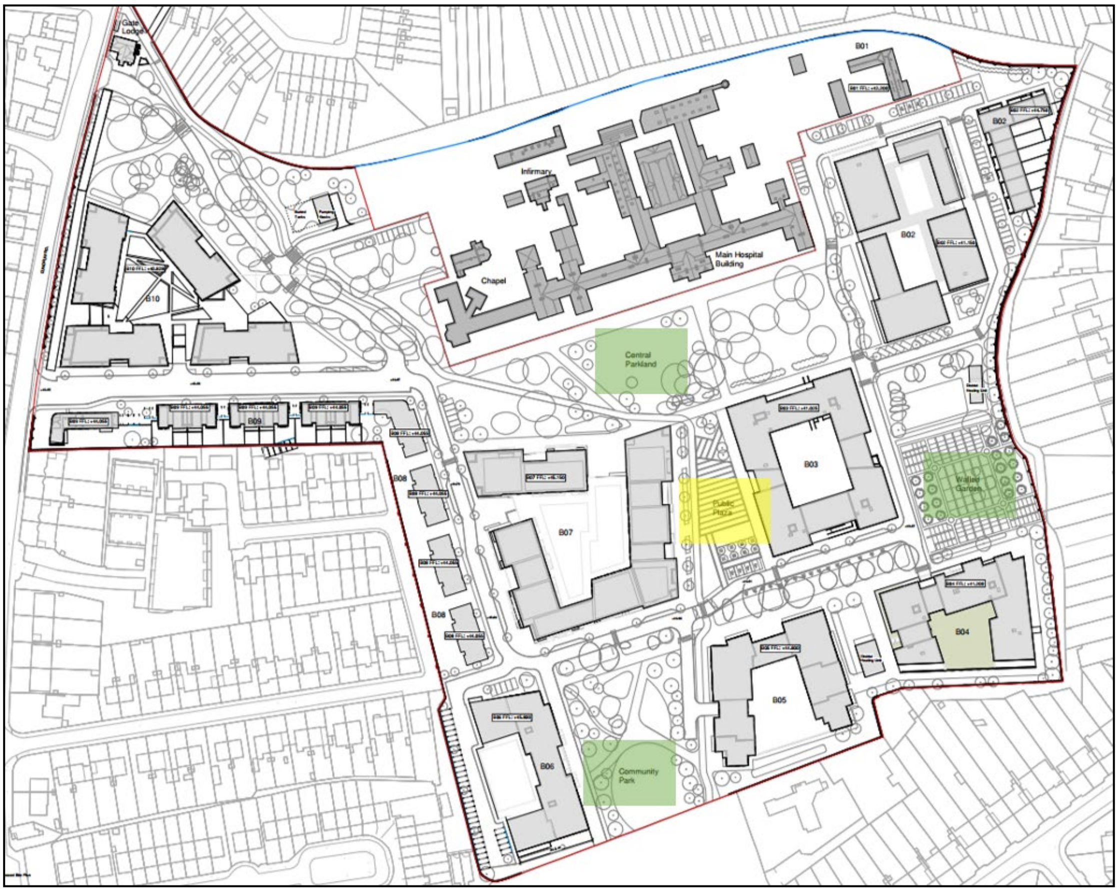


Figure 16.6: View of the proposed development with more sensitive receptors highlighted.

16.2.4 Local Wind Climate

A statistical analysis of 30 years historical wind data has been carried out to characterise the existing wind climate in terms of wind speeds, frequency, and directions.

The existing wind conditions are obtained using the annual average of meteorology data collected at Dublin Airport Weather Station. Figure 16.7 shows on the map the position of the subject site and the position of Dublin Airport.

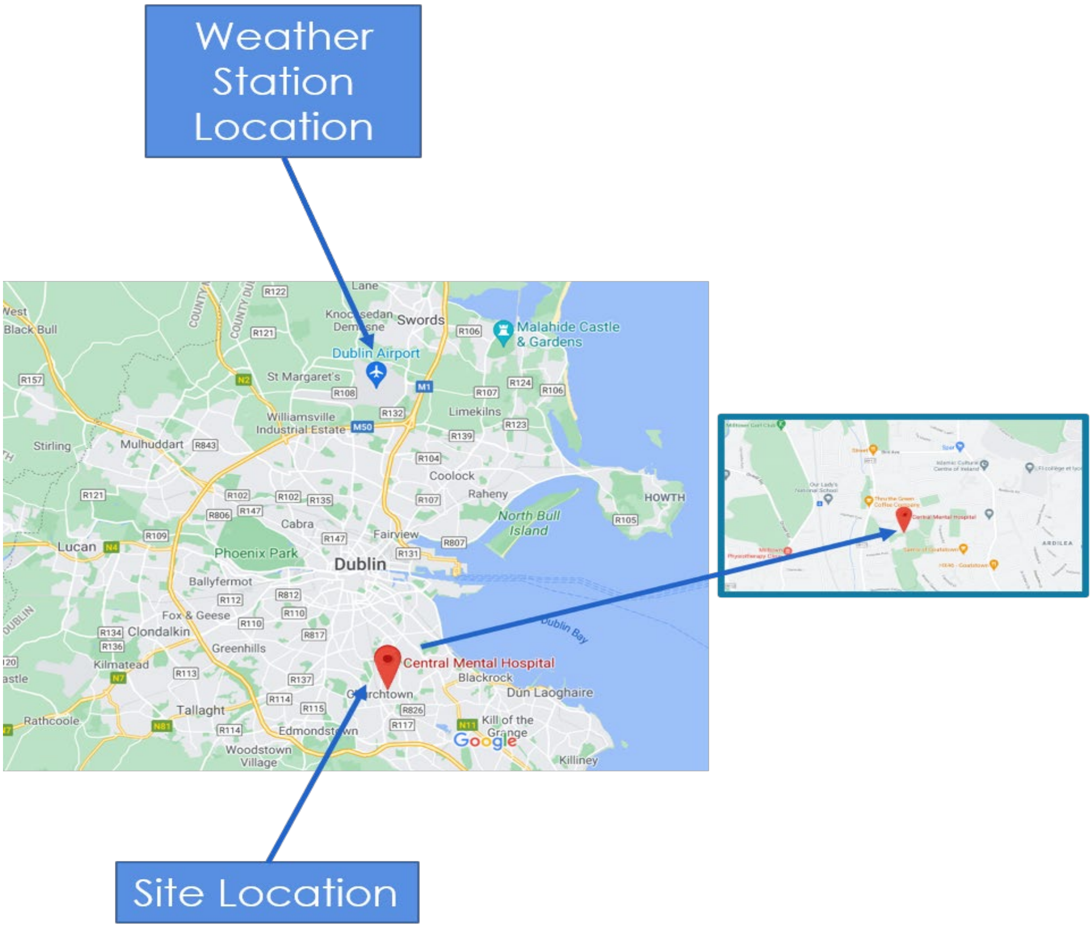


Figure 16.7: Map showing the position of Central Mental Hospital, Dundrum Road development and Dublin Airport.

Regarding the transferability of the available wind data from the Dublin Airport Weather Wind station to the site location, the following considerations have been made:

- **Terrain**: The meteorological station is located on the flat open terrain of the airport, whereas the development site is in an urban area with dense built-in structure with buildings of up to 10m height in average and with some buildings even taller.

- **Mean Wind Speeds**: Due to the different terrain environment, the ground-near wind speeds (at pedestrian level) will be lower at the proposed site compared to the meteorological station at the airport.

- **Wind Directions**: The landscape around the development site can principally be characterised as flat terrain. Isolated elevations in the near area of the development should have no influence on the wind speed and wind directions. With respect to the general wind climate, no significant influence is expected.

Based on the above considerations, it can be concluded that the data from the meteorological station at Dublin Airport are applicable for the assessment of the wind climate at the development site.

Two different data sets are analysed as follows:

- The meteorological data associated with the maximum daily wind speeds recorded over a 30-years period between 1990 and 2020 and,

- The mean hourly wind speeds recorded over a 10-years period between 1990 and 2020. The data is recorded at a weather station at the airport, which is located 10m above ground or 71mOD.

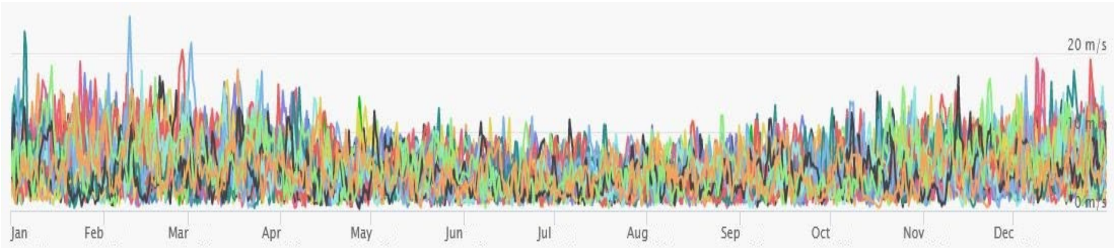


Figure 16.8: Local Wind Conditions - Wind Speed (Mean Values per Months)- historic data 1990-2020.

16.2.4.1 Local Wind for the Assessment of Pedestrian Comfort and Distress

The predominant wind directions on the baseline environment identifies from which direction the wind is blowing on the site for most of the time during a typical year.

In accordance with Lawson Criteria, if the proposed site is exposed to a wind from a specific direction for more than 5% of the times, then the microclimate analysis should consider the impact of this wind (accounting for its direction and most frequent speed) on the local microclimate.

Figure 16.9, presents the wind speed diagram for Dublin, the diagram shows how often (how many days per month) the wind blows with a specific speed.

Figure 16.10, shows the wind rose for Dublin and details how often (how many hours per year in this case) the wind blows from a specific direction, these data highlights that the predominant wind directions for the site are West-South-West, West, and South-West.

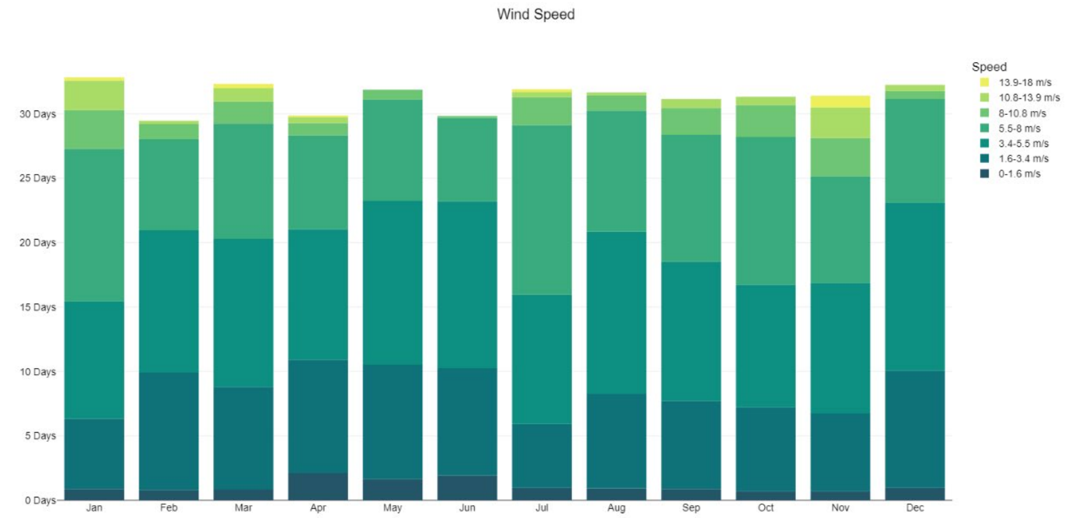


Figure 16.9: Dublin Wind Speed Diagram.

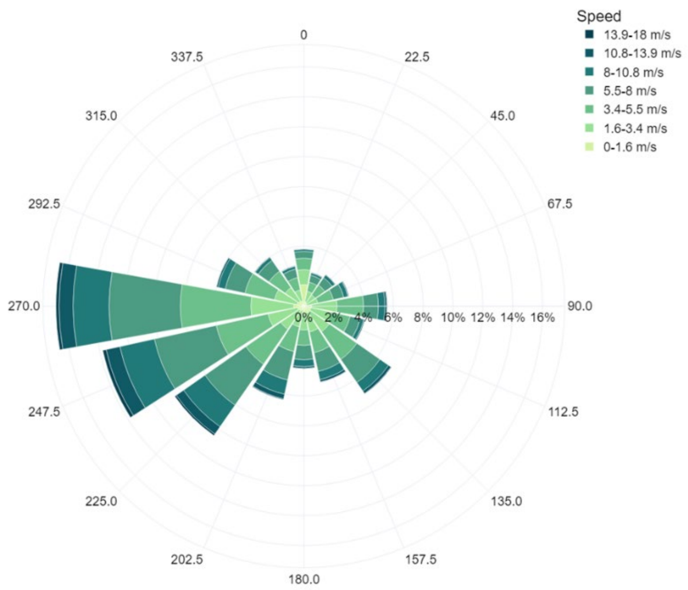


Figure 16.10: Local Wind Rose with wind frequency of occurrence details.

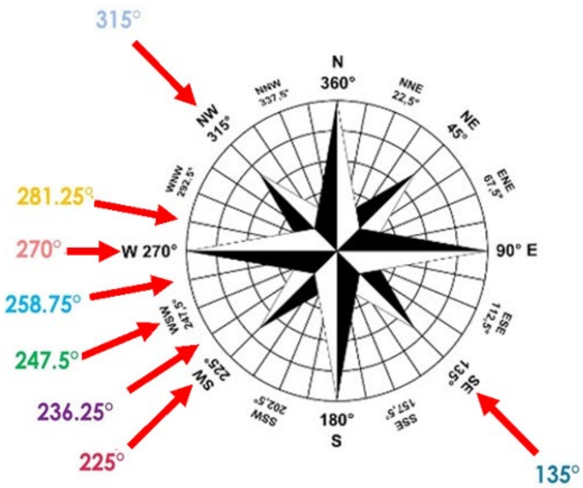
The table that follows reports all the wind directions and their correspondent velocity, displayed in order of frequency of occurrence with those most frequent on the top.

As it can be noted, the wind at the site is mostly blowing (higher frequency of occurrence) from the South-West (225deg) direction with a wind velocity of approximately 5m/s. A similar wind speed is blowing also from the South-South-West direction (213deg), however the frequency of occurrence of this wind is less than 5% (only 3.288% of the times, as indicated in the table) therefore, this wind is not relevant for the scope of performing the pedestrian comfort and distress analysis as per Lawson Criteria.

Table 16.5: Summary of the wind speeds at the site with indicated the magnitude, directions and frequency of occurrence.

BASELINE WIND SPEEDS, DIRECTIONS and FREQUENCY OF OCCURENCE		
Velocity (*m/s*)	Direction (deg)	Frequency(%)
5.601	225	**11.233 (> 5%)**
4.626	135	**6.849 (> 5%)**
5.847	236.25	**6.792 (> 5%)**
6.049	258.75	**6.747 (> 5%)**
6.034	247.5	**6.689 (> 5%)**
5.888	270	**5.662 (> 5%)**
4.994	315	**4.338**
5.503	281.25	**3.904**
4.974	292.5	3.436
5.357	213.75	3.288
4.736	123.75	3.105
4.406	146.25	2.751
5.101	303.75	2.648
5.246	112.5	2.500
4.121	157.5	2.386
4.581	101.25	2.340
4.169	45	2.180
3.558	90	2.135

For assessing the wind microclimate for the proposed development, the study has considered the site exposed to all the wind directions which exceed the 5% of frequency, as required for the Lawson Criteria and some additional high-speed winds, which are occurring less often (below 5% of the times) but that can cause distress conditions because of their speed. On this basis, the wind scenarios to be considered for the wind microclimate assessment are presented in Figure 16.11.



Velocity (m/s)	Direction (°)	Frequency
5.601	225	11.233
4.626	135	6.849
5.847	236.25	6.792
6.049	258.75	6.747
6.034	247.5	6.689
5.888	270	5.662
4.994	315	4.338
5.503	281.25	3.904

Figure 16.11: Baseline Wind Conditions relevant for the Lawson Criteria used for the wind microclimate study.

16.3 Baseline Environment

The baseline environment consists of the area to be developed as shown Figure 16.12 and it's surroundings. The wind microclimate of the baseline environment is defined by the wind patterns that develop on the existing site under the local wind conditions shown in section 16.2.4.

There is not designated public area in the existing context, therefore the application of the Lawson Criteria is done considering that potential receptors will use the area, for the different designated scope, when the proposed development will be constructed.

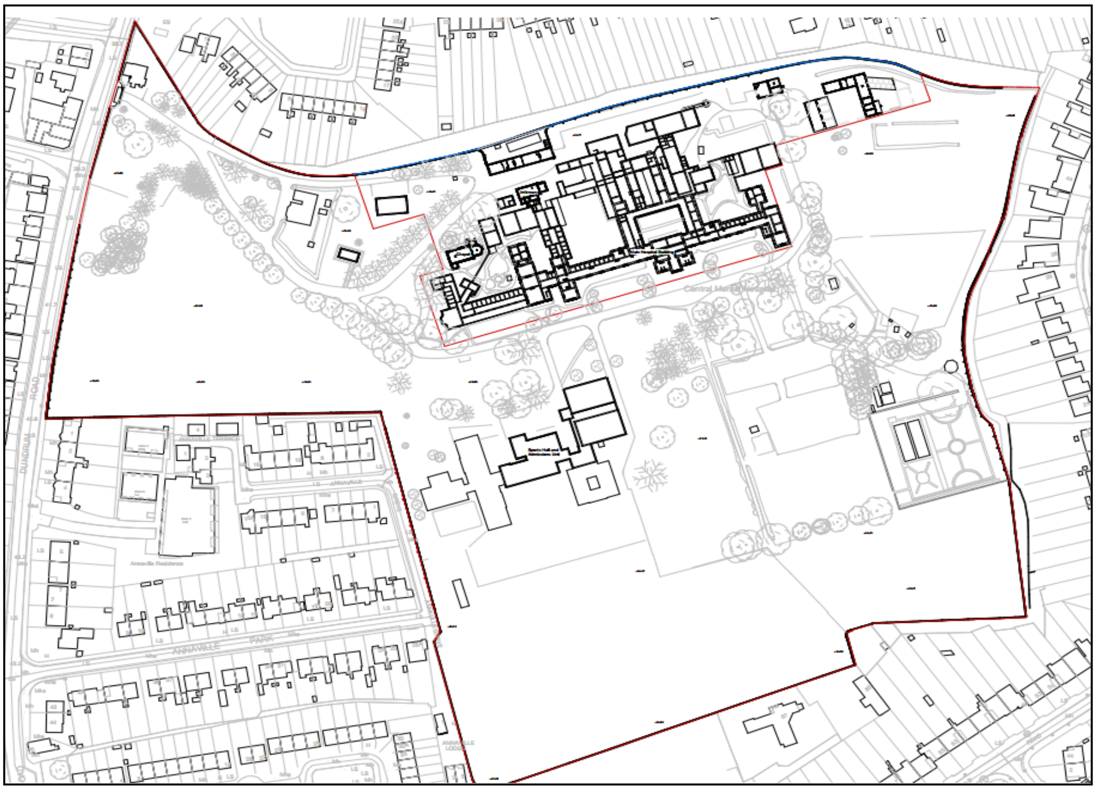


Figure 16.12: Baseline buildings and topography.

At the moment, the area is limited by a wall of approx. 4m height as shown in the images and reproduced in the models prepared for the wind simulations presented in the figures that follow.

16.3.1 Baseline Wind Microclimate

The wind microclimate of the baseline scenario is defined by the wind patterns that develop on the site and it's the surroundings (existing buildings and topography) under the local wind conditions relevant for the assessment of the Pedestrian Comfort and Distress.

Figure 16.13: Baseline existing environment. 3D model.

Figure 16.14: Baseline existing environment. 3D model.

Figure 16.15: 3D model for the CFD wind analysis (Baseline existing environment).

16.3.2.1 Wind Microclimate at Pedestrian Level

Results of the wind simulations carried out are detailed in the following sections. Results of wind microclimate at ground level (1.5m height - flow speeds) are collected throughout the modelled site and the impact of these on the potential receptors presented in the map that show the area of comfort and distress in accordance with Lawson Criteria.

These flow velocities identify if locally, wind speeds at pedestrian-level are accelerated or decelerated in relation to the undisturbed reference wind speed due to the presence of the existing baseline environment.

As it can be seen, wind speeds are shown to be within tenable conditions and in general comparable to the wind speed of the undisturbed flow for the direction considered.

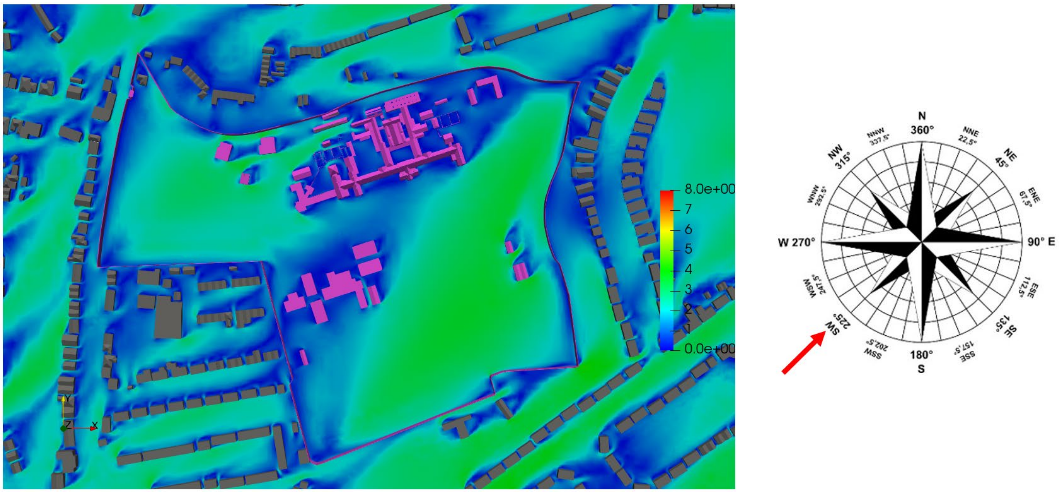


Figure 16.16: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 225°.

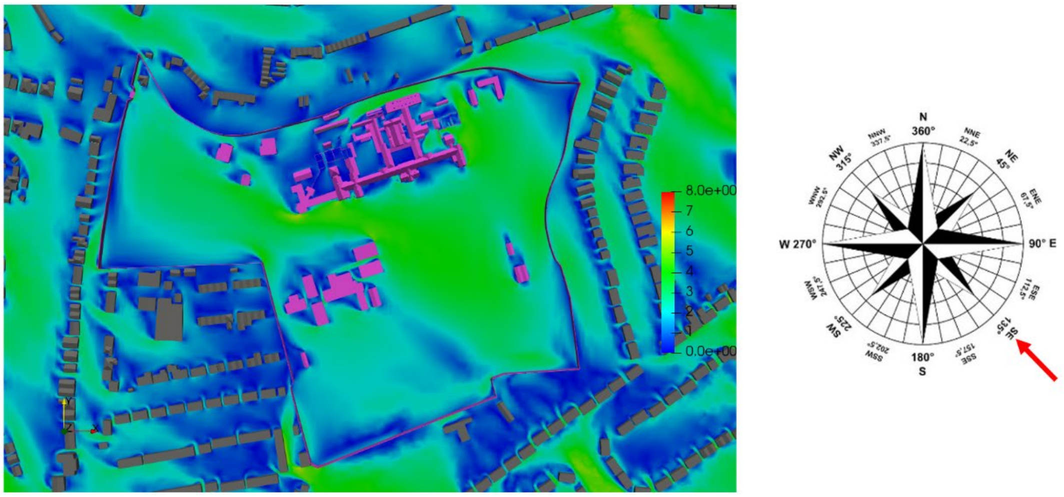


Figure 16.17: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 135°.

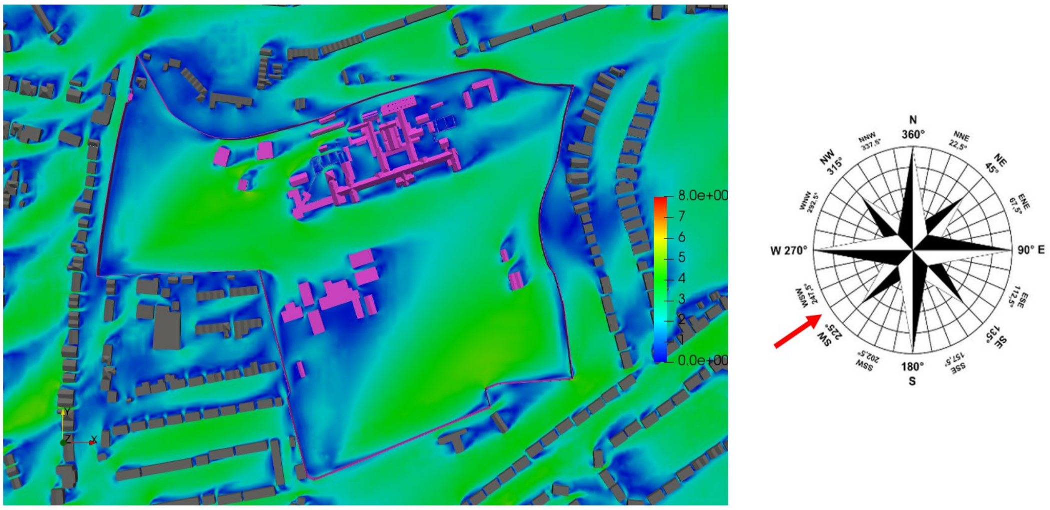


Figure 16.18: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 236°.

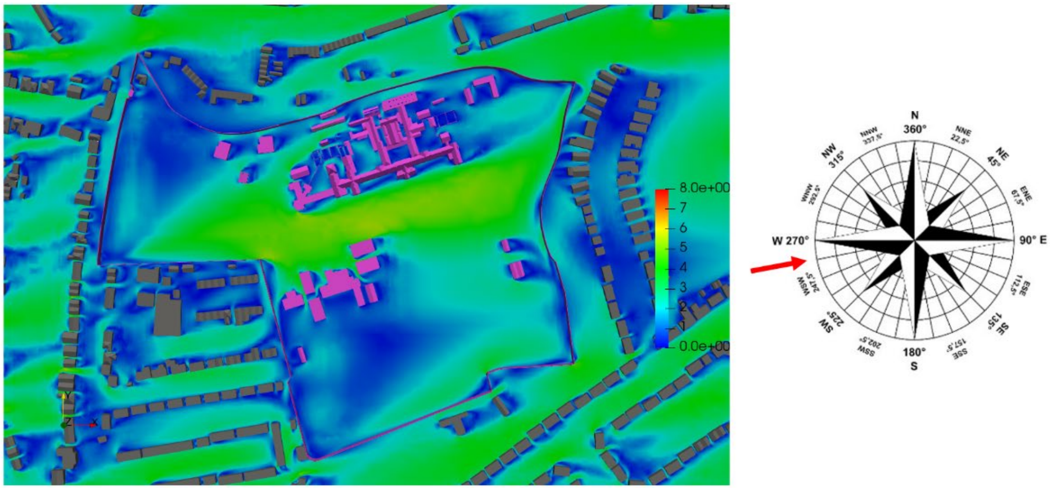


Figure 16.19: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 258°.

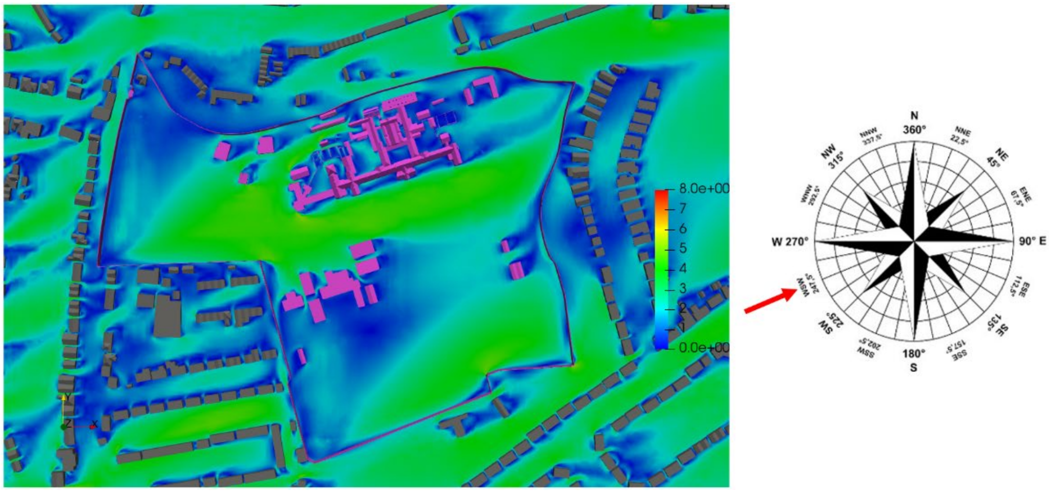


Figure 16.20: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 247°.

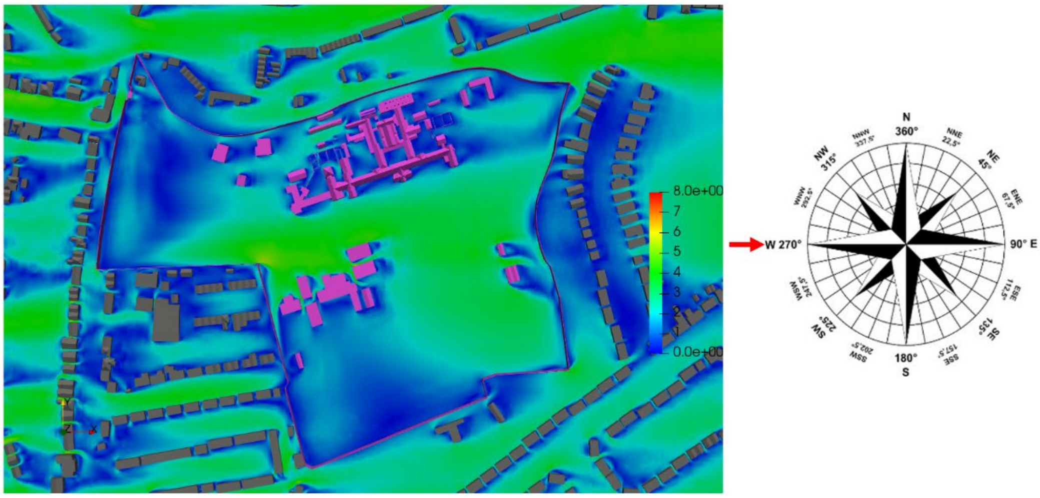


Figure 16.21: Pedestrian Level -Flow Velocity Results at 1.5m above the ground -Wind Direction: 270°.

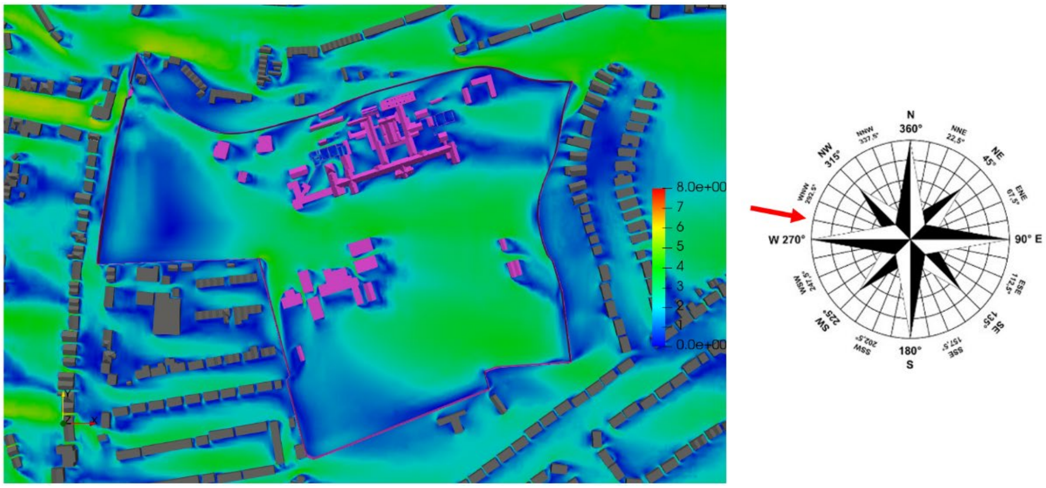


Figure 16.22: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 281°.

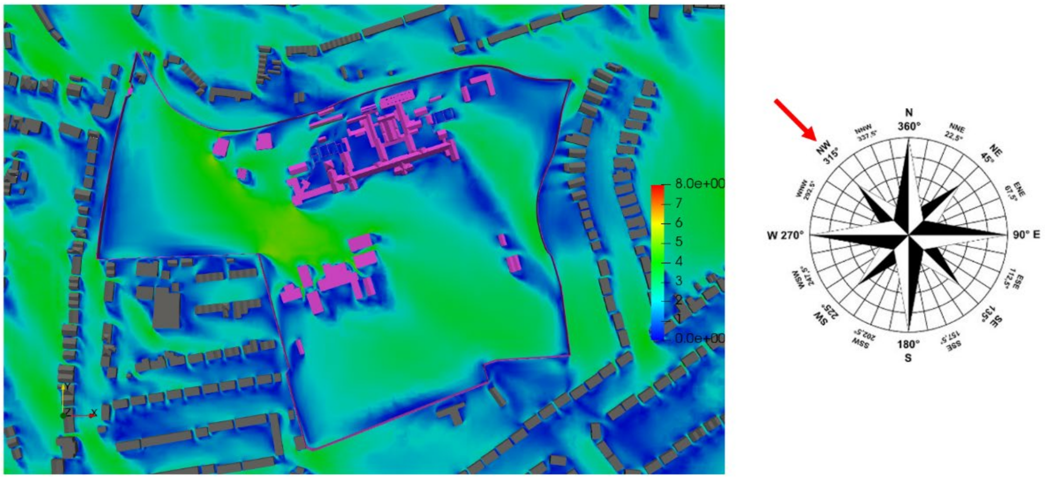


Figure 16.23: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 315°.

<u>3D Views</u>

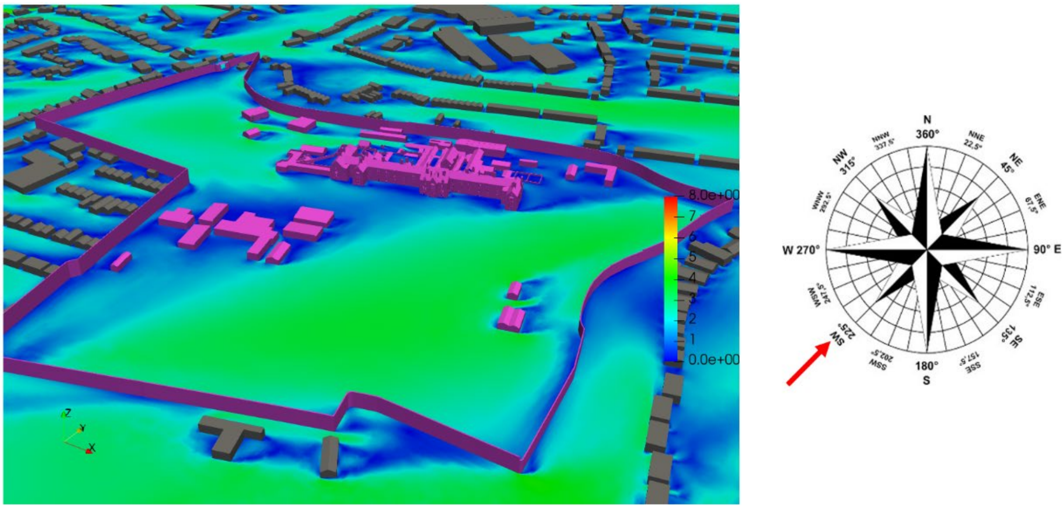


Figure 16.3 Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 225°.

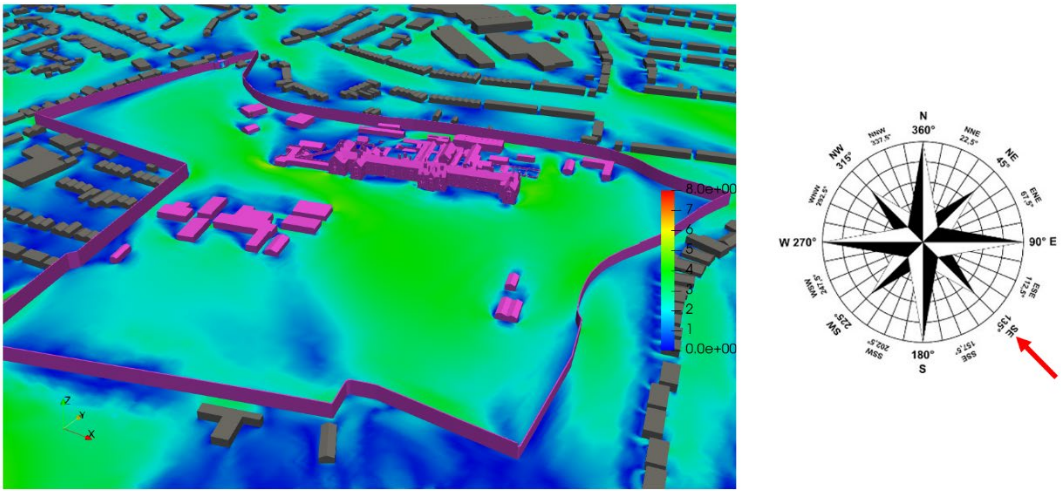


Figure 16.25: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 135°.

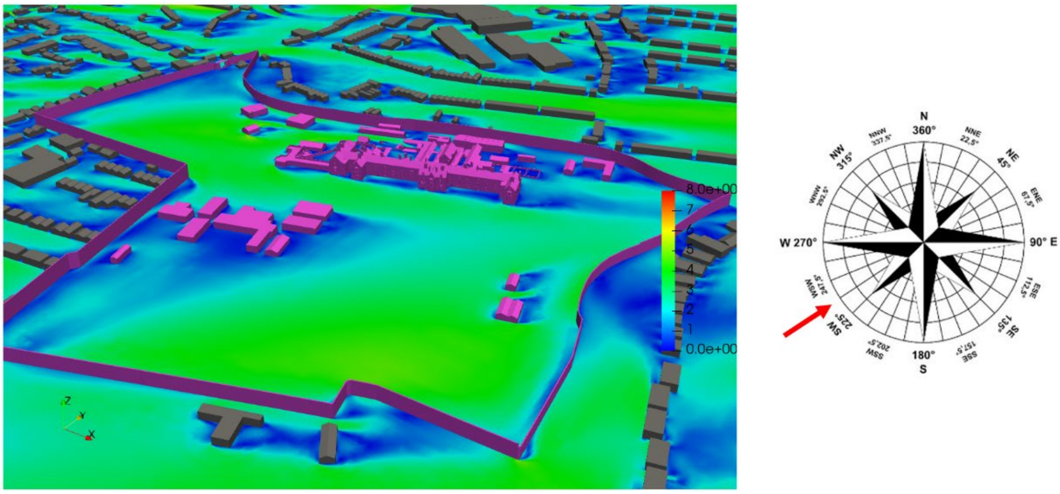


Figure 16.26: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 236°.

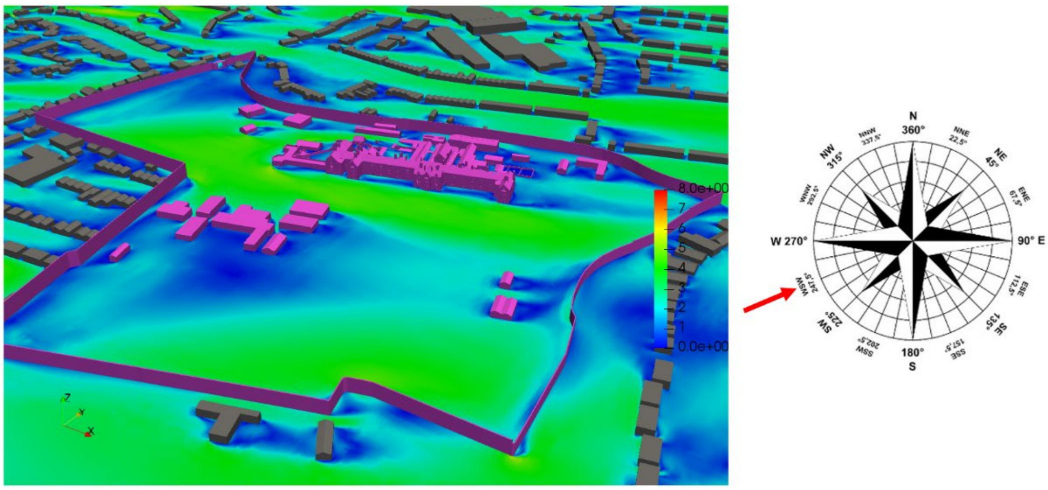


Figure 16.27: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 247°.

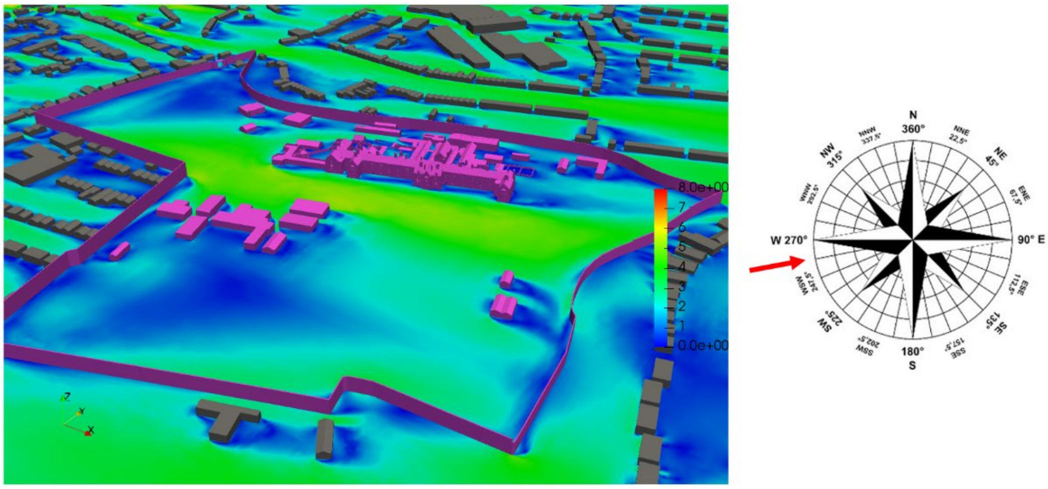


Figure 16.28: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 258°.

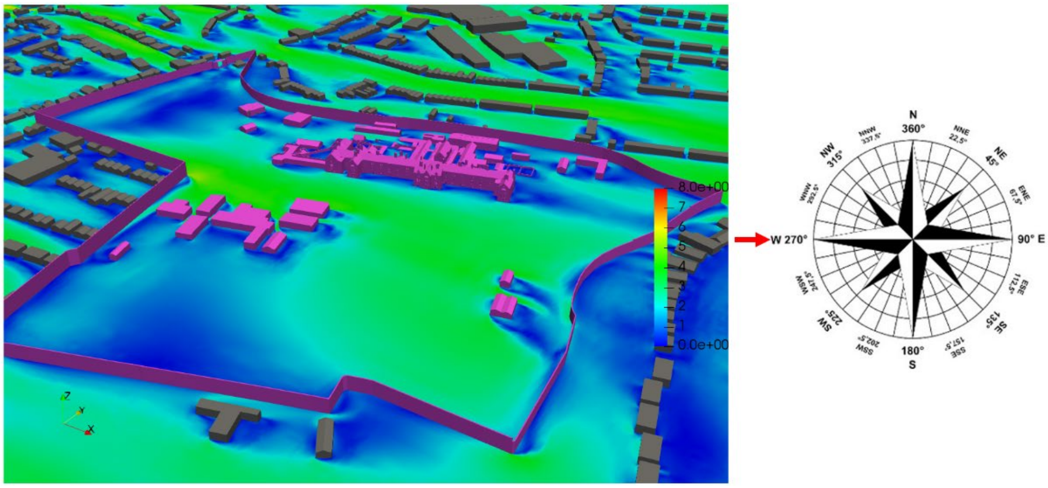


Figure 16.29: Pedestrian Level -Flow Velocity Results at 1.5m above the ground -Wind Direction: 270°.

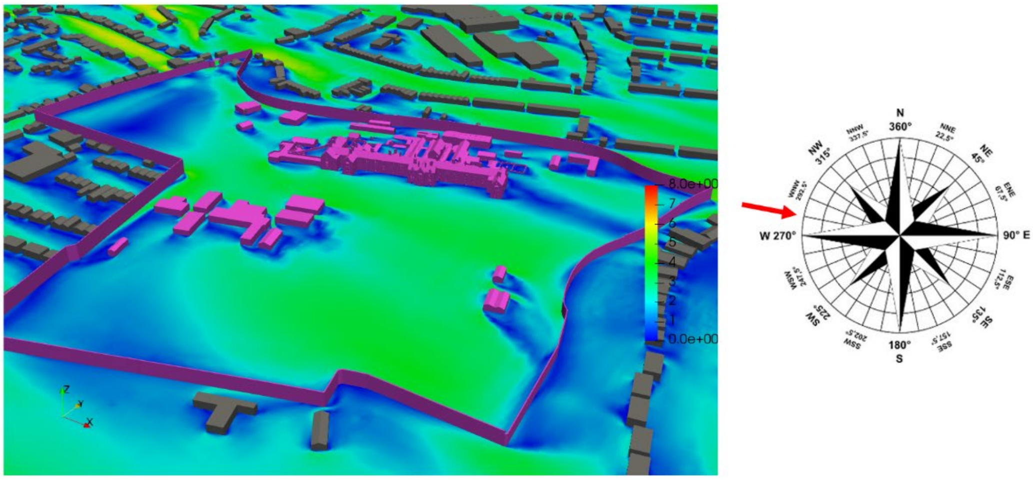


Figure 16.30: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 281°.

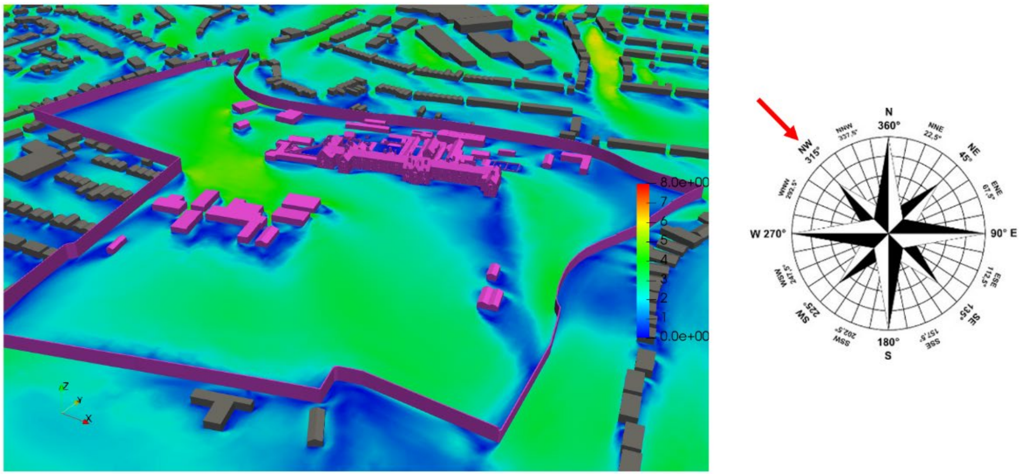
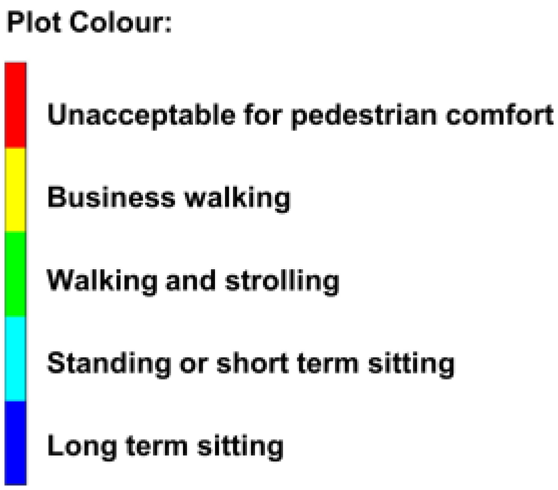


Figure 16.31: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 315°.

16.3.2.2 Impact on Pedestrian Comfort and Distress

The wind flow results obtained simulating the different direction and wind speeds, are combined with wind frequencies of occurrence to obtain comfort ratings at pedestrian level in all areas included within the model. The comparison of comfort ratings with intended pedestrian activities is shown in the Lawson Comfort and Distress Map that follows. The comfort/distress conditions are presented using a colour coded diagram below formulated in accordance with the Lawson Criteria.



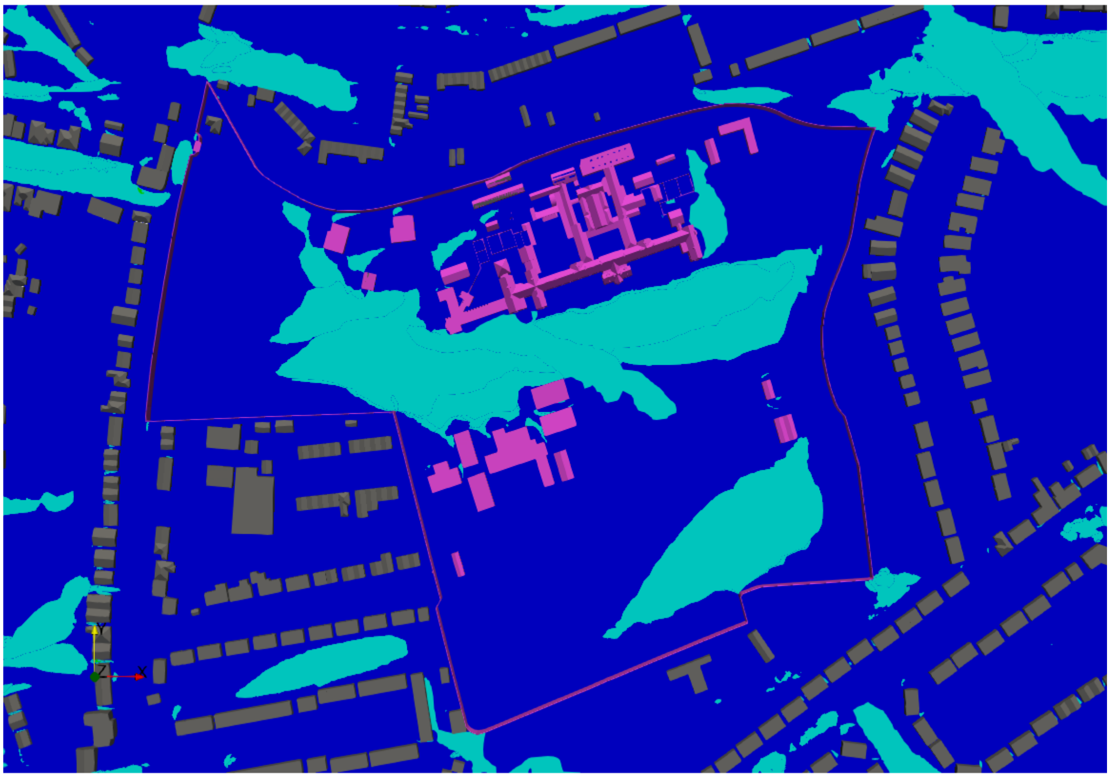


Figure 16.32: Pedestrian Level - Lawson Comfort/Distress Map - Top View.

- The assessment of the baseline scenario has shown that no area is unsafe and no conditions of distress are created in the existing environment under the local wind climate.

- The site is usable for walking and short term sitting, the roads in the surrounding are usable for their intended scope (walking).

- At the moment there is no designated area for public long term sitting, however some area of the site present comfortable conditions for this activity.

16.4 Potential Impacts

The wind microclimate of the proposed development is defined by the wind patterns that develop in the surroundings of the proposed development under the local wind conditions relevant for the Lawson Criteria and considering the existing buildings and topography. For this analysis also the proposed landscaping is included as the presence of landscaping in corners of buildings and roads impact in a beneficial way the local microclimate, creating calmer wind conditions.

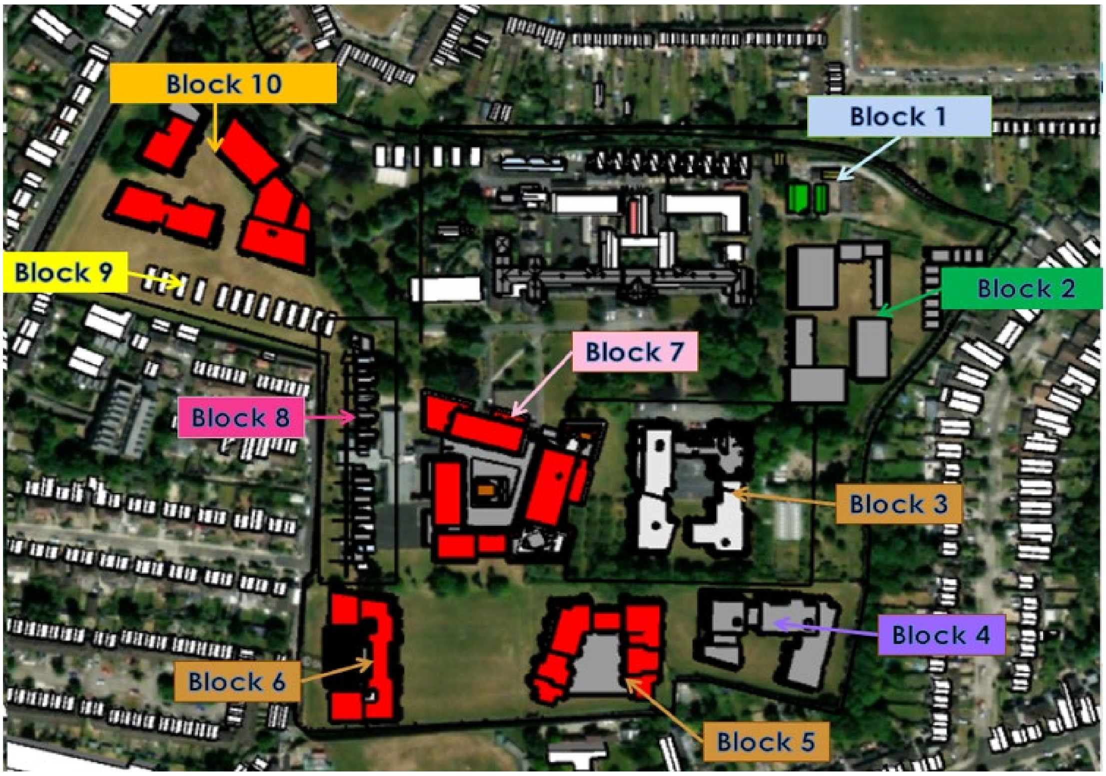


Figure 16.33: Proposed development within the existing environment 3D model.

Figure 16.34: Proposed development within the existing environment 3D model.

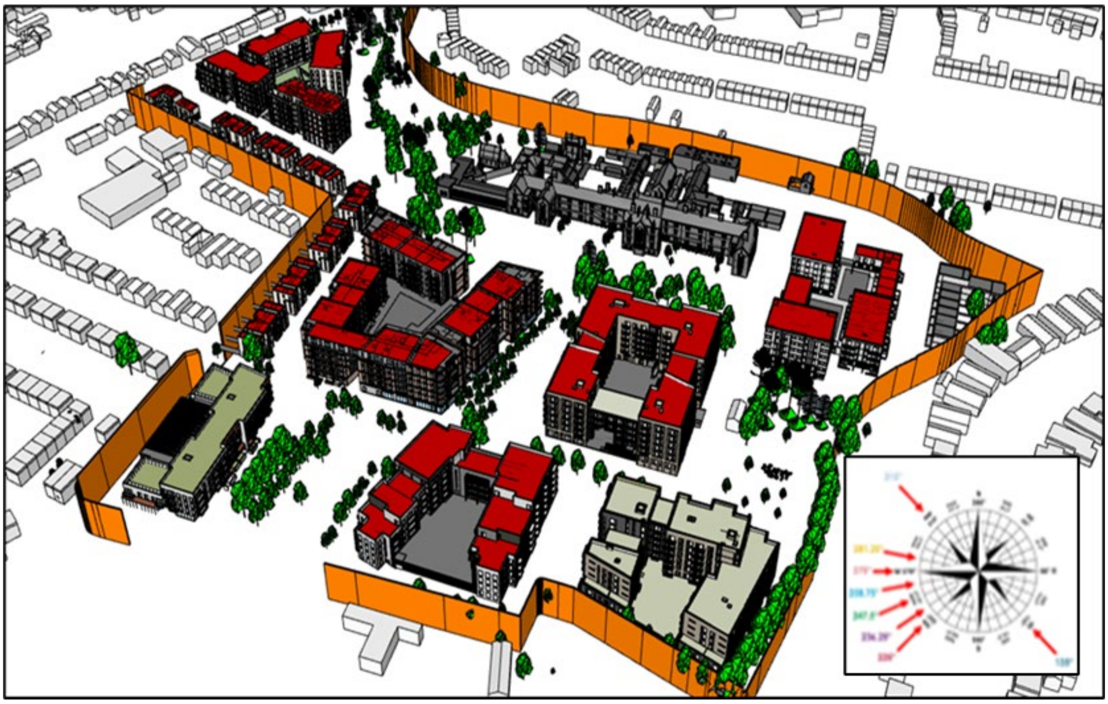


Figure 16.35: 3D model for the CFD wind analysis (proposed development within the existing environment and proposed landscaping included).

Results of the wind simulations carried out are detailed in the following sections. Results of wind microclimate at ground level (1.5m height - flow speeds) are collected throughout the modelled site and the impact of these on the potential receptors presented in the map that show the area of comfort and distress in accordance with Lawson Criteria.

16.4.1 Construction Phase

As construction of the Central Mental Hospital, Dundrum Road Development progresses, the wind conditions at the site would gradually adjust to those of the completed development. During the construction phase, wind conditions will be in line with the baseline wind microclimate and the effect on potential receptors (pedestrians) can be considered negligible. Furthermore, the areas more sensitive for receptors (Park, Public Plaza) are potentially not going to be used until construction will be finalised.

16.4.2 Operational Phase

16.4.2.1 Wind Microclimate at Pedestrian Level

Results of wind speeds and their circulations at pedestrian level of 1.5m above the development ground are presented in the images that follow in order of frequency of occurrence, from the most frequent wind direction to the least frequent one.

These flow velocities identify if locally, wind speeds at pedestrian-level are accelerated or decelerated in relation to the undisturbed reference wind speed (baseline wind speed) by the presence of the proposed development. As it can be seen, wind speeds are shown to be within tenable conditions and in general comparable to the wind speed of the undisturbed flow for the direction considered.

Some of the wind patterns in between the blocks indicates minor funnelling effects, this can be noted near the South-West side of the development which receives the prevailing South-West and South-East winds at approximately 5m/s. However, considering that the baseline wind speed are ranging from 3.9ms/ to 6m/s, throughout the area the wind is not accelerating to significant values (green colour indicated velocity of max 6m/s) and wind is also decelerated respect the undisturbed wind speed in some area due to the presence of the proposed development (blue colour indicate speeds of max 3m/s which are less than baseline wind speed applied).

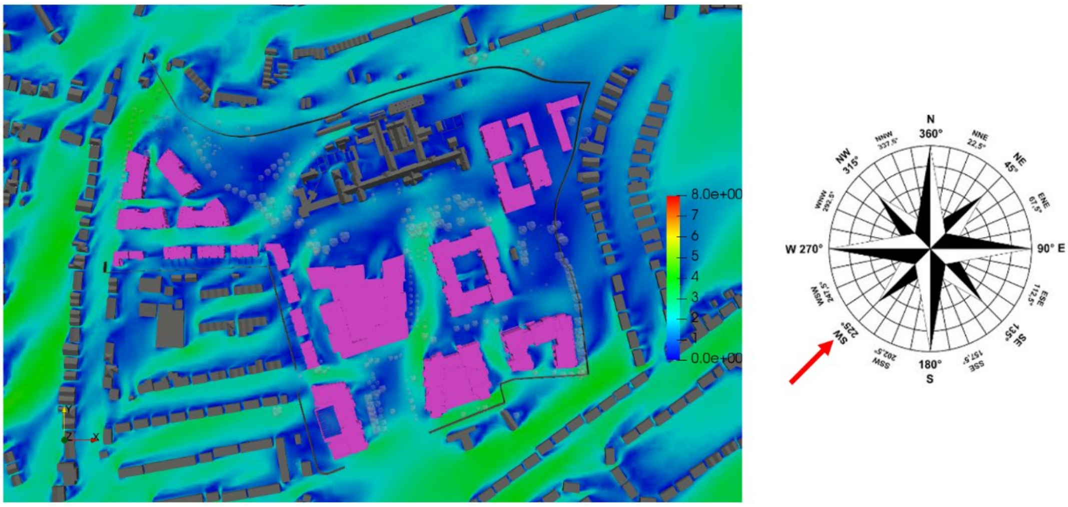


Figure 16.36: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 225°.

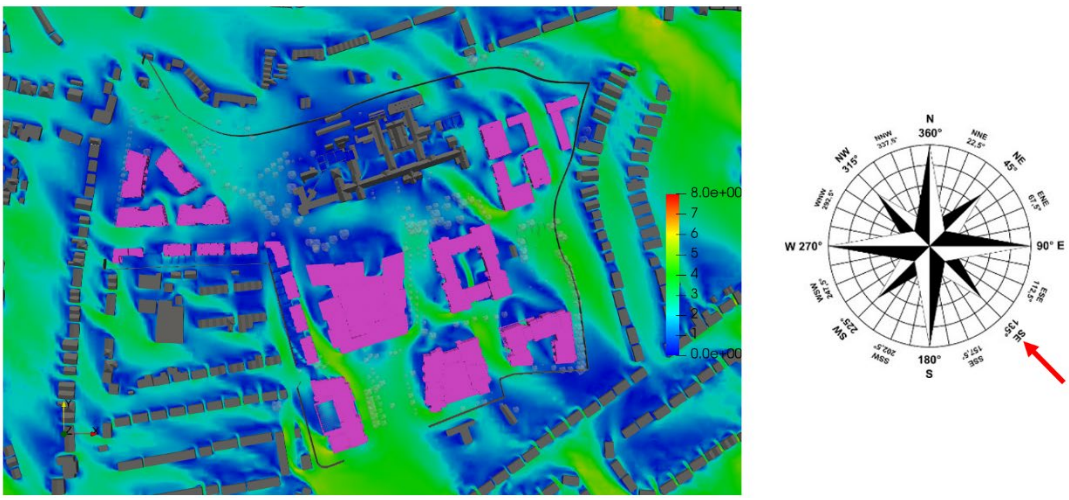


Figure 16.37: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 135°.

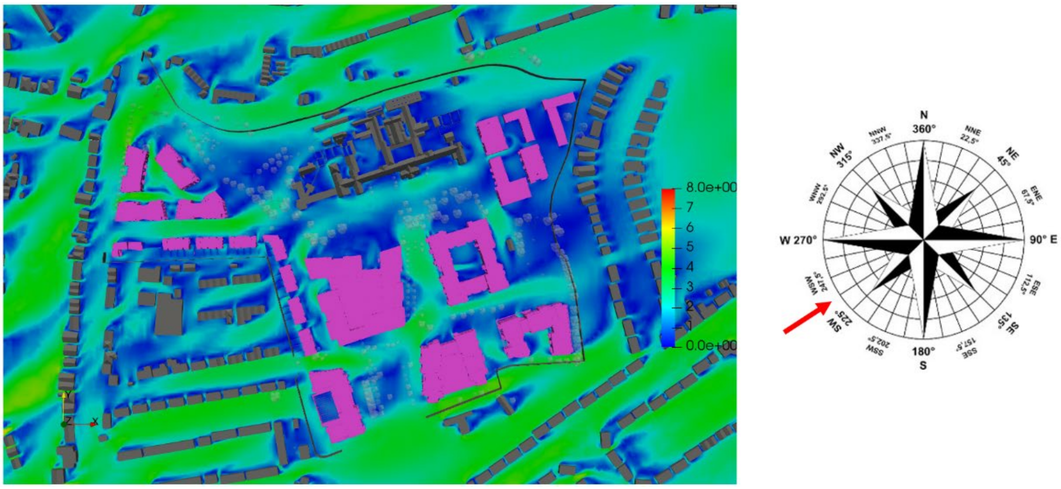


Figure 16.38: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 236°.

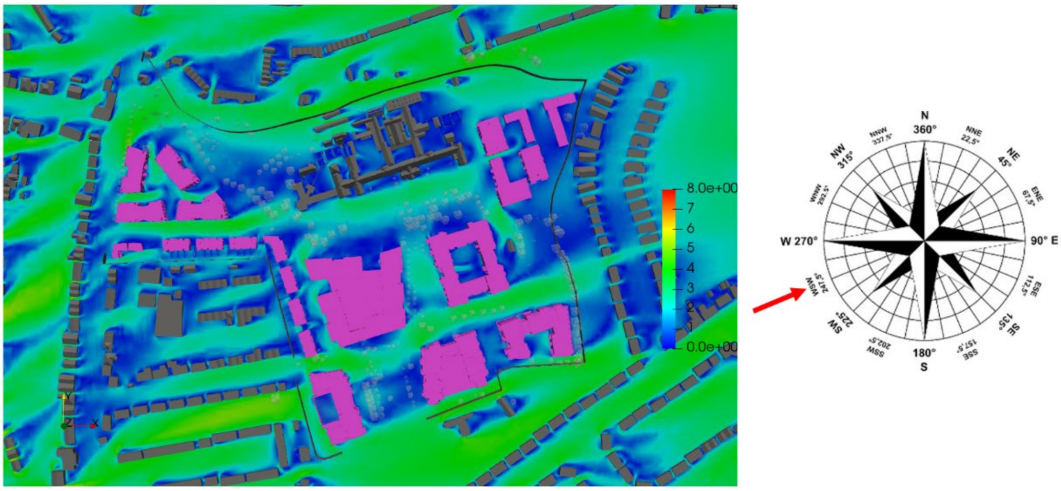


Figure 16.39: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 247°.

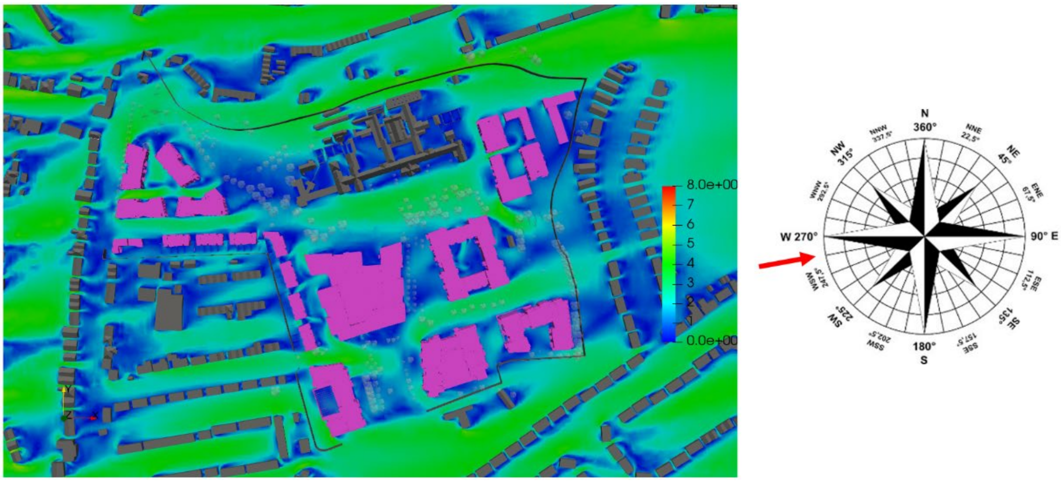


Figure 16.40: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 258°.

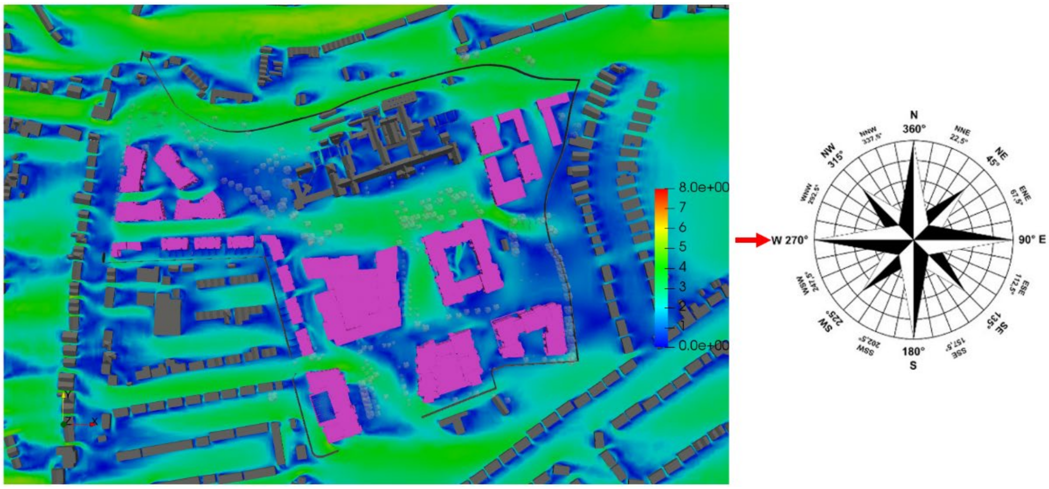


Figure 16.41: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 270°.

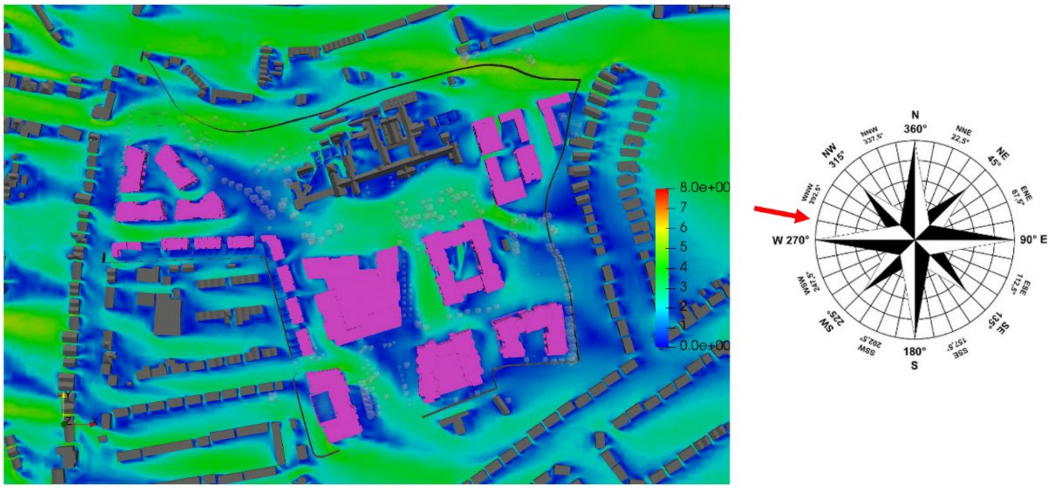


Figure 16.42: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 281°.

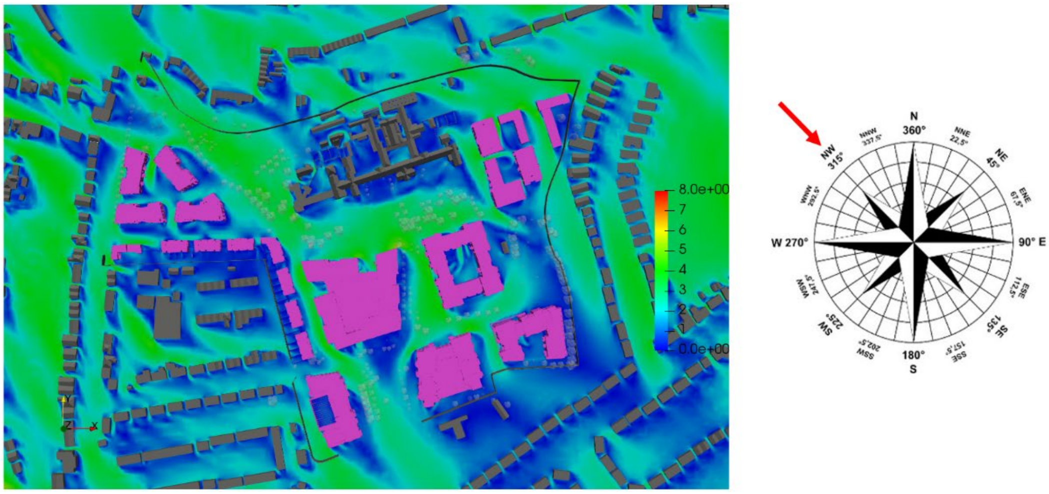


Figure 16.43: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 315°.

3D Views

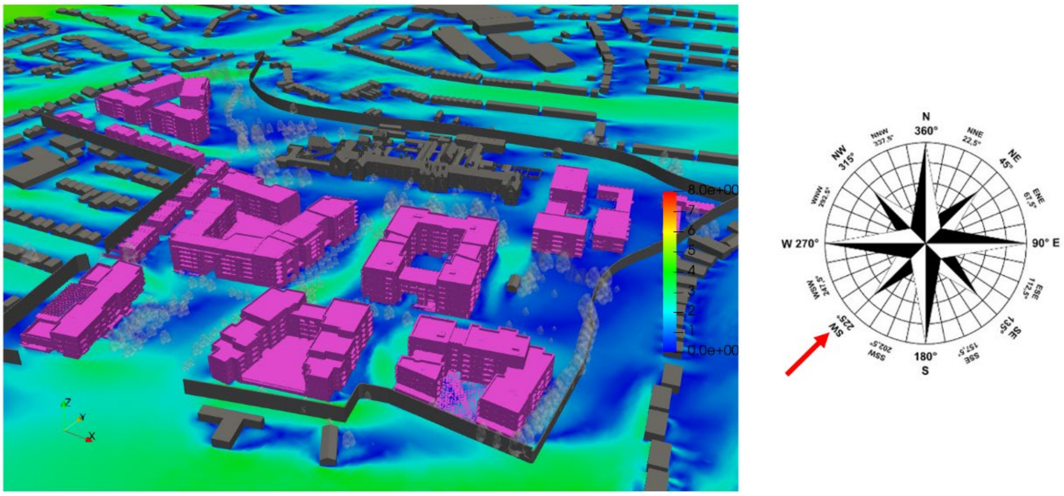


Figure 16.44: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 225°.

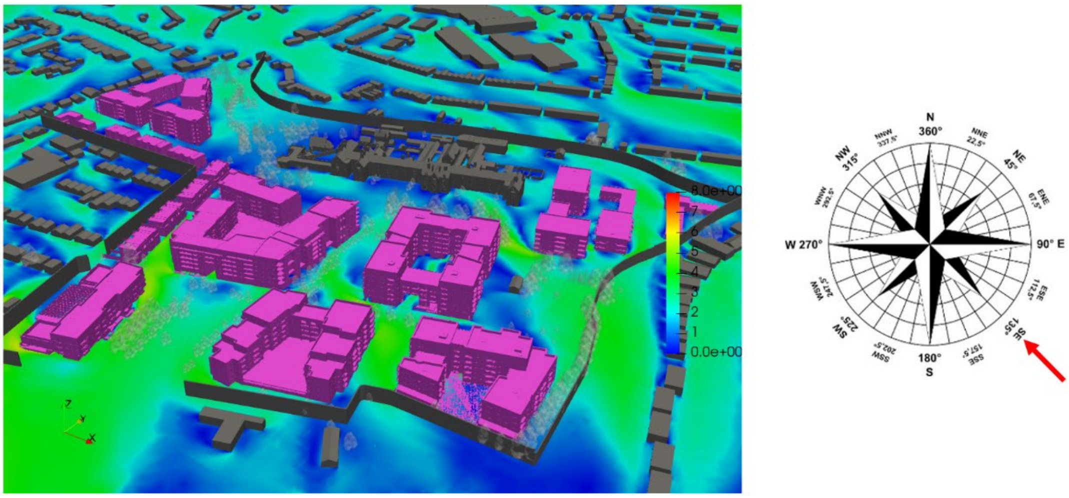


Figure 16.45:4 Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 135°.

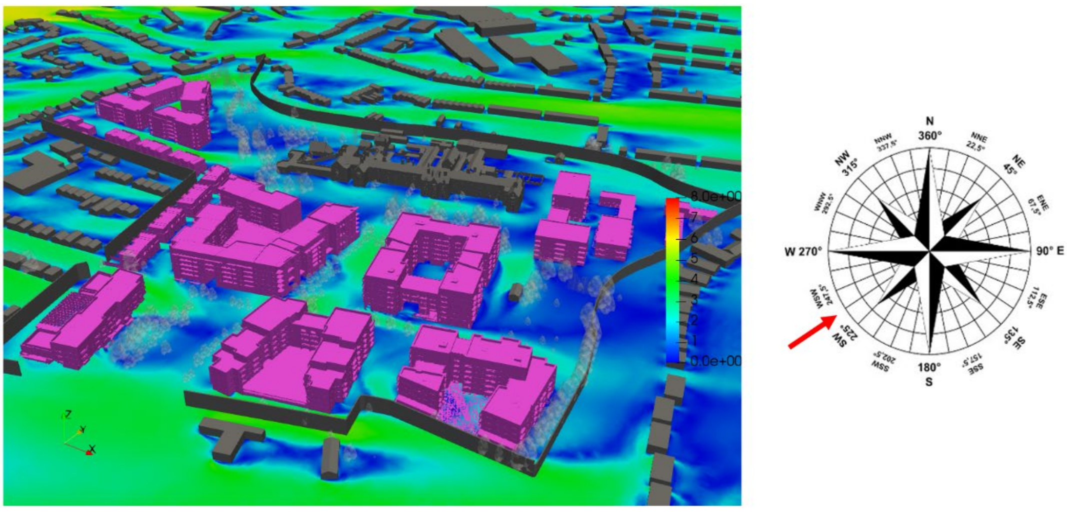


Figure 16.46: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 236°.

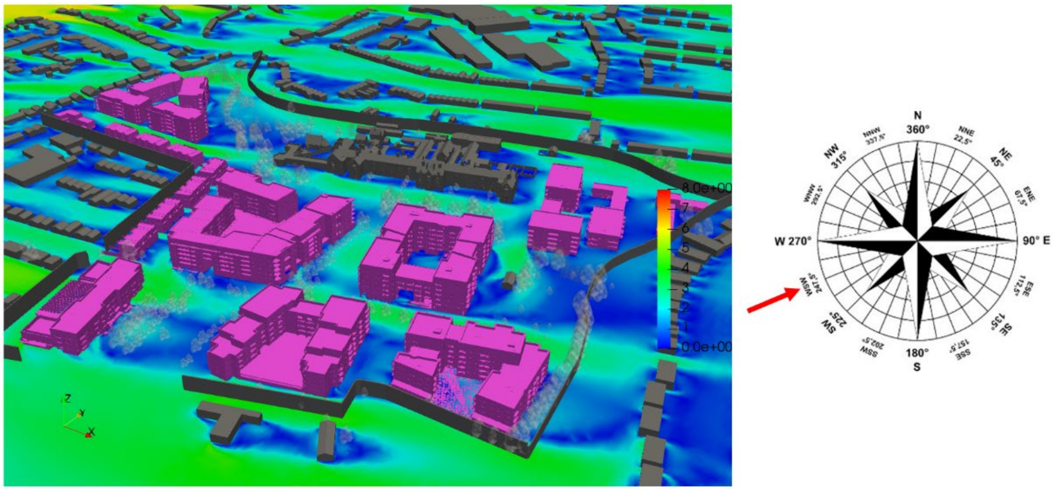


Figure 16.47: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 247°.

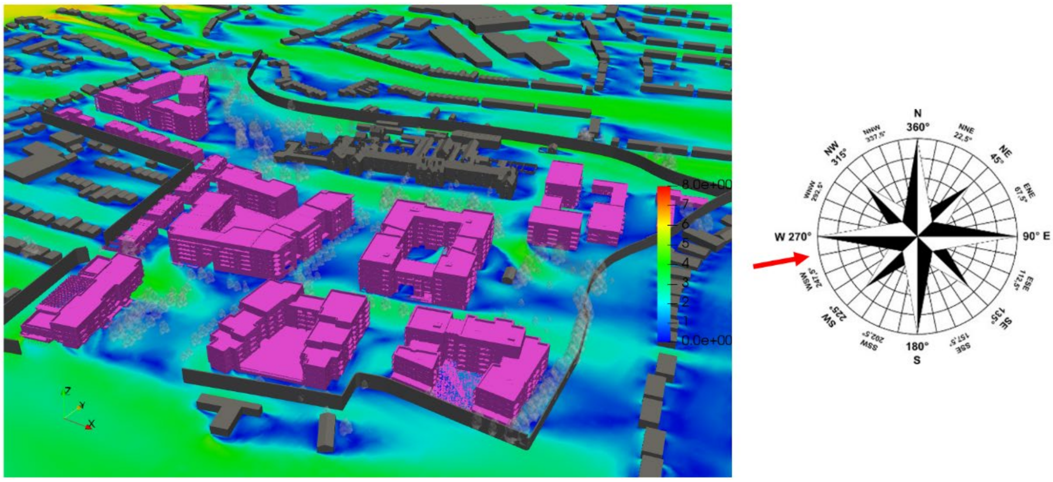


Figure 16.48: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 258°.

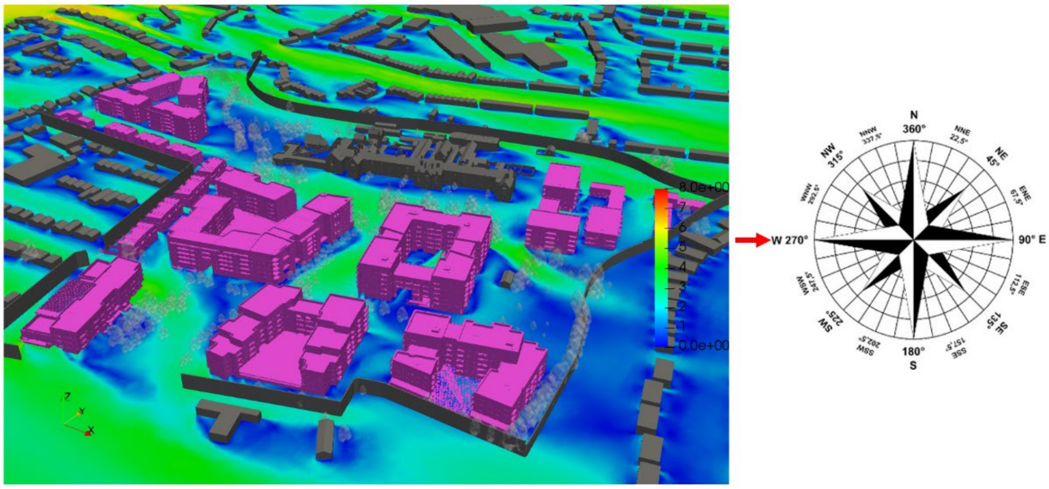


Figure 16.49: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 270°.

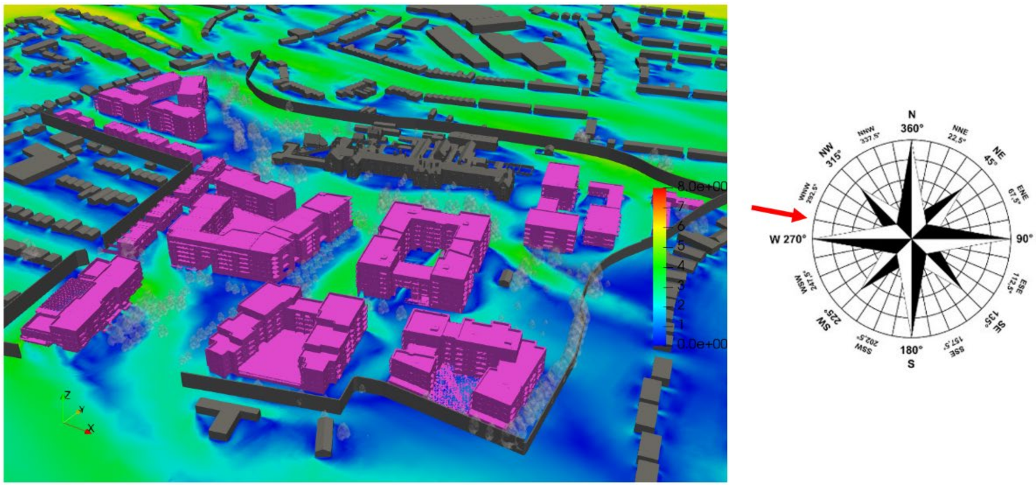


Figure 16.50: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 281°.

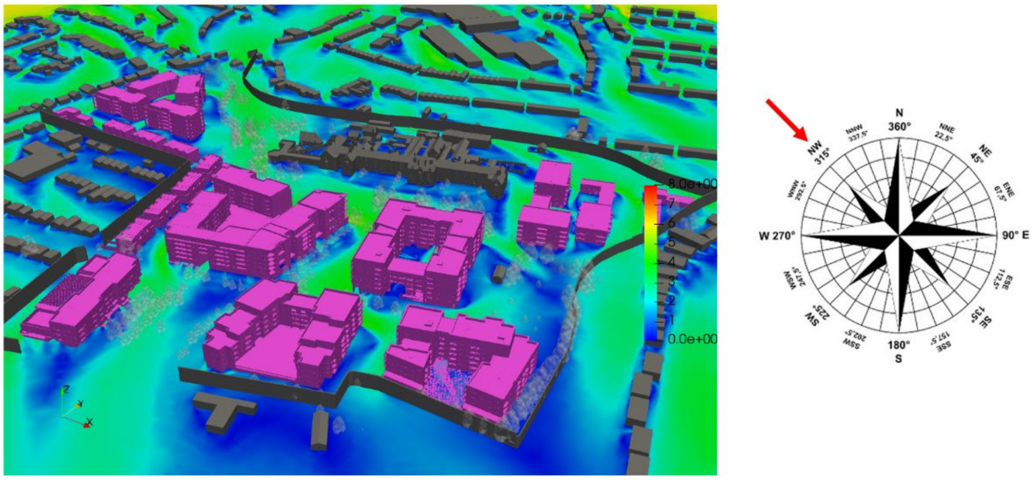


Figure 16.51: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 315°.

16.4.2.2 Impact on Pedestrian Comfort and Distress

The wind flow results obtained simulating the different direction and wind speeds, are combined with wind frequencies of occurrence to obtain comfort ratings at pedestrian level in all areas included within the model. The comparison of comfort ratings with intended pedestrian activities is shown in the Lawson Comfort and Distress Map that follows and the impact of the proposed development are classified on the potential receptors in line with the significance criteria cited in section 16.2.2 and detailed in the summary tables provided at the end of this section. The comfort/distress conditions are presented using a colour coded diagram below formulated in accordance with the Lawson Criteria.

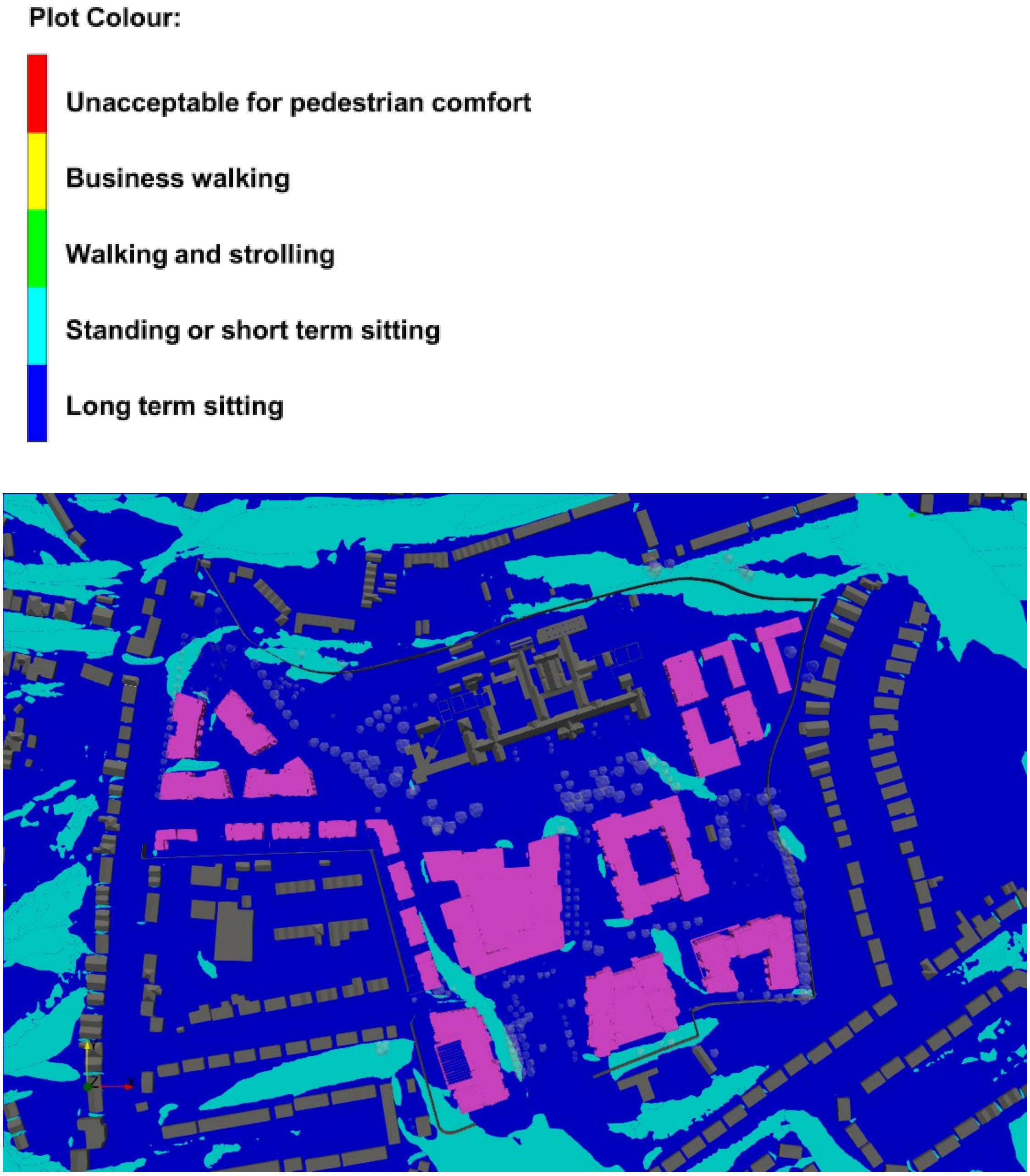


Figure 16.52: Pedestrian Level - Lawson Comfort/Distress Map - Top View.

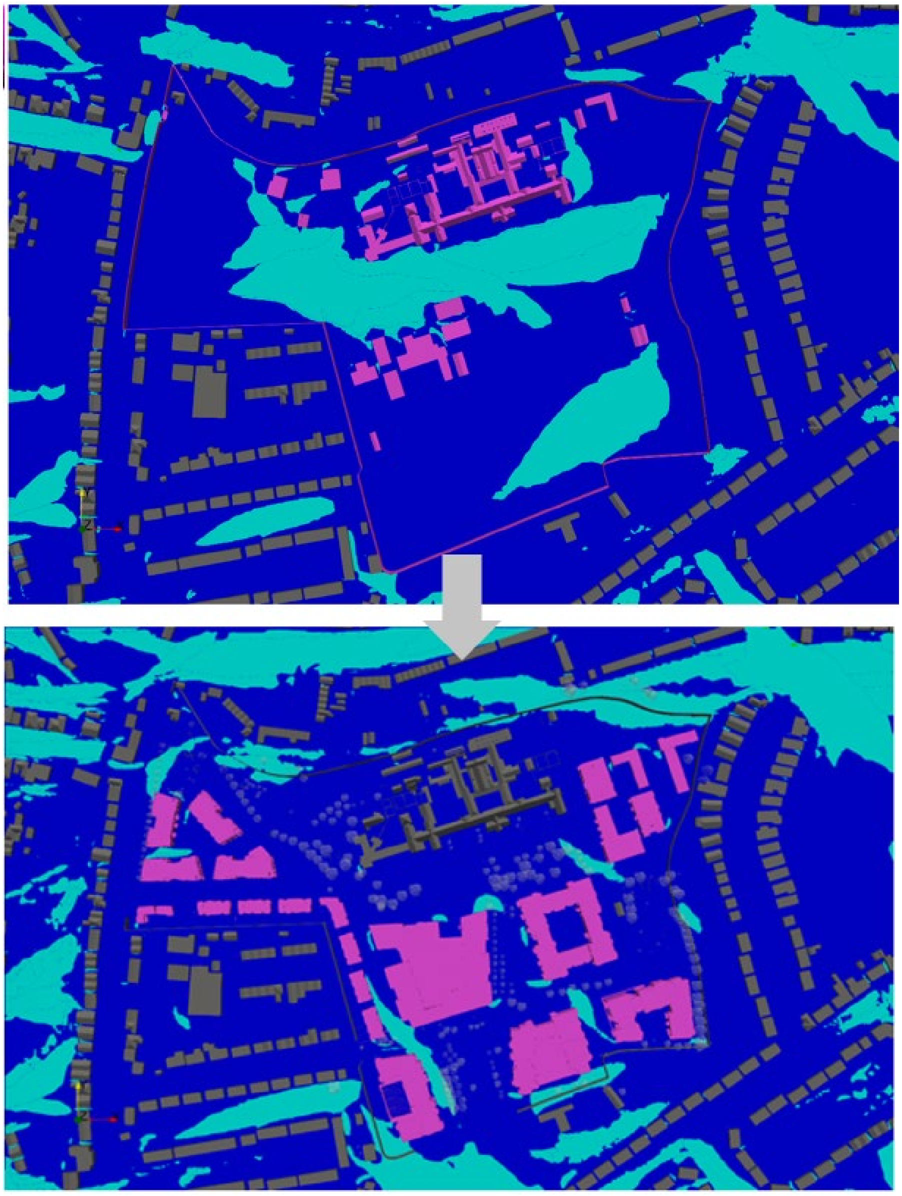


Figure 16.53: Wind Microclimate Baseline (top) versus Proposed scenario.

In summary, the following conclusions can be made observing the results of the wind microclimate analysis and comparing the results obtained, under the same wind conditions for the baseline scenario versus the proposed development scenario:

- The assessment of the proposed scenario has shown that no area is unsafe, and no conditions of distress are created by the proposed development.
- All the roads proposed can be used for their intended scope (walking).
- The proposed Parks and the Public Plaza can be used for long-term sitting/short term-sitting.
- The wind microclimate of the proposed development is comfortable and usable for pedestrians.

As result of the proposed development construction, the wind on the surrounding urban context is also mitigated when compared with the baseline situation, in this sense the proposed development has a beneficial effect on the surrounding wind microclimate and can create comfortable pedestrian areas and public spaces.

Table 16.6: Identification of Impact of proposed development on On-site and Off-site receptors (Proposed development Scenario).

Potential Receptors *(on-site)*	**Baseline Conditions**	**Proposed Development Conditions**	**Impact Significance**
Roads	Conditions are "suitable" for the intended pedestrian use.	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category). Between Block 7, Block 6 and Block 8, conditions are "suitable" for the intended pedestrian use.	*Beneficial/* *Negligible*
Entrances	Not applicable	Conditions are "suitable" for the intended pedestrian use.	*Negligible*
Public Plaza	On the location designated for this use, conditions are "suitable" for the intended pedestrian use.	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	*Beneficial*
Community Park/ Parkland	On the location designated for this use conditions are "suitable" for the intended pedestrian use.	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	*Beneficial*
Walled Garden	On the location designated for this use conditions are "suitable" for the intended pedestrian use.	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	*Beneficial*
Pedestrian circulation areas	On the location designated for this use conditions are "suitable" for the intended pedestrian use.	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	*Beneficial*
Potential Receptors *(off-site)*	**Baseline Conditions**	**Proposed Development Conditions**	**Impact**
Off-Site Area-North	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions on the North area became windier for one comfort category passing from long-term sitting to short-term sitting, however the conditions still remain suitable and calmer than	*Negligible*

		required for the intended pedestrian use (walking).	
Off-Site Area-South	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the baseline scenario.	*Negligible*
Off-Site Area-East	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the baseline scenario.	*Negligible*
Off-Site Area-West	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the baseline scenario.	*Negligible*

16.5 Mitigation Measures

16.5.1 Construction Phase

The construction of the Proposed Development implies the demolishing of some of the existing structures progresses the wind conditions at the Site would gradually adjust to those of the completed development.

16.5.2 Operational Phase

The landscaping proposed for the development has been considered within the wind analysis carried out and its effect has been beneficial in reducing the wind speed around the development and creating calmer wind condition in areas such the Public Plaza and the Communal Garden/Parks where pedestrian can be comfortable for long term sitting.

16.6 Residual Impacts

Wind cannot be eliminated or totally mitigated as it depends on weather conditions which could vary. The data of the historical wind conditions collected and reported in the previous sections, show that the wind speeds likely to occur on the site are below critical values and that pleasant and comfortable microclimate can be maintained for the majority of the time and under the most frequent wind scenarios.

Gusts and storms can still occur however, and they can create unpleasant and sometimes unsafe conditions. The pedestrian activities concerning the Lawson Comfort and Distress Criteria are not in general carried out during those weather conditions.

Having considered the above, no further changes to the development design and further increasing of the landscaping is suggested, as safety and pedestrian comfort is maintained in accordance with Lawson Comfort and Distress Criteria.

16.7 Monitoring

16.7.1 Construction Phase

There is no requirement to monitor wind impact during construction phase for pedestrian comfort and distress as the designated amenity areas will not be in use during this phase of the project and pedestrian are not accessing construction sites.

16.7.2 Operational Phase

The development has been designed to conform to acceptable Lawson Criteria for Comfort and Distress in accordance with the Wind Beaufort Scale and considering the historical wind conditions of the site, there is no further element to monitor for this scope as far as the landscaping is maintained in place as designed.

16.8 Interactions

The wind microclimate analysed in this chapter has included the interaction of the wind on the site adopting the landscaping designed for the proposed site.

16.19 Cumulative Impacts

This section assesses the impact of the proposed development on the existing environment and considers projects that have been:

1. (a) granted planning permission but that are not built yet and,

2. (b) projects that have been submitted for consent but not yet consented.

In accordance with the guideline cited in section 16.1.1, the wind microclimate study should consider the effect of the proposed development together with buildings (existing and/or permitted) that are within 400m from the centre of the site. Other taller buildings outside of this zone that could have an influence on wind conditions within the project site should be included for wind directions where they are upwind of the project site.

In accordance with the guideline cited in section 16.1.1, the wind microclimate study should consider the effect of the proposed development together with buildings (existing and/or permitted) that are within 400m from the centre of the site. Other taller buildings outside of this zone that could have an influence on wind conditions within the project site should be included for wind directions where they are upwind of the project site.

The potential and permitted schemes within the vicinity of the proposed develop ent are listed below. None of these scheme is located upwind in relation to the project site, therefore the only criteria to select the relevance of these scheme for the wind microclimate is based on their distance from the centre of the proposed site.

- **D16A/0818 – Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14.**
  The proposed site is approximately 1.35km away from the proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **ABP31013821 – Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14.**
  The proposed site is approximately 770m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **D19A/0162 – Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14.**
  The proposed site is approximately 650m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **ABP30835320 – The Car Sales Premises Currently Known as Vector Motors, Goatstown Road, Dublin 14, D14FD23.**
  The proposed site is approximately 650m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **D20A/0328 – University College Dublin, Belfield, Dublin 4.**
  The proposed site is approximately 1.25km away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **ABP30943021 – 2.12ha At Our Lady's Grove, Goatstown Road, Dublin 14.**
  The proposed site is approximately 1.25km away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **ABP31128721 – c0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14.**
  This development has been submitted for planning and is currently awaiting decision. The proposed site is approximately 400m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **ABP31182621 – Lands at Knockrabo, Mount Anville Road, Dublin 14.**
  This development has been submitted for planning and is currently awaiting decision. The proposed site is approximately 1000m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **TC06D.311553 – Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14.**
  The proposed development has not been submitted for planning yet. The proposed site is approximately 650m away from our proposed development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **ABP312935 – Sommerville, Dundrum Road, Dublin 14.**
  The proposed development has been submitted for planning on the 7th March 2022 and a decision will be made on ABP in June. The proposed site is approximately 400m away from our proposed development (centre of site). Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts on the wind microclimate on site and the proposed development is not going to impact the wind conditions at that distance.

- **CMH Future S34 – Lands at Central Mental Hospital, Dundrum Road, Dublin 14.**
  The proposed development has not been submitted for planning yet. The S34 development (Apartment blocks 1, 11 and 12, housing and refurbishment of the existing Victorian buildings) will be low rise when compared to the proposed development and neighbouring properties. Detailed cumulative analysis has been undertaken which demonstrates that there will not be any significant cumulative impacts obtained when considering this scheme in the wind microclimate analysis

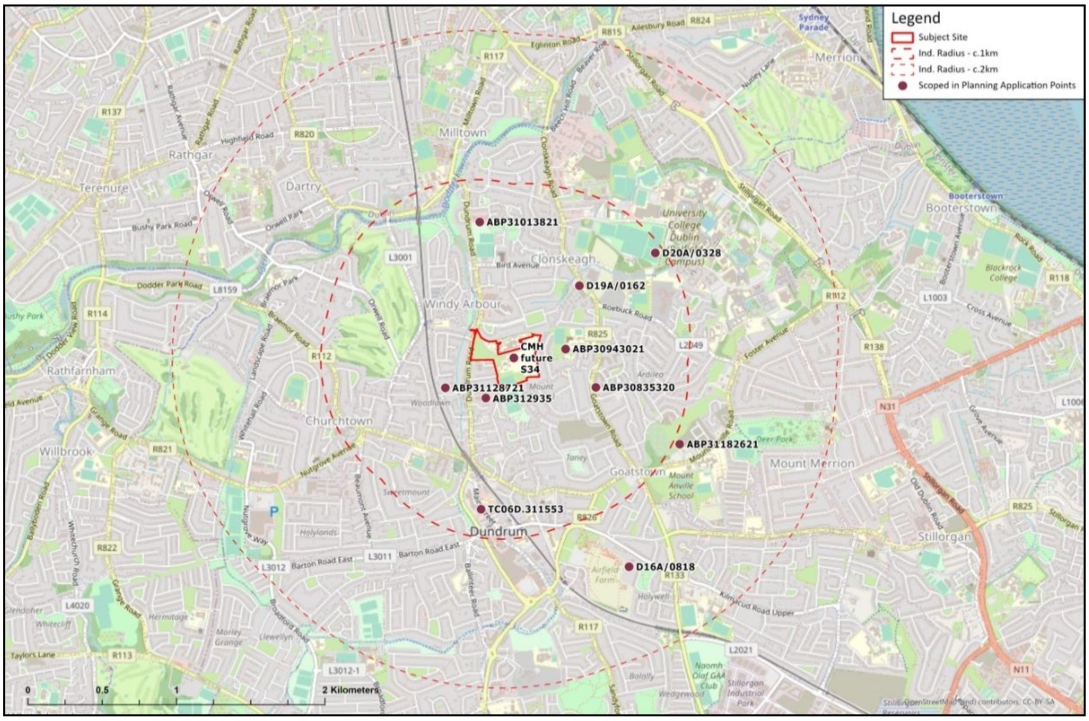


Figure 16.54: Location of Permitted/Potential/Proposed Projects in the vicinity of the proposed development.

The wind simulations have been run again including within the previous model, the cumulative scenario (CMH S34) and the same set of result and comfort maps are generated. Results of simulations carried out are detailed in the following sections. These results present parameters as outlined in the acceptance criteria section described previously for the proposed development.

From a wind and microclimate perspective, no significant cumulative impact is expected from Central Mental Hospital, Dundrum Road on the existing, permitted or future proposed projects within the region of interest for the wind microclimate assessment.

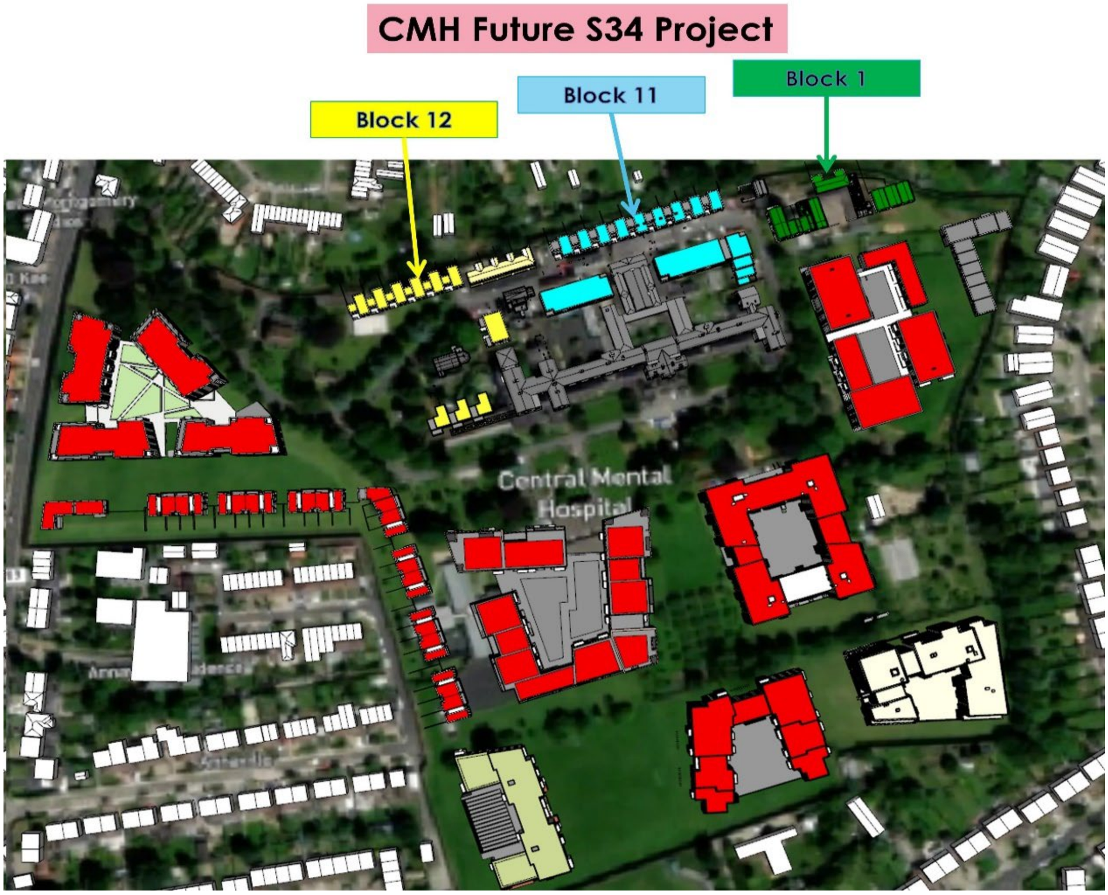


Figure 16.55: Cumulative Scenario relevant for the wind analysis 3D model.

Figure 16.56: Cumulative Scenario relevant for the wind analysis 3D model.

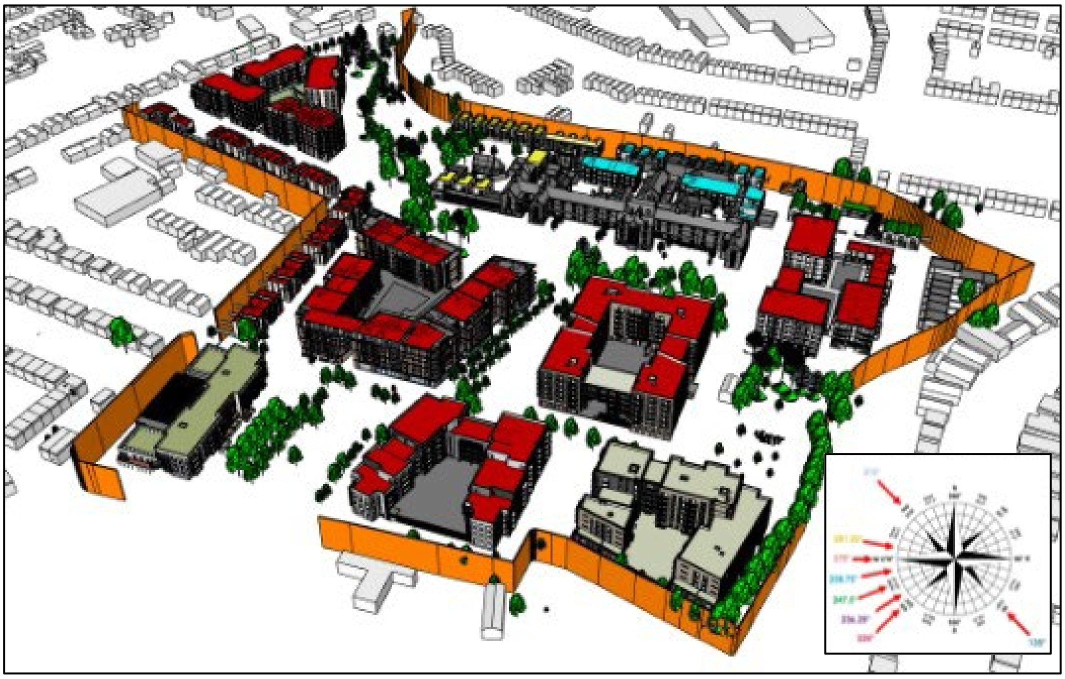


Figure 16.57: 3D model for the CFD wind analysis (Cumulative Scenario).

16.10.1 Construction Phase

As indicated in section 16.4.1, the possible effects on wind microclimate at the site during the construction phase of Central Mental Hospital, Dundrum Road Development are not relevant as the presence of pedestrian on the site is not expected and pedestrian activities cannot be carried out.

As the development proceeds, the wind setting at the site would progressively conform to those of the completed development.

16.10.2 Operational Phase

There is no significant cumulative impact expected from Central Mental Hospital, Dundrum Road on CMH Future S34 project as seen from the pedestrian comfort criteria maps shown in the next sections. The proposed development does not impact or give rise to negative or critical wind speed profiles at the nearby adjacent roads, or nearby buildings also when the CMH.

16.10.2.1 Wind Microclimate at Pedestrian Level

Results of wind speeds and their circulations at pedestrian level of 1.5m above the development ground are presented in the images that follow, in order of frequency of occurrence, from the most frequent wind direction to the least frequent one.

These flow velocities identify if locally, wind speeds at pedestrian-level are accelerated or decelerated in relation to the undisturbed reference wind speed (baseline wind speed) by the presence of the proposed development including also the cumulative CMH Future S34.

As it can be seen, wind speeds are shown to be within tenable conditions and in general comparable to the wind speed of the undisturbed flow for the direction considered. Some of the wind patterns in between the blocks indicates minor funnelling effects, this can be noted near the South-West side of the development which receives the prevailing South-West and South-East winds at approximately 5m/s. The results of the wind conditions at ground level are taken at 1.5m also for the cumulative scenario.

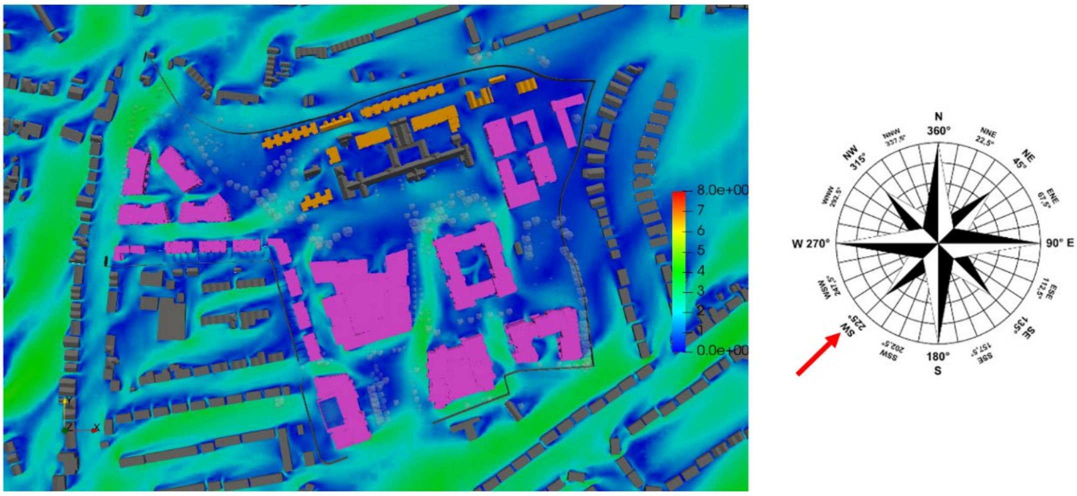


Figure 16.58: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 225°.

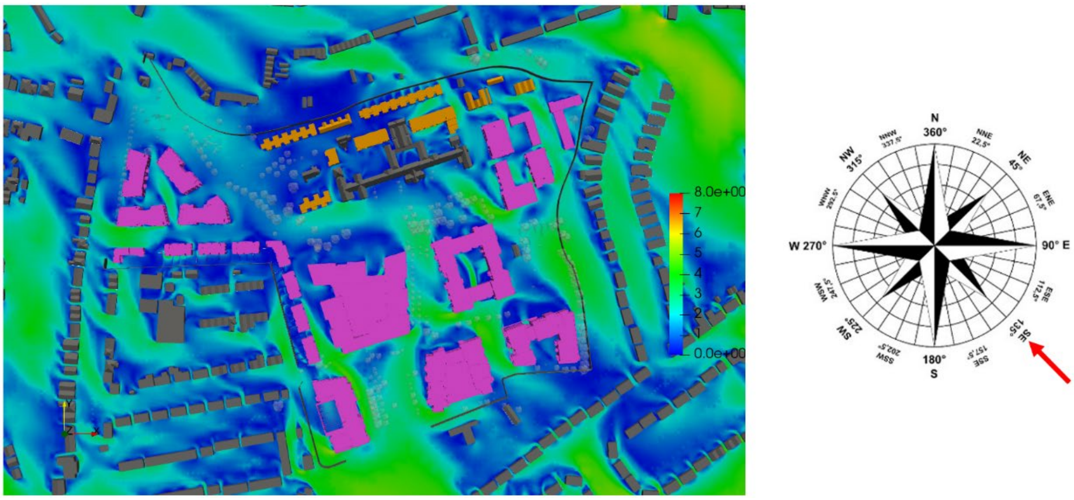


Figure 16.59: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 135°.

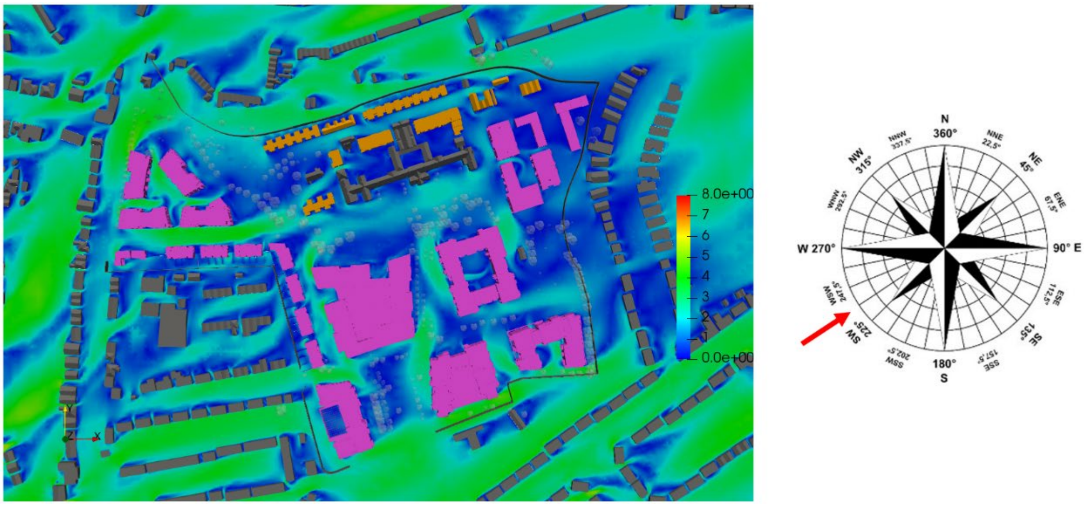


Figure 16.60: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 236°.

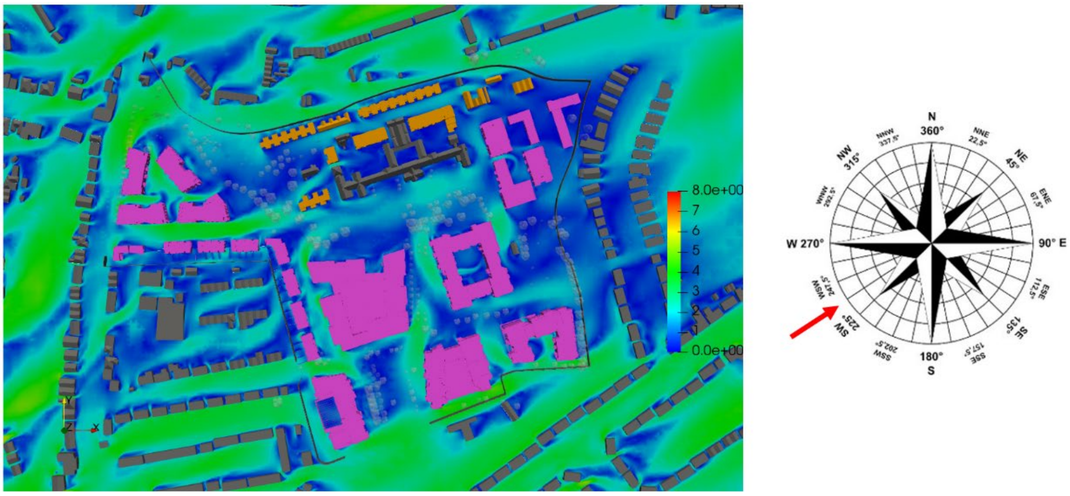


Figure 16.61: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 247°.

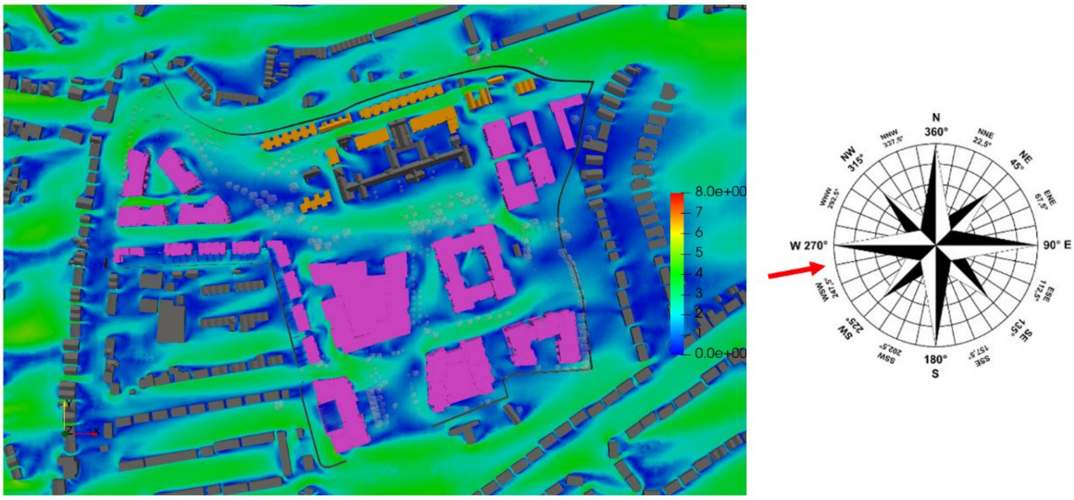


Figure 16.62: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 258°.

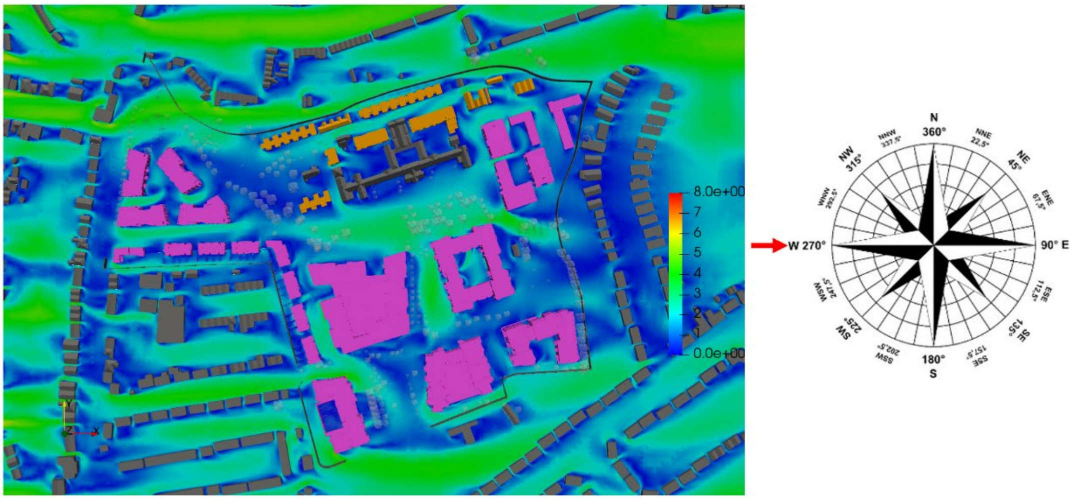


Figure 16.63: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 270°.

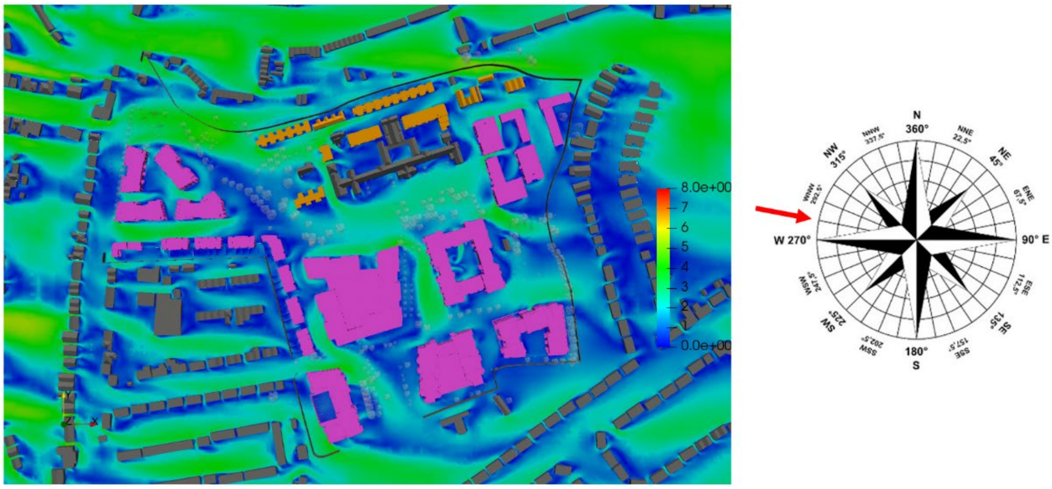


Figure 16.64: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 281°.

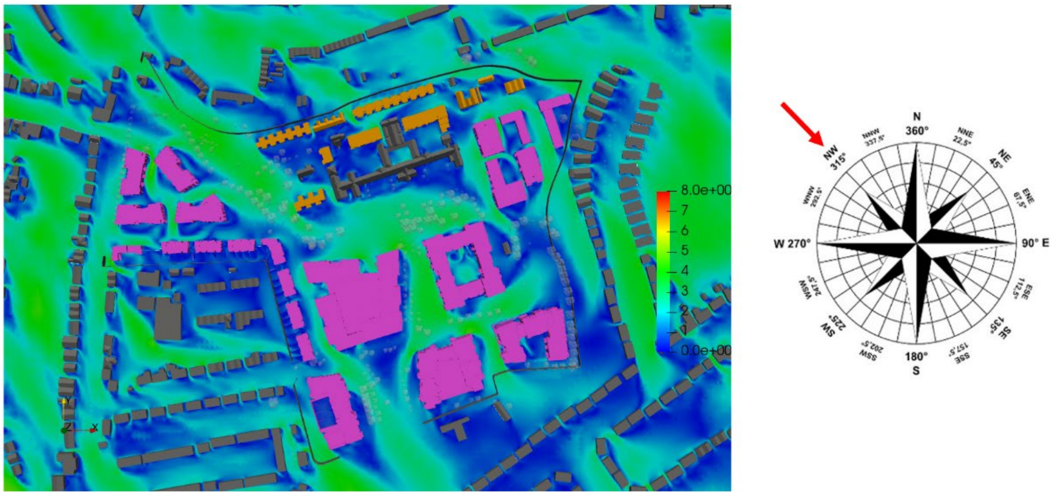


Figure 16.65: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 315°.

3D Views

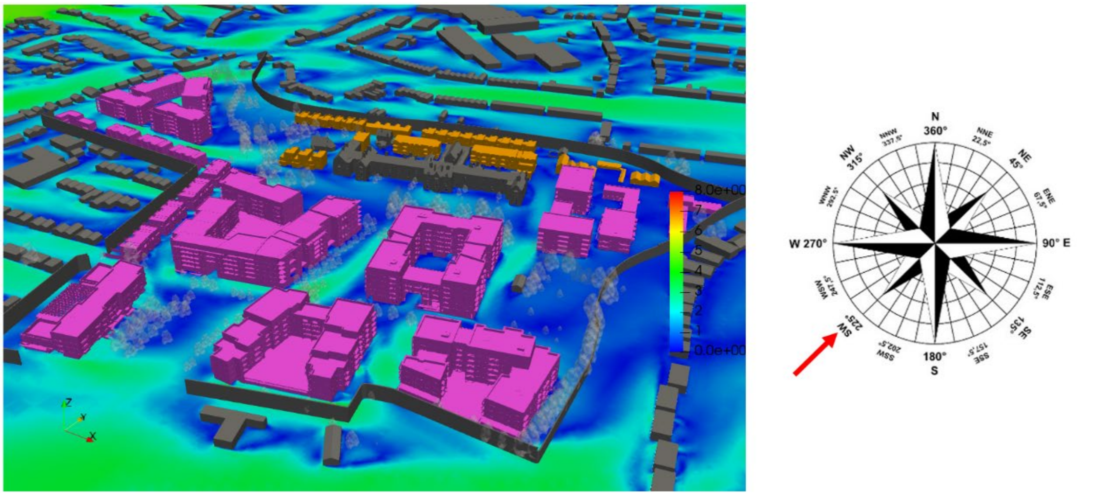


Figure 16.66: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 225°.

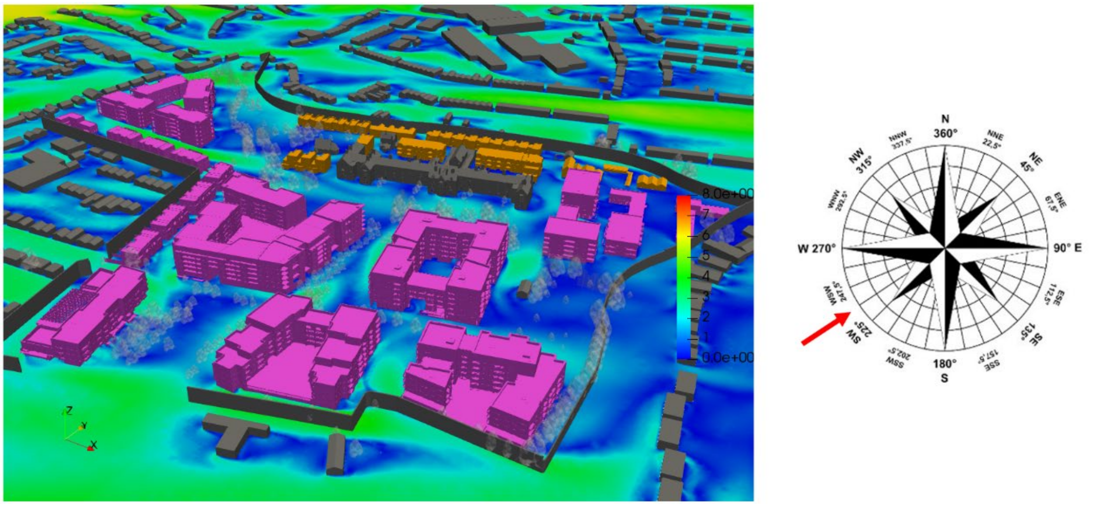


Figure 16.67: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 236°.

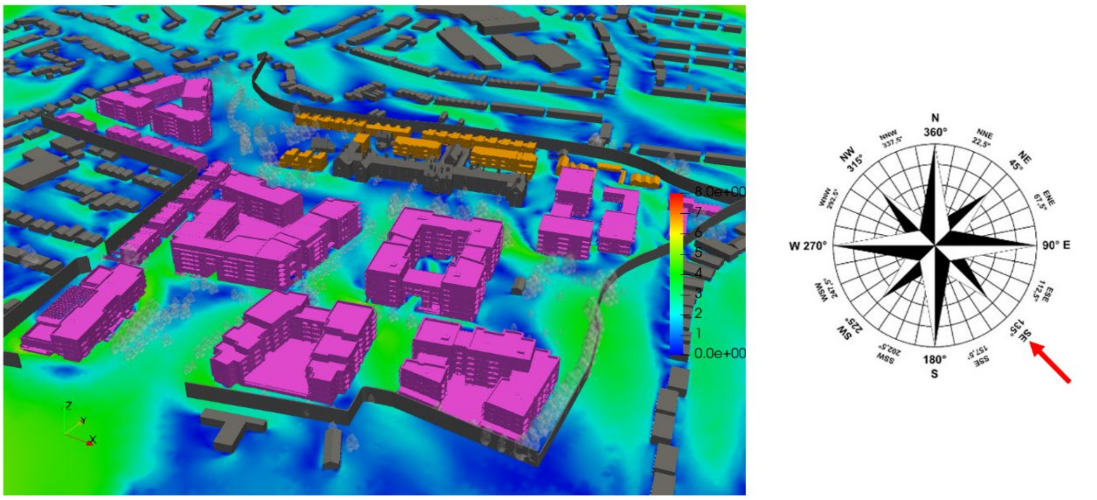


Figure 16.68: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 135°.

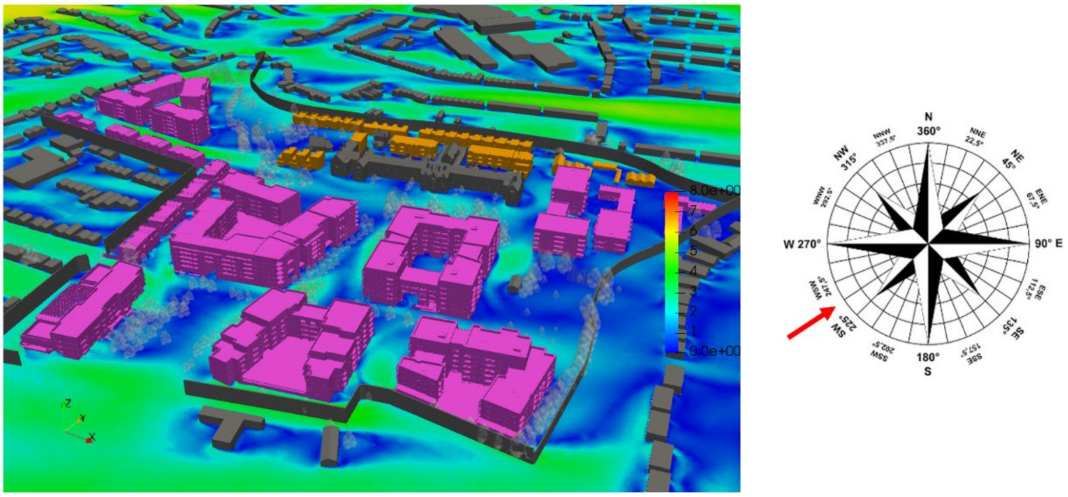


Figure 16.69: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 247°.

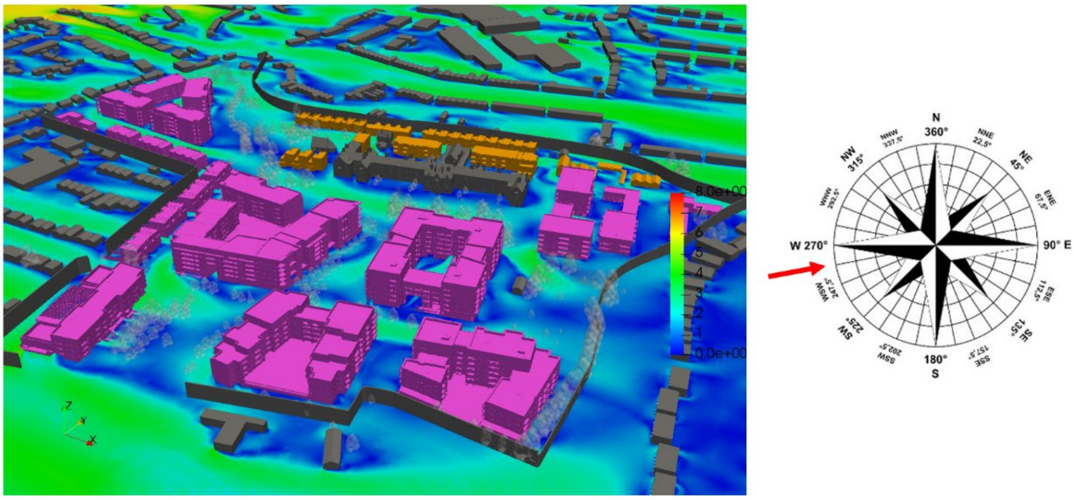


Figure 16.70: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 258°.

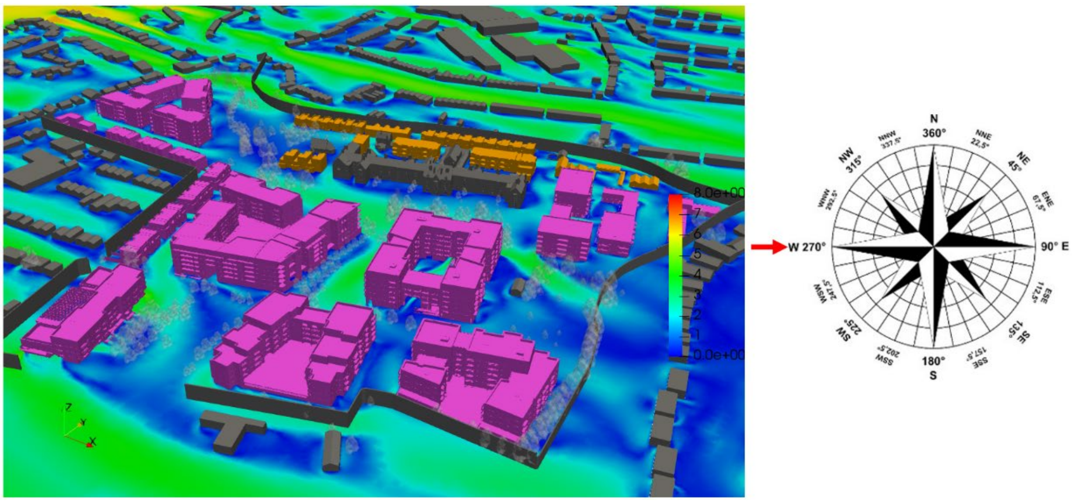


Figure 16.71: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 270°.

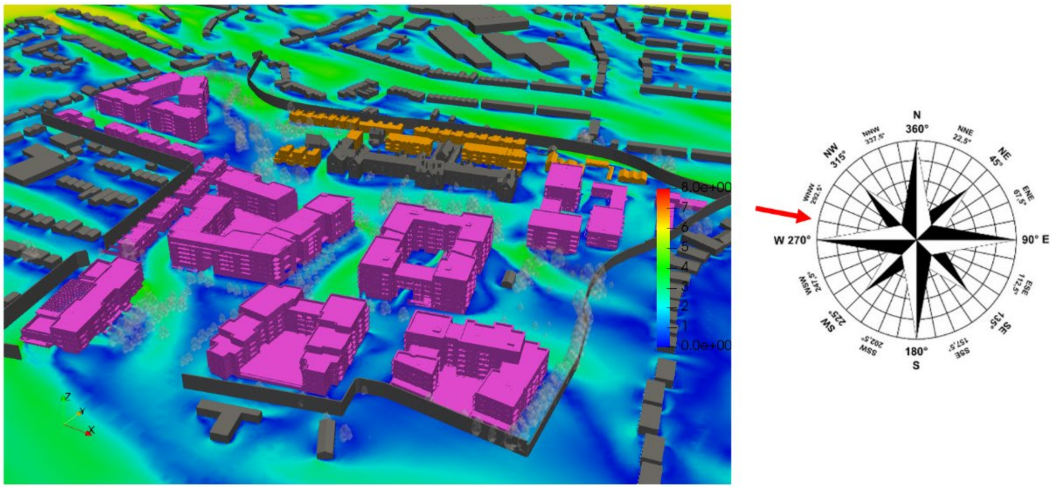


Figure 16.72: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 281°.

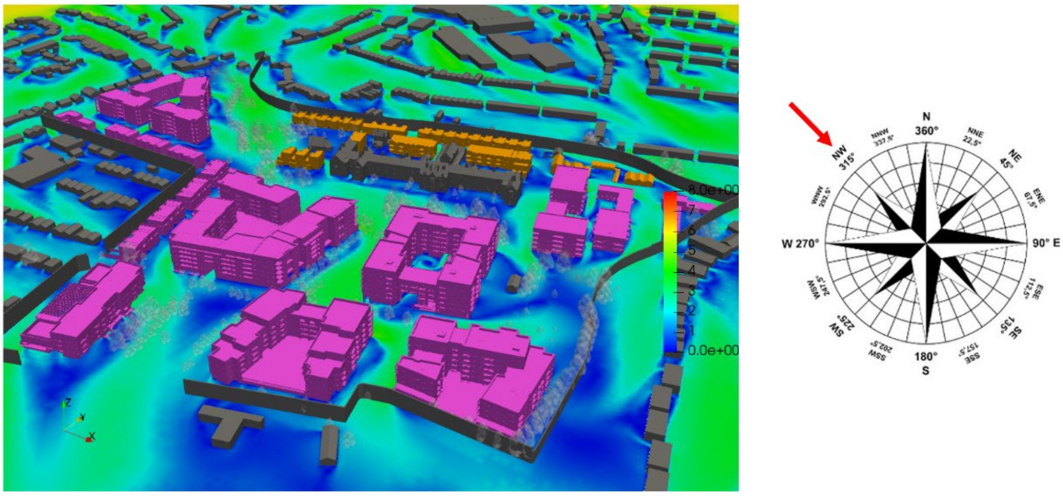


Figure 16.73: Pedestrian Level - Flow Velocity Results at 1.5m above the ground - Wind Direction: 315°.

16.10.2.2 Impact on Pedestrian Comfort and Distress

The wind flow results obtained simulating the different direction and wind speeds, are combined with wind frequencies of occurrence to obtain comfort ratings at pedestrian level in all areas included within the model. The comparison of comfort ratings with intended pedestrian activities is shown in the Lawson Comfort and Distress Map that follows. The comfort/distress conditions are presented using a colour coded diagram below formulated in accordance with the Lawson Criteria.

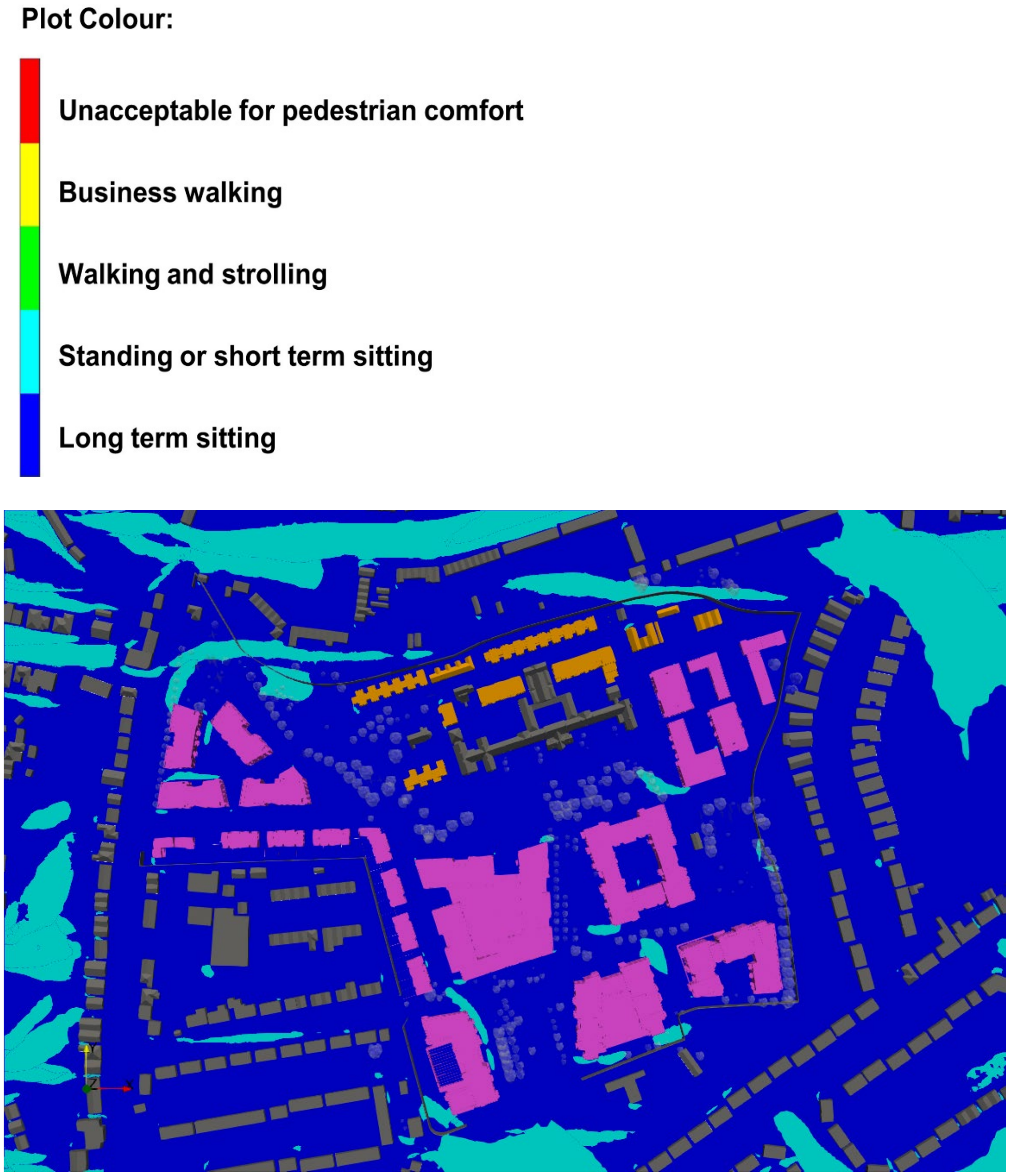


Figure 16.74: Cumulative Assessment: Pedestrian Level - Lawson Map - Top View.

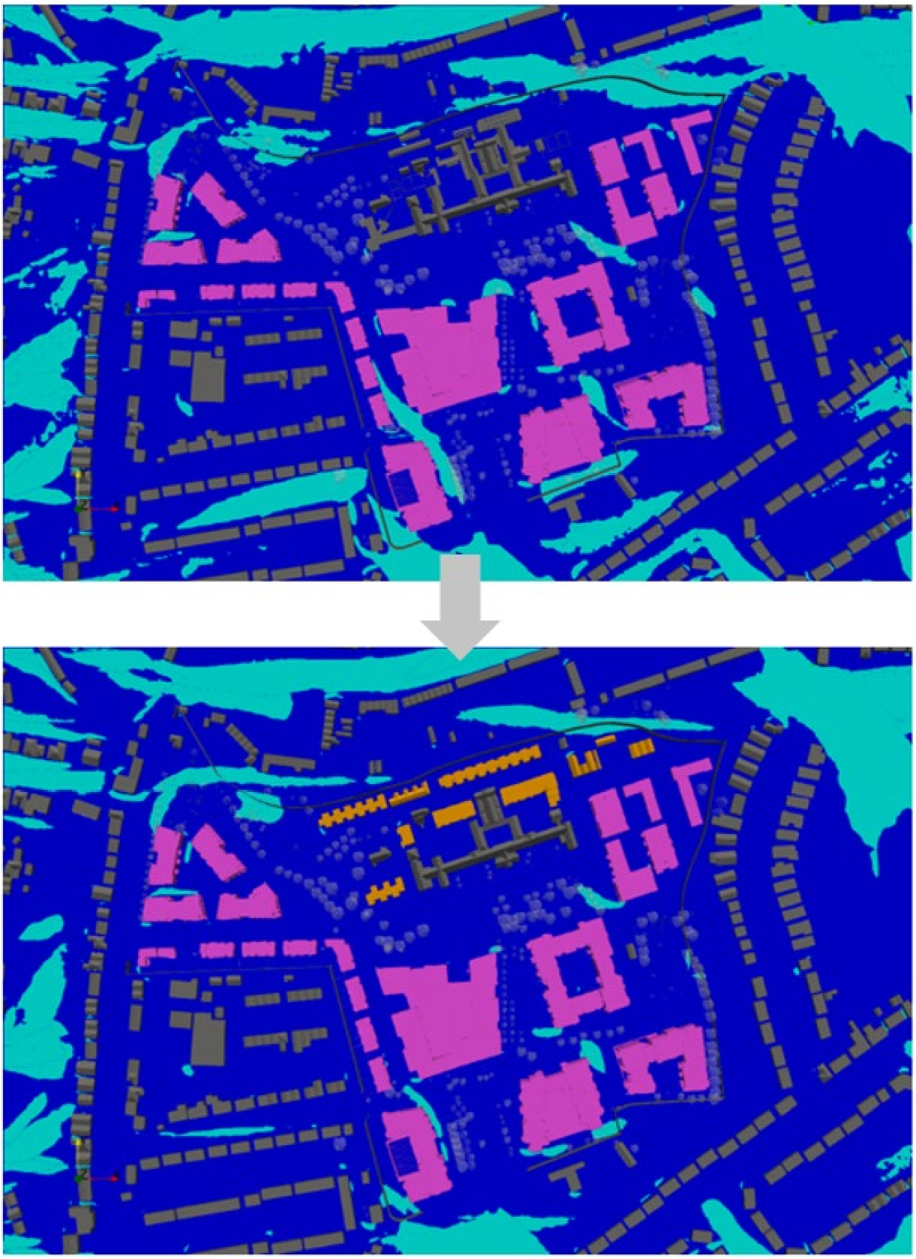


Figure 16.75: Wind Microclimate -Proposed Scenario (top) versus Cumulative Scenario.

In summary, the following conclusions can be made observing the results of the wind microclimate analysis and comparing the results obtained, under the same wind conditions for the proposed scenario versus the cumulative scenario:

- The assessment of the cumulative scenario has shown that no area is unsafe and no conditions of distress are created by the proposed development and the cumulative CMH S43.
- All the roads proposed can be used for their intended scope (walking)
- The proposed Parks and the Public Plaza can be used for long-term sitting/short term-sitting.

- The wind microclimate of the proposed development is comfortable and usable for pedestrians.

As result of the proposed development construction, the wind on the surrounding urban context is also mitigates on the North side of the development when compared with the same baseline situation and proposed scenario, in this sense the proposed development including the CMH future S43 scheme has a beneficial effect on the surrounding wind microclimate.

Table 16.7: Identification of Impact of proposed development on On-site and Off-site receptors (Proposed development Scenario).

Potential Receptors *(on-site)*	**Proposed Development Conditions**	**Cumulative Development Conditions**	**Impact Significance**
Roads	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category). Between Block 7, Block 6 and Block 8, conditions are "suitable" for the intended pedestrian use.	Conditions remain the same as in the proposed scenario	*Negligible*
Entrances	Conditions are "suitable" for the intended pedestrian use.	Conditions remain the same as in the proposed scenario	*Negligible*
Public Plaza	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the proposed scenario	*Negligible*
Community Park/ Parkland	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the proposed scenario	*Negligible*
Walled Garden	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the proposed scenario	*Negligible*
Pedestrian circulation areas	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the proposed scenario	*Negligible*
Potential Receptors *(off-site)*	**Baseline Conditions**	**Proposed Development Conditions**	**Impact**
Off-Site Area-North	Conditions on the North area became windier for one comfort category	Conditions are calmer than required for the intended	*Beneficial*

	passing from long term sitting to short term sitting, however the conditions still remain suitable and calmer than required for the intended pedestrian use (walking).	pedestrian use (by at least one comfort category).	
Off-Site Area-South	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the proposed scenario	*Negligible*
Off-Site Area-East	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the proposed scenario	*Negligible*
Off-Site Area-West	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions remain the same as in the proposed scenario	*Negligible*

16.10 'Do-Nothing' Effect

In case the development will not be constructed, the wind conditions on the site will be in line with those obtained with the Baseline scenario wind microclimate.

16.11 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this chapter.

16.12 References

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- Franke, J., Hellsten, A., Schlunzen, H., Carissimo, B, Ed. (2007); Best Practice Guidelines for the CFD Simulation of Flows in the Urban Environment, University of Hamburg

APPENDIX 16.1
CFD Model

This appendix reports the numerical details of the CFD model implemented for the study of the wind microclimate conditions of this chapter.

16.1 CFD Modelling Method

The wind microclimate study is conducted through Computational Fluid Dynamics (CFD). This is a numerical technique to simulate fluid flow, heat and mass transfer, chemical reaction and combustion, multiphase flow, and other phenomena related to fluid flows. Wind flow is described by Navier-Stokes equations which are solved within the CFD analysis using a finite volume algorithm based on the volumetric mesh/grid in which the geometry is divided.

CFD modelling includes three main stages: pre-processing, simulation, and post-processing as described in Figure A.1.

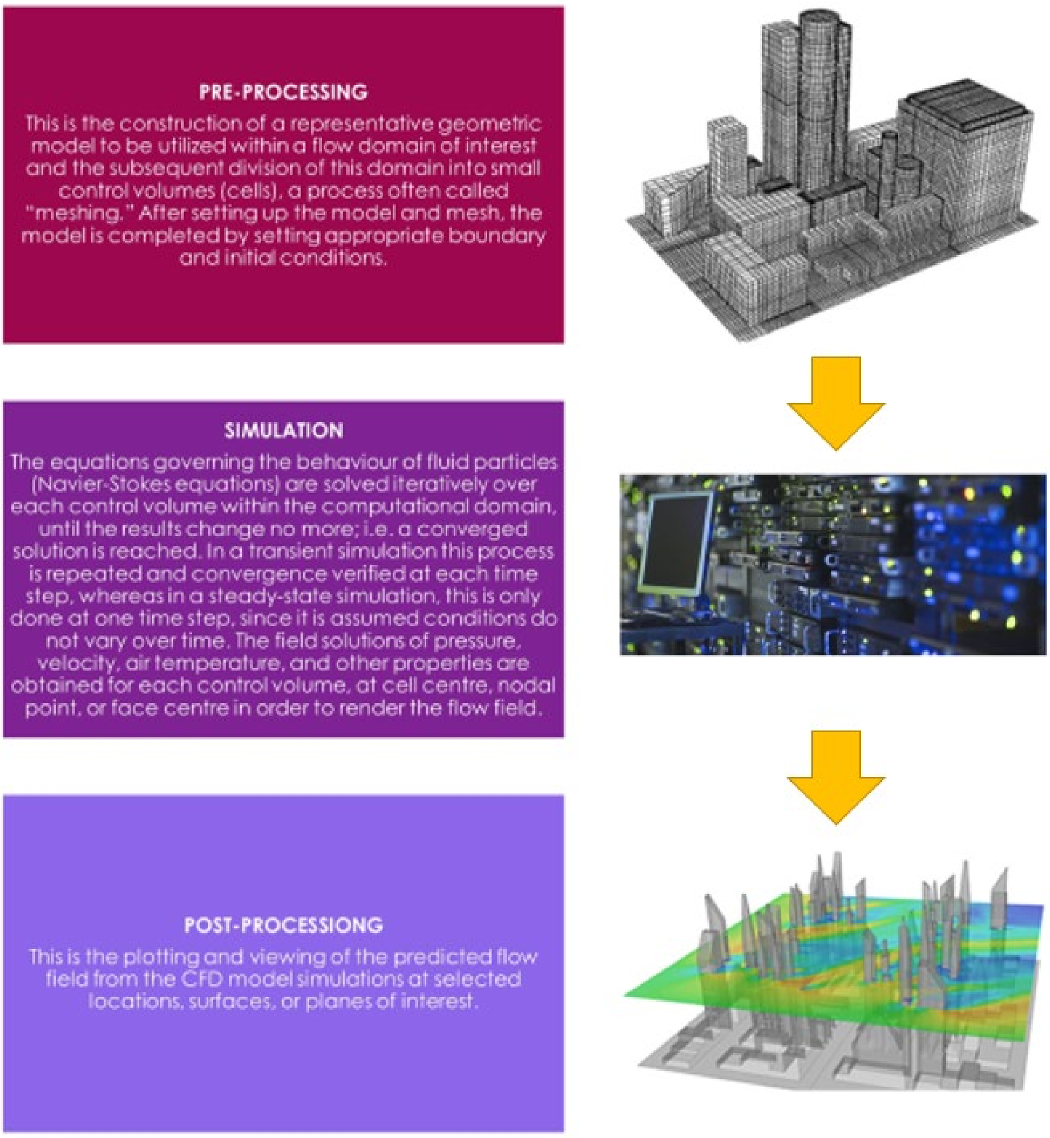

Figure 16.1: Main steps of a CFD modelling study to obtain the flow movement around buildings.

16.1.1 OpenFOAM - CFD Software Details

The analysis of this chapter employs OpenFoam Code, which is based on a volume averaging method of discretization and uses the post-processing visualisation toolkit Paraview version 5.5. OpenFoam is a CFD software code released and developed primarily by OpenCFD Ltd, since 2004. It has a large user base across most areas of engineering and science, from both commercial and academic organisations.

OpenFOAM CFD code has capabilities of utilizing a Reynolds Averaged Navier-Stokes (RANS) approach, Unsteady Reynolds Averaged Navier-Stokes (URANS) approach, Detached Eddy Simulation (DES) approach, Large Eddy Simulation (LES) approach or the Direct Numerical Simulation (DNS) approach, which are all used to solve anything from complex fluid flows involving chemical reactions, turbulence and heat transfer, to acoustics, solid mechanics and electromagnetics.

Quality assurance is based on rigorous testing. The process of code evaluation, verification and validation includes several hundred daily unit tests, a medium-sized test battery run on a weekly basis, and large industry-based test battery run prior to new version releases. Tests are designed to assess regression behaviour, memory usage, code performance and scalability.

The OpenFOAM solver algorithm directly solves the mass and momentum equations for the large eddies that comprise most of the fluid's energy. By solving the large eddies directly no error is introduced into the calculation.

To reduce computational time and associated costs the small eddies within the flow have been solved using the widely used and recognised Smagorinsky Sub-Grid Scale (SGS) model. The small eddies only comprise a small proportion of the fluids energy therefore the errors introduced through the modelling of this component are minimal. The error introduced by modelling the small eddies can be considered of an acceptable level. Computational time will be reduced by modelling the small eddies (compared to directly solving).

16.2.1 CFD Model Details of the Wind Microclimate Study

This subsection describes all features included in the geometrical and physical representation of Central Mental Hospital, Dundrum Road Development CFD model. Any object which may have significant impact on wind movement and circulation are represented within the model.

To be accurate, the structural layout of the building being modelled should include only the obstacles, blockages, openings and closures which can impact the wind around the building. It is important to remember that a CFD simulation approximates reality, so providing more details of the geometry within the model will not necessarily increase the understanding of the bulk flows in the real environment.

16.2.1.1 Modelled Geometry and Computational Mesh

In accordance with the guideline cited in section 16.1.1, when a wind study is carried out using CFD modelling the modelled area must include a detailed three-dimensional representation of the proposed development and the numerical calculation should take place using a model mesh a maximum cell sizes near critical locations (e.g. entrances, corners, etc.) in the order of 0.3m or smaller. Sufficient mesh cells should be also used between buildings with a minimum of 10 cells across a street canyon. However, the cell size of buildings away from the target can be larger to allow for wind modelling efficiency.

To represent reality and consider the actual wind impacting on the site, the modelled area for the wind modelling study comprises a wider urban area of over 2km² around the Central Mental Hospital, Dundrum Road Development, this to include the recommended dimensions (400m radius from the site centre) as outlined in section 16.1.2.

Table 16.1: Modelled Environment Dimensions.

	MODELLED CFD ENVIRONMENT DIMENSIONS		
	Width	Length	Height
CFD Mesh Domain	1600m approx.	1600m approx	160m approx

16.1.1.2 Boundary Conditions for The CFD Model

A rectangular computational domain was used for the analysis. The wind directions were altered without changing the computational mesh. For each simulation scenario, an initial wind velocity was set according to the statistical weather data collected in order to consider the worst case scenario. Building surfaces within the model are specified as 'no slip' boundary conditions. This condition ensures that flow moving parallel to a surface is brought to rest at the point where it meets the surface. Air flow inlet boundaries possess the 'Inlet' wind profile velocity patch boundary condition with its appropriate inflow turbulence intensity and dissipation rates. Air exits the domain at the 'pressure outlet' boundary condition.

Due to aerodynamic drag, there is a wind gradient in the wind flow just a few hundred meters above the Earth's surface – "the surface layer of the planetary boundary layer".
Wind speed increases with increasing height above the ground, starting from zero, due to the no-slip condition. In particular, the wind velocity profile used for the analysis is parabolic. Flow near the surface encounters obstacles that reduce the wind speed and introduce random vertical and horizontal velocity components. This turbulence causes vertical mixing between the air moving horizontally at one level, and the air at those levels immediately above and below it. For this reason, the velocity profile is given by a fluctuating velocity along a mean velocity value which are both numerically simulated by mean of inlet velocity profile and turbulence intensity values assigned to the model.

The equation used for the wind velocity profile within the model, as described above is shown below.

where:

- v_1 = wind speed measured at the reference height h_1
- h_1 = reference height to measure v_1
- h_2 = height of the wind speed v_2 calculated for the wind profile
- z_0 = 0.4 [m] roughness length selected (see table below)

16.1.1.3 Computational Mesh

The level of accuracy of the CFD results are determined by the level of refinement of the computational mesh. Details of parameters used to calculate the computational mesh are presented in Table 16.4. Figure 16.10 shows the mesh utilised in the simulations.

The grid follows the principles of the 'Finite Volume Method', which implies that the solution of the model equations is calculated at discrete points (nodes) on a three-dimensional grid, which includes all the flow volume of interest. The mathematical solution for the flow is calculated at the centre of each of these cells and then an interpolation function is used by the software to provide the results in the entire domain.

Table 16.2: Parameter to Calculate Computational Mesh.

PARAMETERS TO CALCULATE COMPUTATIONAL MESH	
Air Density ρ	1.2kg/m^3
Ambient Temperature (T)	288K ($approx.$15C°) isothermal analysis
Gravity Acceleration (g)	9.8m/s^2
dx	0.3 m at the building 1m in the surroundings 2m elsewhere
Mesh cells size	0.1 m (ratio 1:1)
Total mesh size	Approx. cells number = 10 millions

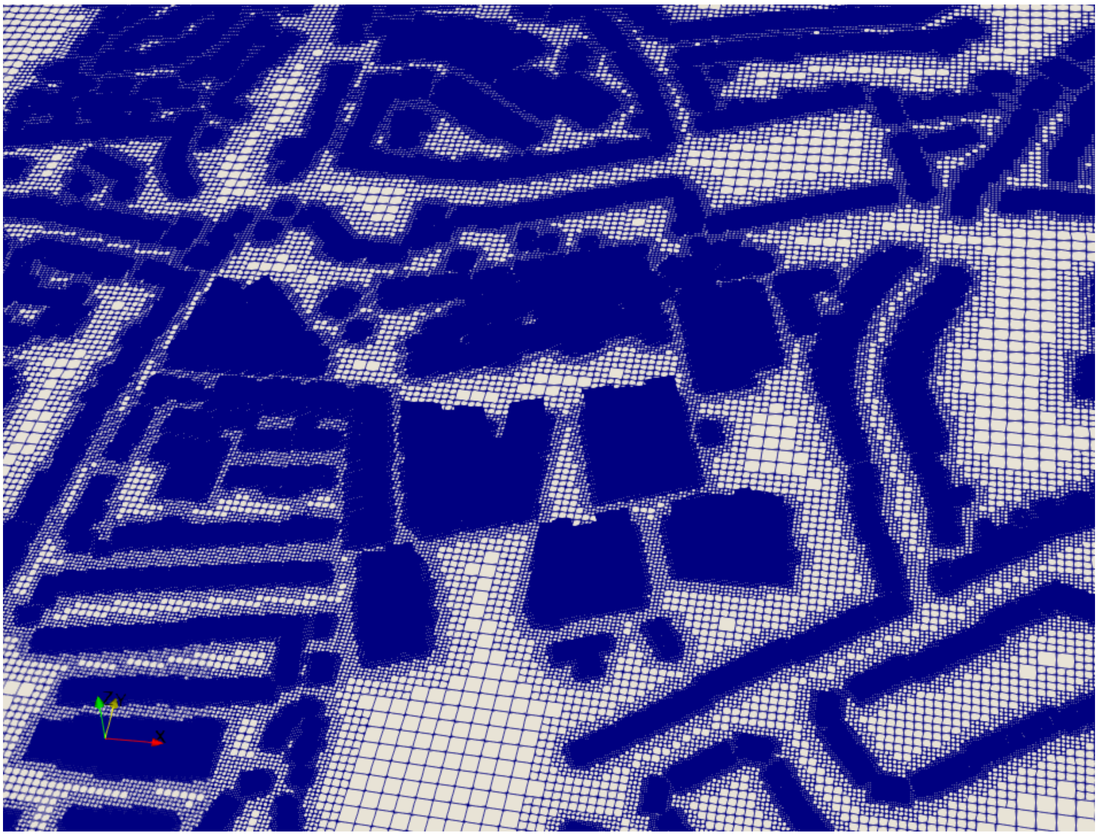

Figure 16.2: CFD Mesh division adopted for the wind modelling/simulation.

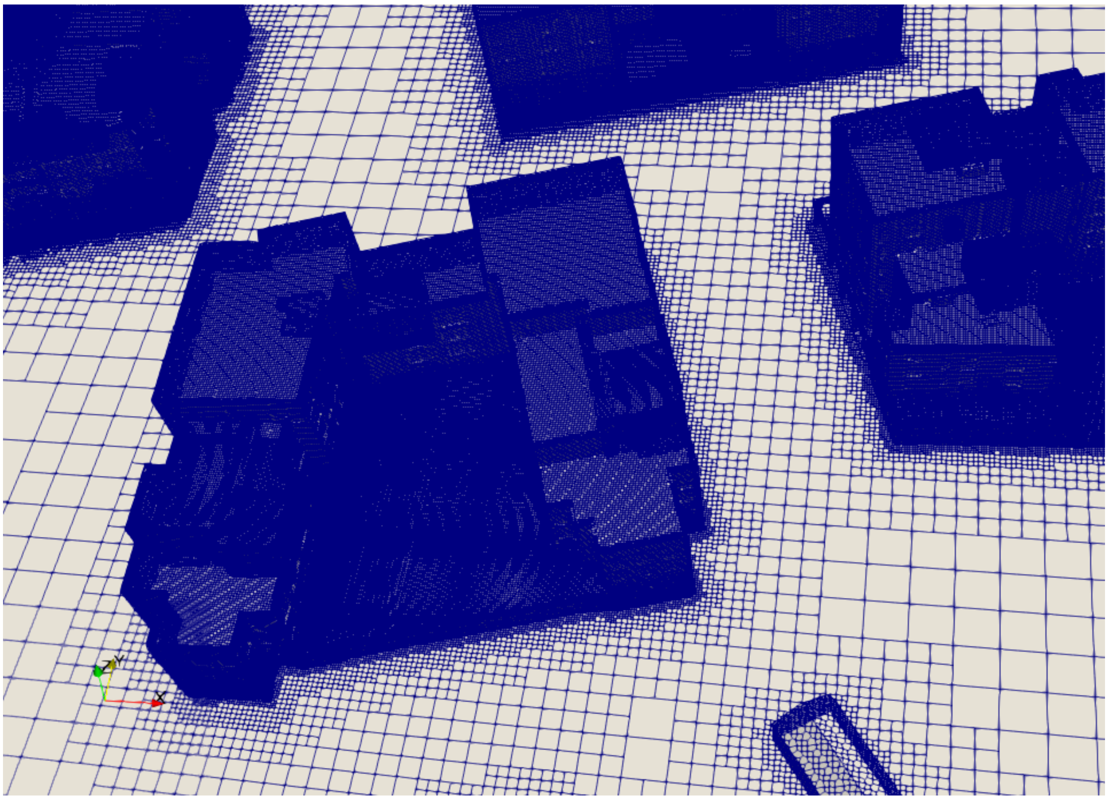

Figure 16.3: CFD Mesh division (details at building surface).

17.0 MATERIAL ASSETS - ROADS AND TRAFFIC

17.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by ILTP Consulting (ILTP) and assesses any likely and significant impacts associated with traffic due to the proposed development. Mitigation measures are proposed where negative effects are identified.

This Material Assets chapter has been prepared by Christy O'Sullivan and Ben Waite of ILTP. Christy O'Sullivan is the Managing Director of ILTP and qualified as a Civil Engineer (BEng.) from University College Cork (UCC) in 1982. He is a Chartered Engineer (CEng.) with 30+ years of experience in traffic and transport engineering and planning and is a Fellow of the Chartered Institution of Highways and Transportation (FCIHT).

Ben Waite is a Senior Transport Analyst, he holds a BA (Hons.) in Geography and an MSc. (Hons) in Geographic Information Science and a Member of the Chartered Institution of Highways and Transportation (MCIHT) and has over 15 years experience in traffic and transport design, analysis and planning.

17.2 Methodology

The following methodology has been adopted for this assessment:

ILTP coordinated traffic count surveys undertaken in February 2019 and in November 2021 in order to collate the full set of traffic data considered necessary to support the planning application for the proposed development. This will be explained in more detail in section 17.3.6.

ILTP conducted an assessment of available information on projected traffic trends, including the Transport Strategy for the Greater Dublin Area, the current Dun Laoghaire Rathdown Development Plan 2016 – 2023 and Smarter Travel a Sustainable Transport Future.

ILTP calculated the estimated trip rates from the proposed development and added these figures to the base flows. A Picady analysis was also undertaken to assess the capacity of the proposed accesses onto Dundrum Road (R117). Picady and LinSig Traffic Signal Junction modelling software was also utilised to assess the capacity of the adjacent junctions with the proposed development in place. From these results a conclusion could be drawn as to the impact that the development will have on the overall traffic flows. Once details were available ILTP then assessed what impact the development had on the road network.

An assessment of public transport provisions in the area was also carried out to determine the likely usage of public transport services by residents and visitors to the new development.

In addition, to the Traffic & Transport Assessment (TTA) undertaken, ILTP prepared a Mobility Management Plan (MMP) for the proposed development, with the specific objectives of reducing in overall terms both the number of trips generated by the development and ensuring that greater numbers use the extensive public transport services in the immediate area.

ILTP also assessed the construction stage traffic impacts of the proposed development on the wider road network.

In terms of projecting future year traffic scenarios beyond the 2021 Base Year, the assumed Opening Year of the proposed development was taken to be 2024, with the Design Year taken as 2039.

Pre-planning discussions also took place with Dun Laoghaire Rathdown County Council (DLRCC) on the proposed access strategy in advance of the tri-partite with the Board. A further meeting took place with the National Transport Authority (NTA) and DLRCC in January 2022 to discuss the proposed changes to the overall masterplan for the subject lands and the proposed SHD planning applications.

17.3 Baseline Environment

This section considers the baseline conditions, providing background information for the site in order to determine the significance of any traffic implications. This section also considers the existing accessibility of the site by sustainable modes of transport.

17.3.1 Site Location

The site of the proposed development is in Dundrum, Dublin 14. The planning application site is approximately 9.6Ha in area and located approximately 5km from Dublin City Centre. The area is largely residential with established schools, community and social facilities in the vicinity.

The proposed Dundrum Central Mental Hospital site is located in a well-established residential area and close to schools, University College Dublin, major retail facilities including Dundrum Town Centre, and local amenities. It is also within a short walk of the Luas Green Line and a variety of Bus services.

17.3.2 Existing Cycling and Pedestrian Facilities

Pedestrian facilities including footpaths are provided on the R117 adjacent to the proposed development. There is an existing pedestrian and cycle crossing on the R117 at the junction with St. Columbanus’ Road, which facilitates pedestrian and cycle access to the closest Windy Arbour Luas stop.

There are also cycle lanes along St. Columbanus’ Road to the immediate west of the site, which facilitate direct cycle connectivity between the subject site and the closest Windy Arbour Luas stop.

In addition to the pedestrian facilities adjacent to the existing road network, there are pedestrian routes in the adjacent Rosemount Green to the south which can be linked into from the proposed development.

There are no dedicated cycle provisions on the R117 Dundrum Road. The R825 Goatstown Road to the east is also located within 350m of the eastern boundary of the site and has dedicated cycle lanes in place.

17.3.3 Public Transport

The subject site is to the east of the Luas Green Line running from Brides Glen to Broombridge via the City Centre, with the Windy Arbour stop in closest proximity. This stop is within a 10-minute walk from the centre of the subject site.

Current Luas services to and from the city centre typically operate at an average of 3-5 minute intervals during peak periods.

There are regular bus services routing to and from the city centre on Dundrum Road, on Goatstown Road to the east and also bus services leaving Dundrum Village to the south. The closest bus stop is located on Dundrum Road approximately 200m walking distance from the centre of the site. This stop is served by the 44, 61 and 17 bus services. Bus route 142 also serves the next bus stop to the north on Dundrum Road, which is in the vicinity of Bird Avenue

The closest bus stops to the east of the site on Goatstown Road are served by the 11 bus route.

17.3.4 Public Transport Capacity and Frequency

The new Luas 55m trams have a theoretical capacity of 408 passengers/tram. This increased the tram capacity from 319 passenger/tram, which is over 25% of an increase.

The new improvement works to the line have also allowed for increased frequencies on the line. Based on the new capacity of the Luas trams the estimated Luas line capacity in persons per direction per hour (pdph) at peak periods based on the following frequencies are:

- 408 @ 5min frequency = 4,896 pdph
- 408 @ 3min frequency = 8,160 pdph
- 408 @ 2min frequency = 12,240 pdph

It's assumed an 80% operational capacity 367 passengers/tram can readily be accommodate on the new Luas 55m trams. Based on the operational capacity of the Luas trams the estimated Luas line capacity in person per direction per hour(pdph) at peak periods based on the following frequencies are:

- 367@ 5min frequency = 4,404 pdph
- 367@ 3min frequency = 7,340 pdph
- 367@ 2min frequency = 11,010 pdph

The Luas system is also future proofed to accommodate 2minute frequencies. This means that additional capacity can be added to the Luas to meet future growth demands on an incremental basis.

ILTP undertook on-site surveys to determine the up-to-date frequencies of the Luas services on 1st March 2022. The frequency of northbound Luas trams in the AM peak period was recorded at the Windy Arbour Luas stop. In addition, the numbers boarding each Luas tram were also recorded.

The surveys also noted that all the trams on the line were the new 55m trams. It was also observed that there was sufficient capacity available on the Luas to accommodate the demands at the Luas stop.

Data for southbound trams were also recorded. These show lower frequencies southbound in the AM peak hour, which is to be expected as demand on the Luas is far greater that on the Luas northbound in the AM peak.

Based on the results of the surveys in the AM peak hour the city bound Luas theoretical capacity was 7,344pdph (408*18) and 6,606pdph using the assumed operational capacity. The recorded inbound frequency was just over 3 minutes for inbound trams.

ILTP also undertook an update of bus services in the area based on the existing timetables which are now in operation. The survey showed that there are currently a variety of bus services available to supplement the Luas service currently in place. The results of this survey are summarised in Table 17.1.

Table 17.1: Bus Services Routes and Frequency During AM and PM Peak Hour.

Service	Typical Frequency during Peak Periods		
	From	AM	PM
Dublin Bus Route 11: Sandyford Business District - Wadelai Park	Sandyford Business District	25 minute interval	20 minute interval
	Wadelai Park	15 minute interval	20 minute interval
Dublin Bus Route 44: Enniskerry – DCU via O'Connell Street	Enniskerry	1 per hour	1 per hour
	DCU	30 minute interval	1 per hour
Dublin Bus Route 61: Whitechurch – Eden Quay via Dundrum	Whitechurch	1 per hour	1 per hour
	Eden Quay	1 per hour	30 minute interval
Dublin Bus Route 142: UCD - Portmarnock via IFSC and Port Tunnel	UCD	_	_
	Portmarnock	_	25 minute interval
Go Ahead Route 17: Rialto - Blackrock	Rialto	20-30 minute interval	20-30 minute interval
	Blackrock	20-30 minute interval	20-30 minute interval
Go Ahead Route 161: Rockbrook - Dundrum	Rockbrook	1 per hour	1 per hour
	Dundrum	1 per hour	1 per hour
Go Ahead Route 175: UCD - Citywest	UCD	1 per hour	1 per hour
	Citywest	40 minute interval	1 per hour

These bus services serve a wide variety of destinations that further enhances public transport in the area. These bus services are available to serve the existing and new development in the area. In total there are 19 buses along these routes. The average operating capacity of an urban bus is approximately 90 passengers per bus. The capacity of the existing bus services in the area are summarised in Table 17.2.

Table 17.2: Estimated Passengers Capacity AM Peak hour.

Estimated Passengers Capacity AM Peak hour (08:00 - 09:00)			
Bus Service To/From	No. Buses per hour	Operational Capacity (passengers per bus)	Total Capacity(passengers per bus)
Dundrum Road	9	90	810
Goatstown Road	6		540
Dundrum Village	4		360
TOTAL	19		1710

These bus services are set to be enhanced through the BusConnects projects and bus capacity increases are planned to be increased by 25% over the coming years. Therefore, bus service capacity and network will be improved further over the period to 2030.

17.3.5 Proposed Transport Infrastructure and Ongoing Improvements to Cycle, Luas and Bus services

There are improvements planned for the bicycle network in the vicinity of the subject lands. The planned improvements are set out in the NTA Greater Dublin Area Cycle Network Plan (2013), which is currently under review by the NTA.

The NTA have recently published the new Dublin Area Bus Network, which is being implemented on a phased basis as part of the BusConnects project. This includes a series of primary Spine routes classified as ‘A’ routes, with additional Radial, Orbital, Local and Peak-Only / Express routes.

The Government in March 2022 approved funding of €4bn for the BusConnects project and this is proposed to increase bus capacity for the city by 23% by 2030. Additional bus services are planned for the area, including the proposed C6 orbital route.

The Luas Green line has been recently upgraded resulting in significant capacity increases on the Luas Green Line and is also future proofed to accommodate future demand on the line to 2030.

17.3.6 Existing Traffic Conditions

There are a number of junctions along Dundrum Road in the vicinity of the proposed development. The junctions are either priority or signal controlled. There are traffic two signal-controlled junctions at Bird Avenue and at Taney Road. The remainder of the junctions along Dundrum Road are priority junctions and these mainly serve local residential areas.

ILTP obtained traffic count survey data available for some junctions on Dundrum Road in the vicinity of the proposed development, including the existing CMH site access junction.

ILTP commissioned new additional traffic counts along the Dundrum Road on 23rd November 2021, which were more comprehensive and detailed compared to the previous data. This more localised data was then compared with pre-covid traffic data and appropriately factored to account for any likely covid distortions. This provided a robust data set on which to undertake a traffic assessment of the proposed development.

The November 2021 traffic data was compared with earlier traffic data collected in 2019 to check for data consistency. The results show that at peak hour periods traffic flows were slightly lower than those recorded in 2019 as a likely result of covid-19 changes. ILTP applied a 4% growth factor the November 2021 data, which was used as the baseline traffic for assessment purposes. These adjusted flows compared to the 2019 data are summarised in Table 17.3.

A traffic assessment using either data set would, therefore, produce almost identical result, however as the 2021 data was more comprehensive it was decided to use this data but appropriately factored.

Table 17.3: 2019 and 2021 Traffic Survey Data Comparison.

Total PCUs Through Junction

Junction		Survey Date Nov-21	Feb-19	% Change Feb-19 to Nov-21
CMH Access	AM	1294	1366	-5.27%
	PM	1109	1125	-1.42%
Rosemount/Frankfort Park	AM	1515	1521	-0.39%
	PM	1307	1349	-3.11%
Highfield Park	AM	1326	1389	-4.54%
	PM	1146	1147	-0.09%

Adjusted Data for Covid-19 Fluctuations

		Nov-21 + 4%	Feb-19	% Change Feb-19 to Nov-21
CMH Access	AM	1346	1366	-1.48%
	PM	1153	1125	2.52%
Rosemount/Frankfort Park	AM	1576	1521	3.59%
	PM	1359	1349	0.76%
Highfield Park	AM	1379	1389	-0.72%
	PM	1192	1147	3.91%

17.4 Potential Impacts of the Proposed Project

17.4.1 Construction Phase

Typical construction working hours on site are expected to be as follows:

- Mondays to Fridays – 8.00am to 7.00pm
- Saturday – 8.00am to 2.00pm
- Sundays and Public Holidays – No activity on site

A detailed Construction Traffic Management Plan (CTMP) will be prepared and submitted to the planning authority prior to commencement of construction of the development.

Various route proposals were assessed for accessing the construction site, however, it was decided that the route with the least impact on the adjoining road network would be the most prudent, as it would reduce conflict with other vehicles.

The site adjoins the R117 Regional Road which means that all HGV movement associated with the construction stage of the proposed development can be required to only use the regional and national road networks to the south of the proposed development.
The proposed Haul Route for the construction works for the proposed development is shown in Figure 17-1.

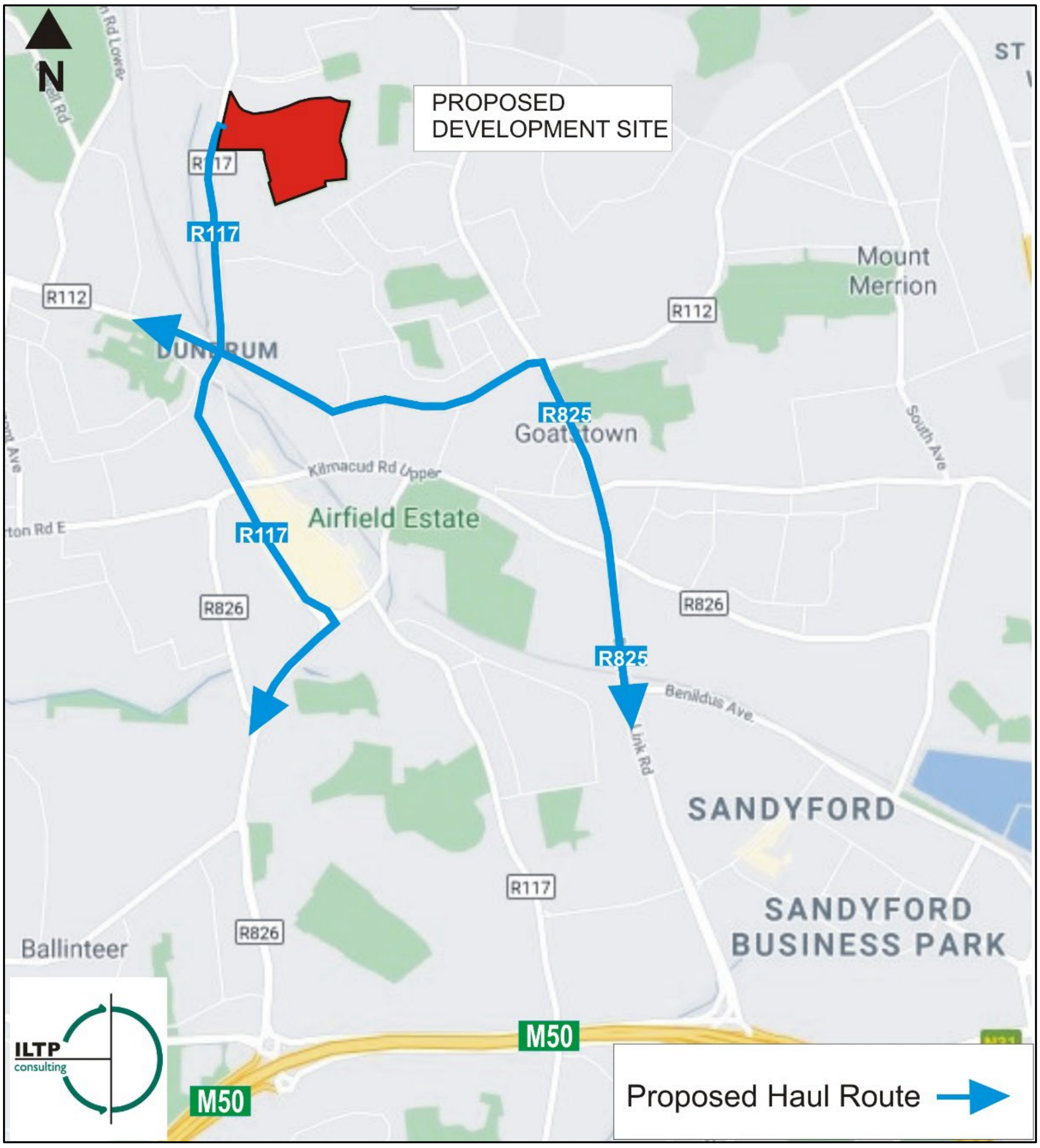

Figure 17.1: Proposed Haul Route.

Construction traffic will access the site from Dundrum Road. Based on the quantities of excavation and fill to be moved to or from the site, construction waste removal, and general site deliveries for the intended construction works, HGV traffic is estimated to be a maximum of 10 movements per hour.

It is projected that the works will result in approximately 300 to 400 construction workers on site during typical construction period, with a maximum of 800 construction personnel on site concurrently during short period of peak activity. Given typical construction working hours the majority of these personnel are expected to arrive to site in advance of the 08:00 – 09:00 morning peak hour and after the 17:00 - 18:00 evening peak hour.

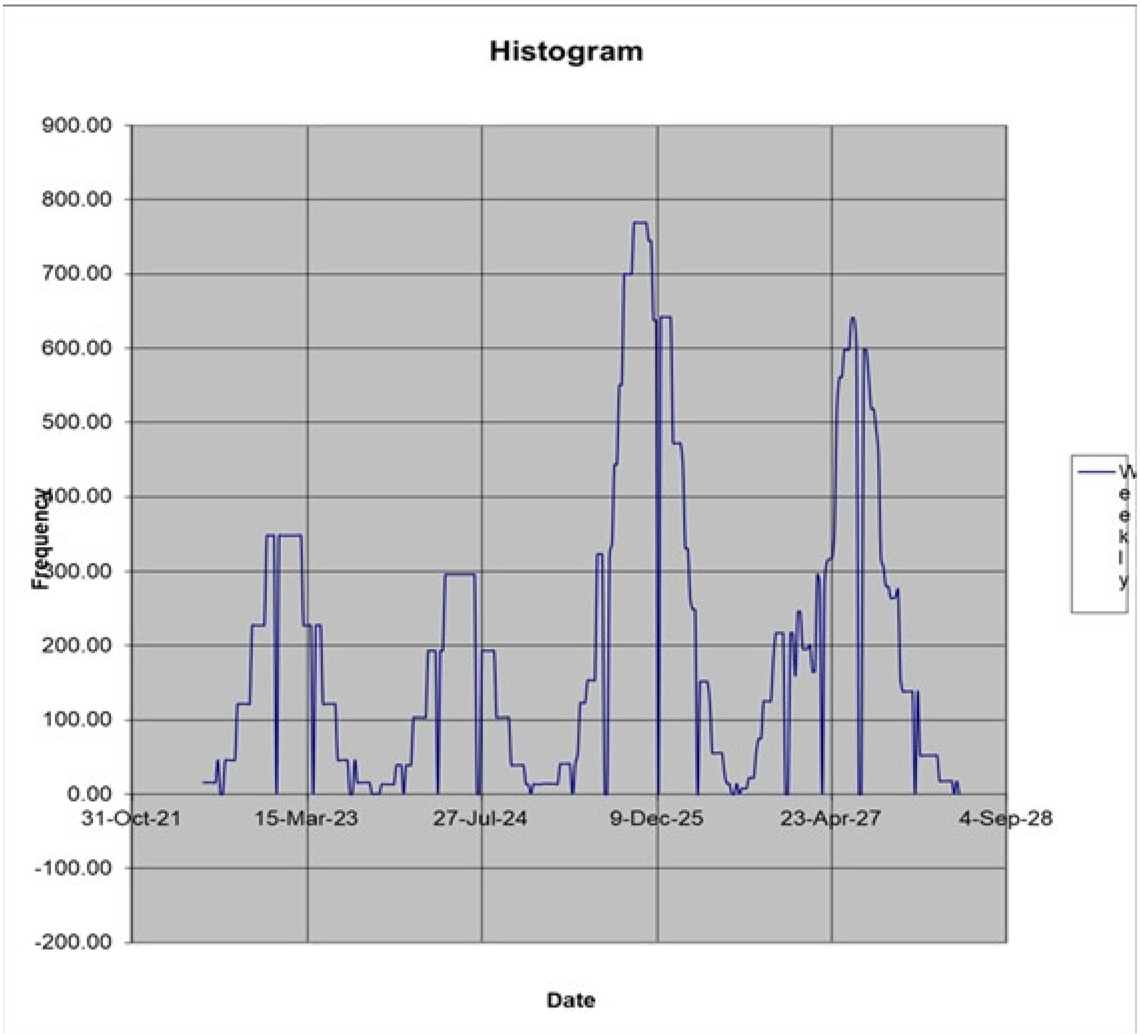

Figure 17.2: Approximate Weekly Construction Workers Trip Movements To/From Site (Source: CEMP Report).

Some construction workers will arrive on foot, cycle or use public transport. In addition, many construction workers come to site in groups by car or van. Vehicular movements carrying construction personnel can be broken down as follows:

• 800 peak staff working on site (Max)	
• 40% arrive during AM or PM Peak Hours	320
• 30% arrive via public transport, walk or cycle	96
• Total arrive via car/van	224
• Average Car Occupancy = 2.2 (including driver)	2.2
• Maximum additional movements AM/PM Peak (800 staff)	102 cars/vans
• With up to 400 staff normally on site	
• Normal additional movements AM Peak	51 cars/vans

This volume of construction traffic estimated to be generated during peak traffic hours is lower than the peak volumes of non-construction traffic projected for the operational phase of the development.

Beyond the bulk earthworks stage, other stages during construction are estimated to have lower HGV volumes and lower traffic volumes overall.

The projected peak volume of construction traffic, including both truck and staff movements, is lower than the peak traffic volumes projected for the fully occupied development during the operational stage.

Therefore, in Traffic Impact Assessment terms, the most onerous scenario to assess in terms of capacity and traffic impact is the operational stage of the development.

Systematic Definition of Effects

The likely effect of the proposed development during the construction phase will be:

1. Additional HGV traffic along the proposed designated haul route which will have a slight medium-term adverse effect on the local road network during the construction works.

2. Additional construction personnel car / light vehicle movements which will have a slight medium-term adverse effect on the local road network during the construction works.

3. Construction vehicle movements associated the proposed development when undergoing service connections on the public road, which will have a slight short-term adverse effect on traffic movements on these roads in the vicinity of the proposed development.

4. Construction vehicle movements and works to Dundrum Road which will have a slight short-term adverse effect on pedestrian and cycle movements on these roads in the vicinity of the proposed development, for example due to pedestrians and cyclists having to give way at the construction access to the site and / or divert around construction works.

17.4.2 Operational Stage

Traffic Projections for Proposed Development

ILTP prepared estimates of the overall Traffic increases that would result from the proposed development.

ILTP have estimated trip generation figures for the proposed development based on their experience in Ireland and having regard to the range of trip rates from the Trip Rate Information Computer System (TRICS) database. The traffic impact from other planned and committed developments in the area were also assessed using the data contained in the planning document accompanying these relevant developments. The cumulative impact of these developments is set out later in the section 17.9. These developments were also assumed to be in place in advance of the proposed development and were added to the opening year traffic assessments to give a robust assessment of the development. The reduced car parking, below the CDP maximum standards is also likely to result in lower traffic movement associated with the completed development to that assumed in the TTA.

Future Year Scenarios – Without and With Proposed Development

No further growth in background traffic is assumed between the 2024 Opening Year and 2039 Design Year, which is consistent with the overall transport trends and strategy for the Dublin area and wider national policy objectives.

Therefore, for the 2039 Design Year it was assumed that the 2024 traffic volumes without and with the proposed development would persist, which would represent a worse-case scenario.

Projected Trip Generation for Proposed Development

For EIAR and TTA evaluation purposes ILTP have however assumed that some growth in background traffic would arise over the short term and that the development itself will generate additional traffic movements on the road network, which represents a worse-case scenario in terms of evaluation methodology.

The proposed development will generate an increased level of traffic on the local road network and demand for public transport.

To calculate the likely increase in traffic volumes trip rates were established for each proposed land use type and quantum using ILTP's own experience of comparable developments of similar size and nature in Ireland, and with reference to the TRICS database.

Using TRICS, ILTP estimated the total number of person-based trips each individual element of the development is likely to produce and combined to produce gross trip rates. These person base trips also allowed us to calculate public transport demands to and from the new development.

It should be noted that the additional trips used in the traffic assessments can more accurately be defined as trip ends, as each trip has both an origin and a destination. If all trip ends were assumed to be new trips and these were applied to all developments, this would result in a doubling of forecasted trips on the wider network. The traffic assessment assumed all the trips to and from the proposed development were additional trips which represent a very robust assessment of traffic movements.

ILTP applied a modal split to calculate the likely number of non-car-based trips also, based on existing walking, cycling and public transport facilities. The final modal split was calculated based on a combination of data from TRICS and with reference to the CSO data and is as follows:

- Car (Driver) 44.6%
- Car (Passenger) 5.4%
- Pedestrian & Cycle 20%
- Bus 5%
- Luas 25%

Given the mix of uses not all trips will be external as many of the proposed facilities will be used by the residents. ILTP have assumed that internal trips to and from the creche, retail uses and other facilities would account for 15% of the overall residential trips and have assumed that the external trips would account for 85%. Similarly the trips to and from the retail and the other facilities provided on site would be mainly used by the local resident, but 20% were assumed to be external trips. The trip rates used for the enterprise centre are assumed to be 90% external with 10% coming from with the development.

Table 17.4: Proposed Weekday Peak Hour Trip Generation Volumes on Adjoining Road Network.

Type	AM Trips		PM Trips	
	Arr	Dep	Arr	Dep
SHD				
Apartments	36	176	124	60
Houses	3	11	8	4
S34 Application				
Apartments	2	8	6	3
Houses	2	9	7	3
Total Residential	42	204	146	71
Non-Residential				
SHD				
Creche	3	1	1	2
Retail Cluster	7	7	8	8
Restaurant/Café	1	1	1	1
Community	1	1	1	1
Medical	1	1	1	1
S34 Application				
Enterprise	42	3	3	40
Total Non-Residential	55	14	16	53
SHD	51	197	145	77
S34	46	20	16	47
Total	**97**	**217**	**161**	**123**

The Trip Generation assessment yields an estimate of an additional 97 no. inward and 217 no. outward trips for the AM peak hour (08:00 – 09:00). An additional 161 no. inward trips and 123 no. outward trips were estimated for the PM peak hour (17:00 – 18:00) for the entire masterplan lands.

As the AM and PM peak hours are the times of the day with the highest level of traffic volumes it can be assumed that if the road network can perform effectively at these times, it will meet all demands placed upon it at other periods.

The weekend flows along Dundrum Road are lower than the peak hour period for weekdays. Also traffic generated by the proposed development will be lower at weekend. Therefore no further assessment of weekend traffic was warranted.

Junction Capacity Assessments

A PICADY traffic modelling analysis was undertaken for peak weekday and weekend periods to assess the capacity of the proposed left in left out access junction onto Dundrum Road with the proposed development traffic in place.

The PICADY analysis found that the approach arms of the proposed access junction will operate at or below 46% capacity with the peak hour development traffic in place. This confirms the proposed access junction has more than adequate capacity for the proposed development. Further details of the Picady traffic modelling analysis are included in the Traffic and Transport Assessment & Mobility Management Plan report, included separately.

ILTP also conducted a LinSig (signalised junction) capacity assessment of the existing R117-Bird Avenue junction.

The LinSig model results for the junction showed that by even applying robust traffic generation figures, the junction had ample capacity during peak weekday periods with the proposed development in place.

For further details of the traffic analysis and wider traffic impact assessment refer to the Updated Traffic and Transport Assessment & Mobility Management Plan report, included separately with the wider response to the Further Information Request for the proposed development.

Systematic Definition of Effects

Traffic impacts of less than 5% are defined as having a slight traffic impact. Traffic increased of 5% to 10% are defined as moderate traffic impact, which traffic greater that 10% increase defined as a significant traffic impact.

The likely effect of the proposed development during the operational phase will be additional traffic which will have a significant long-term impact in the immediate vicinity of the proposed development on Dundrum Road and a moderate long-term effect on the adjoining section of Dundrum Road and a slight traffic impact on the wider road network.

The opening year mode share is anticipated to be 25% using Luas. It is estimated that 80% of persons leaving the proposed development by Luas in the AM Peak will travel towards to City Centre.

Based on current frequencies of 18 trams per hour, this equates approximately 6 to 7 additional person per tram city bound in the AM peak, which can be accommodated by the existing Luas services.

Based on current bus frequencies on the buses in the area and a mode share of 5% the estimated additional passengers per bus are set out in Table 17.5.

Table 17.5: Estimated Bus Service Demand AM Peak Hour.

	Estimated Additional Passengers per Bus AM Peak hour (08:00 - 09:00)		
	No. Passengers	No. Buses per hour Dundrum Road /Goatstown Road/Dundrum Village	Additional passengers per bus/ per hour
Departing	28	8	2
Arriving	12	11	
TOTAL	**40**	**19**	

Based on current frequencies this would result in an additional 2 passengers per bus during the AM peak hour period.

The improved walk and cycle facilities included in the development would further improve connectivity to the bus and Luas service in the area. The site is within 800m of the Windy Arbour Luas stop. The site is therefore within walk distance of a high capacity and high frequency public transport.

The proposed pedestrian routes through the proposed development would have significant long-term positive effects regarding reduced walking and cycling travel times to public transport services and improved permeability and connectivity to amenities in the area.

17.5 Mitigation Measures

17.5.1 Construction Phase

In order to reduce the potential impacts described above, remedial and mitigation measures will be implemented as set out below and in the Construction Environmental Management Plan included under a separate cover with this application.

RT_1: Tracked excavators will be moved to and from the Site on low-loaders and will not be permitted to drive onto the adjacent roadway.

RT_2: The applicant shall at all times keep all public and private roads and footpaths entirely free of excavated materials, debris and rubbish.

RT_3: Public roads outside the Site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.

RT_4: The applicant shall be responsible for and make good any damages to existing roads or footpaths caused by his own contractors or suppliers transporting to and from the Site.

RT_5: The contractor shall confine his activities to the area of the Site occupied by the works and the builders' compound, as far as practicably possible, during any particular phase of the works.

RT_6: All construction workers will be encouraged to use public transport, and also to car share where appropriate. On site staff car parking can also be provided to ensure no construction workers will be required to park on adjacent roads or streets.

RT_7: No daytime or night-time parking of site vehicles or construction staff vehicles will be permitted outside agreed areas.

RT_8: Construction work will be limited to normal working hours; that are 08.00 – 19.00 on weekdays and 08.00 – 14.00 on Saturdays. All deliveries of materials, plant and machinery to the Site and removals of waste or other material will take place within the permitted hours of work. Vehicle movements will be planned to ensure arrival and departure times are maintained inside the agreed working hours.

RT_9: Deliveries will be co-ordinated to prevent queuing of vehicles adversely affecting traffic flow and to minimise disruption to local traffic. They will be timed and coordinated to avoid conflict with collection of waste, other deliveries (particularly to adjoining owners), and rush hour traffic. Large deliveries will be scheduled outside peak traffic hours to minimise disruption.

RT_10: Properly designed and designated access and egress points to the construction site will be used to minimise impact on external traffic.

RT_11: Firm, level, and well-drained pedestrian walkways will be provided.

RT_12: Adequate visibility will be provided at the proposed access point to the proposed development off Dundrum Road.

RT_13: Footpaths will not be blocked resulting in pedestrians having to step onto the carriageway.

RT_14: The final Construction Traffic Management Plan with be submitted and agreed with the planning authority prior to the commencement of any development.

17.5.2 Operational Phase

The following traffic mitigation measures shall be implemented for the operational phase of the development:

RT_15: A Mobility Management Plan has been prepared for the proposed development which includes recommended mitigation measures to reduce usage of private cars and increase the use by residents and patrons within the development of more sustainable modes of travel, such as including good cycle parking provision, will further promote the greater use of sustainable travel modes. It is projected that successful implementation of the mobility management plan measures included will reduce the vehicular trip generation from the proposed development below that included for in the Traffic Impact Assessment for the proposed development. For further details refer to the Traffic & Transport Assessment and Mobility Management Plan included separately with the wider response to the Further Information Request for the proposed development.

RT_16: A Stage 2 Road Safety Audit (RSA) will be undertaken at the detailed design stage to ensure that the final design is in accordance with the TII Road Safety Audit Guidelines (December 2017) prior to the commencement of construction. A Stage 3 post construction and pre-opening of the proposed development in accordance with RSA guidelines to address any potential road safety issues related to the completed scheme.

RT_17: During the operational phase of the development, it is projected that the adjoining road network can readily accommodate the additional traffic from the proposed development.

RT_18: The recent improvement to the Luas has significantly increased the capacity of the route and the Luas is future proofed to accommodate further capacity increases to 2030. The bus network capacity is also proposed to be increased city wide over the coming years up to 2030.

RT_19: DLR in consultation with the NTA are preparing an Area Based Travel Plan (ABTP) which includes the CMH site. This will further promote sustainable travel modes in the area.

RT_20: Wider national, regional and local policy objectives combined with planned investment in sustainable travel modes will further mitigate the impact of the development over time.

17.6 Residual Impacts

17.6.1 Construction Phase

Due to the proposed mitigation measures outlined above, the impact of the proposed development will be temporary and slight during the construction stage.

17.6.2 Operational Phase

There will be a moderate increase in the use of the road network by private vehicles. A mobility management plan will promote more sustainable forms of transport and will significantly mitigate these impacts.

There will be an increase in the number of pedestrians and cyclists in the surroundings of the development. However, footpaths and cycling paths are provided as part of the development, thus, impact should be minimal.

17.7 Monitoring

17.7.1 Construction Phase

A Construction & Environmental Management Plan (CEMP) has been prepared and will be submitted with the application. The CEMP sets out the overarching vision of how the construction of the project will be managed in a safe and organised manner by the Contractor with the oversight of the Developer. The CEMP is a living 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 EIAR and any subsequent conditions relevant to the project.

Further specific monitoring measures are set out below:

1. A site liaison officer will be identified as a single contact point for the planning authority and local community to deal in a prompt and efficient manner with any issues that may arise in relation to construction traffic and activity on the public road.
2. Public roads outside the Site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.

17.7.2 Operational Phase

As part of the Mobility Management Plan for the proposed development a Mobility Manager will be appointed by the Management Company. The Mobility Manager will also be involved in monitoring of the modes of travel to and from the proposed development. This ideally will be done on an annual basis. Monitoring of travel patterns will facilitate the provision of sustainable transport modes and ensure that modal targets are met and improved upon over time.

17.8 Interactions

17.8.1 Construction Phase

A Construction Traffic Management Plan will be put in place and agreed with the planning authority which will minimise the traffic impact during construction stage. This will be coordinated with the wider Construction Environmental Management Plan to minimise Noise, Air Quality and Human Health impacts.

The traffic impacts, which would also be temporary in duration during construction are not considered to be significant due to the implementation of the mitigation measures identified in Section 17.5.1.

17.8.2 Operational Phase

The estimated 2021 Base Year, 2024 Opening Year and 2039 Design Year traffic volumes were provided to the EIAR Noise and Air Quality consultants as an input to their own separate EIAR assessments. Therefore, additional traffic from the proposed development may potentially have associated Noise and Air Quality impacts.

A series of mitigation measures will be implemented to minimise the operational stage traffic impact of the proposed development, which includes the implementation of effective Mobility Management Plan measures. Further details of the Noise and Air Quality assessments are set out in the respective EIAR chapters.

With regard to potential interactions with Human Health, the overall development has been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS). In addition, significant improvements to the public realm are included in the overall design. The proposed pedestrian and cycle links through the proposed development would have significant long-term positive effects with regard to reduced walking and cycling travel times to public transport services and improved permeability and connectivity to amenities in the area.

A Stage 1 Road Safety Audit has also been undertaken in respect to the previous permitted development, which is now undergoing compliance approval with the planning authority. Further Stage 2 & Stage 3 RSAs will be undertaken during the implementation phase of the development.

A Mobility Management Plan will also be agreed and implemented to encourage more sustainable travel modes. Further details of the Human Health assessment are set out in Chapters 11 and 12 of this EIAR.

17.9 Cumulative Impacts

17.9.1 Construction and Operational Phase Cumulative Impacts

The potential cumulative impacts of the proposed development on Traffic and Transportation have been considered in conjunction with developments in the surrounding area. We outline the status of each project and the expected cumulative impacts associated with this development.

- **D16A/0818 – Greenacres, Kilmacud Road Upper, Dublin 14**

The proposed development is approximately 1.2km away from our proposed development. The traffic to and from the CMH development dissipates throughout the network and has a negligible traffic impact on Kilmacud Road Upper. Due to the distance of this site from the CMH site, it is not anticipated that there will be any significant cumulative impacts during the construction or operational phases of the developments.

- **ABP31013821 – Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14.**
  The proposed site is approximately 770m away from our proposed development. The additional traffic from this development on Dundrum Road was allowed for in the traffic assessment and this development was assumed to be in place in advance of the CMH development.

- **D19A/0162 – Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14.**
  The proposed site is approximately 650m away from our proposed development. The traffic to and from the CMH development dissipates throughout the network and has a very minor traffic impact on Roebuck Road. Due to the distance of this site from the CMH site, it is not anticipated that there will be any significant cumulative impacts during the construction or operational phases of the developments.

- **D17A/1124 – Site of c.2.75 hectares at Knockrabo, Mount Anville Road, Goatstown, Dublin 14 (Phase 2).**
  The site is over 1km from the CMH development. The traffic to and from the CMH development dissipates throughout the network and has no material cumulative traffic impact on Mount Anville Road or the development. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts during the construction or operational phase of the developments.

- **ABP30835320 – The Car Sales Premises Currently Known as Vector Motors, Goatstown Road, Dublin 14, D14FD23.**
  The proposed site is approximately 500m away from our proposed development and is described as student accommodation. The traffic to and from the CMH development dissipates throughout the network and has no material cumulative traffic impact on Goatstown Road. It is not anticipated that there will be any significant cumulative impacts during the construction or operational phases of the developments.

- **ABP30943021 – 2.12ha At Our Lady's Grove, Goatstown Road, Dublin 14.**
  The proposed site is approximately 500m away from our proposed development and is described as student accommodation. Due to the distance of this site from our proposed site and the nature of the development, it is not anticipated that there will be any significant cumulative impacts during the construction or operational phase of the developments.

- **ABP31128721 – c0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14.**

The proposed site is approximately 400m away from our proposed development. The additional traffic from this development on Dundrum Road was allowed for in the traffic assessment and this development was assumed to be in place in advance of the CMH development.

- **ABP31182621 – Lands at Knockrabo, Mount Anville Road, Dublin 14.**
  The site is over 1km from the CMH development. The traffic to and from the CMH development dissipates throughout the network and has no material cumulative traffic impact on Mount Anville Road.. Due to the distance of this site from our proposed site, it is not anticipated that there will be any significant cumulative impacts during the construction or operational phase of the development.

- **TC06D.311553 – Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14.**
  The proposed development has not been submitted for planning and sufficient details are available on which to undertake a detailed appraisal. The proposed site is approximately 650m away from our proposed development. The site is located in Dundrum town centre and may replace existing development on the site. It is therefore not likely to result in a significant cumulative impact in the construction or operational phases.

- **ABP 312935-22 – Sommerville, Dundrum Road, Dundrum, Dublin 14.**
  This development has been recently submitted for planning and is currently awaiting decision. The proposed site is approximately 300m away from our proposed development. The additional traffic from this development on Dundrum Road was allowed for in the traffic assessments and this development was assumed to be in place in advance of the CMH development.

- **CMH Future S34 – Lands at Central Mental Hospital, Dundrum Road, Dublin 14.**
  The traffic assessment undertaken for the CMH development includes for the likely development and traffic generation of these lands that will form part of a separate S34 application and therefore has been included for in at both the construction and operational stages.

The cumulative traffic impacts of the proposed development are summarised in Table 17.6, immediately to the south of the southern entrance on Dundrum Road. This is where the largest traffic impact of our development will arise.

Table 17.6: Cumulative Impact of Adjacent Developments.

	Additional Two-way Trips Immediately South of Southern Access - Vehicles Per Hour	
	AM Peak	PM Peak
ABP31013821 (Mount St. Mary's SHD)	16	18
ABP31128721 (Highfield/Frankfort SHD)	16	5

ABP312935-22 (Sommerville SHD)	7	10
Total Additional Trips	**37**	**33**
Existing Peak Hour Flows	1323	1271
Percentage Increase	2.9%	2.6%
Less Existing CMH Traffic	(39-23) 16	(33-11) 21
Net Increase	**1.2%**	**1.6%**

Table 17.6 shows that the cumulative traffic impact of other developments assessed have a cumulative traffic impact of less than 3% of the 2024 base year traffic in both the AM and PM peak hours. To account for these potential cumulative impacts the 2024 opening year traffic was factored by 3%. In addition, the reductions in traffic that will arise with the closure of the existing CMH facility would further reduce the cumulative traffic impact on the surrounding road network. However, to ensure a robust assessment these reductions were not included in the traffic assessments undertaken on the road network.

The operational stage of our development was estimated to generate an additional 314 movements (97+217) in the AM peak hour, while the construction traffic was estimated to generate a maximum of an additional 112 (10 +102) movements in the AM peak hour.

The cumulative construction stage traffic impact of the other developments along Dundrum Road and in the vicinity of the proposed development is forecasted to be lower than the operational stage traffic impact. If the construction of these other developments is ongoing, during either the construction or operational stages of our development, then the construction stage cumulative traffic impact would be less than the cumulative traffic impact of the operational stage of these other developments. Therefore, there was no necessity to undertake a separate detailed traffic assessment of the cumulative traffic impact for the construction stage.

17.9.2 Conclusion

The cumulative traffic impact of other proposed developments in the area was considered and included for in the traffic assessments undertaken. To account for the cumulative traffic impact of other developments in the area, the opening year traffic flows were factored up by 3% across the network. The traffic impact of the S34 lands was also included in the assessment of the SHD development. This provided for a robust assessment of the cumulative traffic impact of proposed development.

17.10 ‘Do-Nothing’ Effect

If the lands were to remain undeveloped then there would be no direct traffic impact on the surrounding area. The planned closure of the existing CMH facility would result in a minor reduction on traffic on Dundrum Road. Not developing the lands would also represent a missed opportunity as the lands that are well located in an area well served by public transport. It would also undermine wider national policy objectives, that of delivering sustainable development in areas well served by sustainable travel modes and public transport.

17.11 Difficulties Encountered in Compiling the Chapter

A potential difficulty was the impact that Covid -19 pandemic restrictions might have on any traffic flows recorded during this period as a basis of undertaking the traffic assessments. However earlier 2019 traffic data was available for comparison purposed and appropriate factors applied to the new data used in the TTA. Both the 2019 or the factored 2021 traffic data would produce almost identical results.

The Luas was in the process of being upgraded over the past two years and it was difficult to get a precise information on the frequency and capacity of the Luas. These upgrades are now completed and operational and a recent capacity assessment of Luas was undertaken and included in the transport assessment.

17.12 Conclusion

A predominantly residential development is proposed on lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14. This chapter presents a summary of the aspects of the development pertinent to traffic and transportation.

The existing background traffic conditions have been quantified by way of traffic count surveys. An assessment of public transport provisions in the area was also carried out to determine the likely usage of public transport services by residents and visitors to the new development.

ILTP assessed available information on projected traffic trends, including the Transport Strategy for the Greater Dublin Area, the current Dun Laoghaire Rathdown Development Plan 2016 – 2023 and Smarter Travel a Sustainable Transport Future.

ILTP calculated the estimated trip rates from the proposed development and added these figures to the base flows. A Picady analysis was also undertaken to assess the capacity of the proposed accesses onto Dundrum Road (R117). Picady and LinSig Traffic Signal Junction modelling software was also utilised to assess the capacity of the adjacent junctions with the proposed development in place.

From these results a conclusion could be drawn as to the impact that the development will have on the overall traffic flows. Once details were available ILTP then assessed what impact the development had on the road network. ILTP also assessed the construction stage traffic impacts of the proposed development on the wider road network.
The potential cumulative impacts of the proposed development on Traffic and Transportation were also considered in conjunction with developments in the surrounding area.

The likely effect of the proposed development during the operational phase will be additional traffic which will have a significant long-term impact in the immediate vicinity of the proposed development on Dundrum Road and a moderate long-term adverse effect on the adjoining section of Dundrum Road and a slight traffic impact on the wider road network.

The proposed pedestrian routes through the proposed development would have significant long-term positive effects regarding reduced walking and cycling travel times to public transport services and improved permeability and connectivity to amenities in the area.

17.13 References

Glossary of Terms

AADT	Annual Average Daily Traffic
CDP	County Development Plan
DLRCC	Dun Laoghaire Rathdown County Council
GFA	Gross Floor Area
HGVs	Heavy Goods Vehicles
ILTP	ILTP Consulting
MMP	Mobility Management Plan
NTA	National Transport Authority
PICADY	Priority Intersection Capacity and Delay
PDPH	Per Direction Per Hour
RSA	Road Safety Audit
TRICS	Trip Rate Information Computer System
TTA	Traffic & Transport Assessment

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18.0 MATERIAL ASSETS – WASTE

18.1 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.

A site-specific *Construction and Demolition Waste Management Plan* (C&D RWMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the demolition, excavation and construction phases of the proposed Development and has been included as Appendix 18.1. The C&D RWMP 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 (DoEHLG) in July 2006 and the Environmental Protection Agency's (EPA) document 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021).

A separate *Operational Waste Management Plan* (OWMP) has also been prepared for the operational phase of the proposed Development and is included as Appendix 18.2 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.

18.2 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.

This Chapter is based on the proposed Development, as described in Chapter 5 (Description of the Proposed Development) and considers the following aspects:

- Legislative context;
- Construction phase (including demolition, 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 18.5.

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.

18.3.1 Legislation and Guidance

Waste management in Ireland is subject to EU and national waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Acts 1996-2021. European and national waste management policy is based on the concept of the ‘waste hierarchy’, which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 18.1).

Figure 18.1: Waste Hierarchy. (Source: European Commission.)

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 18.2).

Figure 18.2: Circular Economy. (Source: Repak.)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland*, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, *A Resource Opportunity,* in 2012.

One of the first actions to be taken from the WAPCE was the development of the *Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (*2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The strategy for the management of waste from the construction phase is in line with the requirements of the DoEHLG's *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (2021) and the EPA's *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2006)*. The guidance document, *Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers* (FÁS & Construction Industry Federation, 2002), was also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from current waste statistics from the operating phases of the development, industry guidelines, plans and reports including the EMR Waste Management Plan 2015 – 2021, BS 5906:2005 Waste Management in Buildings – Code of Practice, The Dún Laoghaire Rathdown County Council (DLRCC) (Segregation, Storage and Presentation of Household and Commercial) Bye-Laws 2019, the DLRCC Guidance Notes for Waste Management Residential and Commercial Developments (2020), the EPA National Waste Database Reports 1998 – 2019 and the EPA National Waste Statistics Web Resource.

18.3.2 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.

18.3 Baseline Environment

In terms of waste management, the receiving environment is largely defined by Dún Laoghaire-Rathdown County Council (DLRCC) as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021 and the Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland. Currently the EMR and other regional waste management plans are under review and the Regional Waste Management Planning Offices expect to publish the final plan in early 2022.

The waste management plans set out the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 55% of managed municipal waste by 2025; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020. Ireland achieved 84 per cent material recovery of such waste in 2019, and therefore surpassed the 2020 target and is currently surpassing the 2025 target. The National Waste Statistics update published by the EPA in November 2021 identifies that Ireland's current against "Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)" was met for 2020 at 51% however they are currently not in line with the 2025 target (55%).

The Dún Laoghaire-Rathdown County Council Development Plan 2016 – 2022 and Draft Dún Laoghaire-Rathdown County Council Development Plan 2022 – 2028 also set policies (and draft policies) and objectives for the DLRCC area which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, DLRCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

18.3.1 Characteristics of the Proposed Development

A full description of the proposed Development can be found in Chapter 5 (Description of the Proposed Development). The characteristics of the proposed Development that are relevant in terms of waste management are summarised below.

18.3.1.1 Demolition Phase

There will be waste materials generated from the demolition and refurbishment of some of the existing buildings and hardstanding areas on site, as well as from the further excavation of the building foundations.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific C&D WMP in Appendix 18.1. The C&D RWMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed Development. The reuse, recycling / recovery and disposal rates have been estimated using the EPA National Waste Reports and these are summarised in Table 18.1.

Table 18.1: Predicted on and off-site reuse, recycle and disposal rates for construction waste.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	96.8	0	0.0	85	82.3	15	14.5
Concrete, Bricks Tiles, Ceramics	548.8	30	164.6	65	356.7	5	27.4
Plasterboard	43.0	30	12.9	60	25.8	10	4.3
Asphalts	10.8	0	0.0	25	2.7	75	8.1
Metals	161.4	5	8.1	80	129.1	15	24.2
Slate	86.1	0	0.0	85	73.2	15	12.9
Timber	129.1	10	12.9	60	77.5	30	38.7
Total	**1076.1**		**198.5**		**747.4**		**130.2**

18.3.1.2 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.

There will be soil and stone excavated to facilitate site preparation for the construction of building and road foundations. The volume of material has been estimated by the project engineer (Barrett Mahony) to be c. 56,677m^3. It is envisaged that all of the excavated material apart from 7,199m^3 (which will be reused as fill) will be required to be removed off site. Material moved offsite will be taken for offsite reuse, recovery and/or disposal.

If any material requires removal from the site, it 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 RWMP (Appendix 18.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones if to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2019). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely 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 18.1). 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 18.2.

Table 18.2: Predicted on and off-site reuse, recycle and disposal rates for construction waste.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	2078.7	10	207.9	80	1662.9	10	207.9
Timber	1763.7	40	705.5	55	970.1	5	88.2
Plasterboard	629.9	30	189.0	60	377.9	10	63.0
Metals	503.9	5	25.2	90	453.5	5	25.2
Concrete	377.9	30	113.4	65	245.7	5	18.9
Other	944.9	20	189.0	60	566.9	20	189.0
Total	**6299.0**		**1429.9**		**4277.0**		**592.1**

18.3.1.3 Operational Phase

As noted in Section 18.1, an OWMP has been prepared for the proposed Development and is included as Appendix 18.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the operational phase including dry mixed recyclables (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, furniture, medical items and abandoned bicycles.

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 18.3, 18.4, 18.5 & 18.6, below, and is based on the uses and areas as advised by the Project Architects.

Table 18.3: Estimated waste generation for the proposed development for the main waste types.

Waste type	Waste Volume (m^3/week)			
	Residential Duplex 2 - Bed (Individual)	Residential House/Duplex 3 - Bed (Individual)	Residential House 4 - Bed (Individual)	Residential Block 2 (Combined)
Organic Waste	0.02	0.02	0.02	1.72
DMR	0.12	0.14	0.18	11.80
Glass	<0.00	<0.00	<0.00	0.33
MNR	0.06	0.07	0.09	6.86
Total	**0.20**	**0.23**	**0.29**	**20.71**

Table 18.4: Estimated waste generation for the proposed development for the main waste types.

Waste type	Waste Volume (m^3/week)

	Residential Block 3 (Combined)	Residential Block 4 (Combined)	Residential Block 5 (Combined)	Residential Block 6 (Combined)
Organic Waste	2.34	1.51	1.64	0.61
DMR	16.55	10.69	11.61	4.30
Glass	0.45	0.29	0.32	0.12
MNR	8.70	5.62	6.11	2.26
Total	**28.04**	**18.11**	**19.67**	**7.28**

Table 18.5: Estimated waste generation for the proposed development for the main waste types.

Waste type	Waste Volume (m^3/week)			
	Residential Block 7 (Combined)	Residential Duplex Block 8 (Combined)	Residential Duplex Block 9 (Combined)	Residential Block 10 (Combined)
Organic Waste	3.20	0.28	0.16	2.36
DMR	22.65	1.96	1.15	16.71
Glass	0.62	0.05	0.03	0.46
MNR	11.91	1.03	0.60	6.41
Total	**38.38**	**3.31**	**1.94**	**25.93**

Table 18.6: Estimated waste generation for the proposed development for the main waste types.

Waste type	Waste Volume (m^3/week)			
	Childcare Unit (Individual)	Medical Unit (Individual)	Community Centre Facility (Individual)	Other Commercial Units (Combined)
Organic Waste	0.05	0.03	0.30	0.41
DMR	1.71	0.57	1.88	7.99
Glass	0.01	<0.00	0.20	0.22
MNR	0.94	0.25	2.30	3.33
Confidential Paper	-	0.23	-	-
Medical Waste	-	0.63	-	-
Total	**2.70**	**1.71**	**4.78**	**11.95**

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 residents. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). WSAs can be viewed on the plans submitted with the application under separate cover.

The OWMP seeks to ensure the development contributes to the targets outlined in the EMR Waste Management Plan 2015 – 2021, *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland* and the DLRCC waste Bye-laws.

18.4 Potential Impacts of the Proposed Project

This section details the potential waste effects associated with the proposed Development.

18.4.1 Construction Phase

The proposed Development will generate a range of non-hazardous and hazardous waste materials during site demolition, excavation and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. 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 and pollution issues is the presence of vermin, impacts on local biodiversity and the potential for downstream impacts on proximate watercourses and designated sites 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 9. It is anticipated that c. 56,677 m^3 of excavated material will need to be removed off-site, however it is envisaged that c. 7,199 m^3 tonnes of excavated material will be reused on-site as fill. 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***.

18.4.2 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***.

18.5 Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

18.5.1 Construction Phase

The following mitigation measures will be implemented during the demolition and construction phase of the proposed Development:

WM_1: As previously stated, a project specific C&D RWMP 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 The EPA, Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 18.1. The mitigation measures outlined in the C&D RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this C&D RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

- **Prior to commencement, the appointed Contractor(s) will be required to refine / update the C&D RWMP (Appendix 18.1) in agreement with DLRCC, or submit an addendum to the C&D RWMP to DLRCC, detailing specific measures to minimise waste generation and resource consumption requested by DLRCC, 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 RWMP throughout the duration of the proposed construction and demolition phases.**

A quantity of topsoil, sub soil, clay and made ground which will need to be excavated to facilitate the proposed Development. Project Engineers have estimated that c. 56,677 m^3 of excavated material will need to be removed off-site, however it is envisaged that c. 7,199 m^3 excavated material will be reused on-site as fill. 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:

WM_2

- **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.**

WM_3

- **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.

18.5.2 Operational Phase

WM_4: As previously stated, a project specific OWMP has been prepared and is included as Appendix 18.2. The mitigation measures outlined in the OWMP will be implemented in full and form part of mitigation strategy for the site. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the EMR Waste Management Plan 2015 – 2021, *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland* and the DLRCC waste bye-laws.

- **The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this OWMP, ensuring a high level of recycling, reuse and recovery at the Site of the proposed Development.**

In addition, the following mitigation measures will be implemented:

- **The Operator / Buildings Manager 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);

- □ Abandoned bicycles; and
- □ Healthcare Risk Waste.

- **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;**
- **Health Care Risk Waste generated at the healthcare facility will comprise and be segregated into in yellow bags (such as dressings, swabs, bandages, gloves etc.) and yellow sharps buckets (for waste such as surgical kits, needles, syringes, razors, stitch cutters etc.).**
- **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, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland* and the DLCC Waste Management (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws 2018. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

18.6 Residual Impacts

The implementation of the mitigation measures outlined in Section 18.5 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.

18.6.1 Construction Phase

A carefully planned approach to waste management as set out in Section 18.5 and adherence to the C&D RWMP (which include mitigation) during the construction phase will ensure that the predicted effect on the environment will be ***short-term***, ***imperceptible*** **and** ***neutral*****.**

18.6.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 18.5 and adherence to the OWMP (which include mitigation) will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be ***long-term, imperceptible*** **and** ***neutral*****.**

18.6.2 Conclusion

Assuming the full and proper implementation of the mitigation measures set out herein and in the C&D RWMP (Appendix 18.1) and the OWMP (Appendix 18.2), no likely significant negative effects are predicted to occur as a result of the construction or operational of the proposed Development.

18.7 Monitoring

The management of waste during the demolition and 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 Operator / Buildings Manager to ensure effective implementation of the OWMP internally and by the nominated waste contractor(s).

18.7.1 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 mitigation measures in the C&D RWMP 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.

18.7.2 Operational Phase

During the operational phase, waste generation volumes will be monitored by the Operator / Buildings Manager against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs, where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

18.9 Interactions

This section discusses interactions between this Chapter and other specialist environmental topics considered in this EIAR.

18.9.1 Land, Soils, Geology & Hydrogeology

During the construction phase, excavated soil, stone, clay and made ground (c. 56,677 m^3) will be generated from the excavations required to facilitate site levelling and construction of the new foundations. It is estimated that c. 49,478 m^3 of excavated material will need to be removed off-site. However, it is envisaged that c. 7,199 m^3 material will be reused on-site as fill. Where material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 9 & 18 and the requirements of the C&D RWMP (Appendix 18.1), will ensure the effect is ***long-term***, ***imperceptible*** and ***neutral.***

18.9.2 Material Assets - Roads and Traffic

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the Site during the construction and operational phases of the proposed Development. The increase in vehicle movements as a result of waste generated during the construction phase will be *temporary* in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 17 (Material Assets - Roads and Traffic). Provided the mitigation measures detailed in Chapter 17 & 18 and the requirements of the OWMP (included as Appendix 18.2) are adhered to, the predicted effects are ***short to long-term, imperceptible*** and ***neutral*****.**

18.9.3 Population and Human Health

The potential impacts on human beings are in relation to incorrect management of waste during construction and / or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific C&D RWMP and OWMP (Appendices 18.1 and 18.2, respectively), will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be ***long-term***, ***imperceptible*** **and** ***neutral.***

18.10 Cumulative Impacts

As has been identified in our receiving environment section all cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

18.10.1 Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. The list of developments that have been reviewed in regard to cumulative impacts can be found in chapter 3 Planning and Development Context.

Developments that potentially could overlap during the Demolition & Construction phases of note:

D16A/0818 – Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14.

ABP31013821 – Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14.

D19A/0162 – Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14.

ABP30835320 – The Car Sales Premises Currently Known as Vector Motors, Goatstown Road, Dublin 14, D14FD23.

D20A/0328 – University College Dublin, Belfield, Dublin 4.

ABP30943021 – 2.12ha At Our Lady's Grove, Goatstown Road, Dublin 14.

ABP31128721 – c0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14.

ABP31182621 – Lands at Knockrabo, Mount Anville Road, Dublin 14.

TC06D.311553 – Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14.

CMH Future S34 – Lands at Central Mental Hospital, Dundrum Road, Dublin 14.

ABP312935 – Sommerville House, Dundrum Road, Dublin 14.

Due to the high number of waste contractors in the Dublin region there are sufficient contractors available to handle waste generated from these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be **short-term, not significant** and **neutral.**

18.10.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. The list of developments that have been reviewed in regard to cumulative impacts can be found in chapter 3 Planning and Development Context. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible** and **neutral**.

18.11 'Do-Nothing' Effect

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no demolition, excavation, construction or operational waste generated at this Site. There would, therefore, be a neutral effect on the environment in terms of waste.

18.12 Difficulties Encountered in Compiling the Chapter

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process and planning conditions.

There is a number of licensed, permitted and registered waste facilities in the Dublin region and in the surrounding counties. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability. The waste facilities selected will ultimately be selected to minimise the environmental impacts on the surrounding environment.

Provided all mitigation measures as set out in this chapter and the attached RWMP and OWMP, the overall predicted impact of the proposed development is **long-term, imperceptible** and **neutral**.

18.13 References

- **Waste Management Act 1996-2021 (No. 10 of 1996) as amended.**
- **BS 5906:2005 Waste Management in Buildings – Code of Practice.**
- **Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.**
- **Department of Communications, Climate Action and Environment (DCCAE), Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (2020).**
- **Department of Environment and Local Government (DELG) (1998). *Waste Management – Changing Our Ways, A Policy Statement*.**

- **DCCAE, *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021)**
- **Department of Environment, Communities and Local Government (DECLG) (2012*). A Resource Opportunity - Waste Management Policy in Ireland*.**

- Dún Laoghaire Rathdown County Council (DLRCC), Dún Laoghaire Rathdown County Council Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws (2019).
- DLRCC, Guidance Notes for Waste Management in Residential & Commercial Developments (2020)
- DLRCC, *Dún Laoghaire Rathdown County Council Development Plan 2016 – 2022.*
- DLRCC, Draft *Dún Laoghaire Rathdown County Council Development Plan 2022 – 2028 (2021).*
- **Department of Environment, Heritage and Local Government (DEHLG) (2020). *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities.***
- **Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects'* (2021)**
- **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 1998-2012.**
- **EPA (2015). *Waste Classification-List of Waste & Determining if Waste is Hazardous or Non-Hazardous*.**
- **EPA and Galway-Mayo Institute of Technology (GMIT) (2015). *EPA Research Report 146-A Review of Design and Construction Waste Management Practices in Selected Case Studies-Lessons Learned.***
- **FÁS and the Construction Industry Federation (CIF) (2002). *Construction and Demolition Waste Management-a handbook for Contractors and Site Managers.***
- **Forum for the Construction Industry-Recycling of Construction and Demolition Waste.**
- **Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended.**
- **Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended.**
- **Protection of the Environment Act 2003, (No. 27 of 2003) as amended.**

APPENDIX 18.1 – CONSTRUCTION DEMOLITION RESOURCE WASTE MANAGEMENT PLAN

APPENDIX 18.2 – OPERATIONAL WASTE MANAGEMENT PLAN

See Volume 2 – Appendices

19.0 MATERIAL ASSETS – BUILT SERVICES

19.1 Introduction

This chapter of the EIAR assesses the impacts of the proposed Strategic Housing Development (SHD) at the lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14, on the Material Assets – Built Services, namely the Foul Drainage, Potable Water Supply, Electricity, Gas network and telecommunications on the environment and the surrounding area. This chapter of the EIAR should be read in conjunction with the architectural and engineering drawings submitted as part of this planning application.

This chapter has been prepared by John Considine, BE, MIStructE, MIEI, CEng, FConsEIM, Chartered Engineer of Barrett Mahony Consulting Engineers. John is a Chartered Civil/Structural Engineer and a Fellow of the Association of Consulting Engineers of Ireland. He has over 33 years' experience as a consulting engineer covering civil engineering design and structural engineering design, principally in Ireland & the UK where he has been involved in many high-profile projects. He has been involved in the preparation of EIAR documents for over ten years and is particularly familiar with the area in and around Dublin where many of his projects are located.

Paul Stephenson - BE, MIEI, CEng, Chartered Engineer also inputted into the chapter. Paul is a Chartered Civil Engineer and Geotechnical specialist with over 12 years' experience of the Irish and UK markets, both in consultancy and site roles. His experience includes scheduling and supervising site investigations, interpretation of ground investigation data and production of geotechnical reports. He has carried out a wide range of geotechnical designs for soft ground and peat, soil stabilisation and earthworks, basements, retaining structures and deep excavations, piled and shallow foundations and slope stabilisation.

Richard O'Farrell, BEng, MCIBSE, Founder and Managing Director of Engineering Design Consultants Limited has contributed the outline of the available MEP utilities on the site and has detailed all identified risks associated with these services. Richard graduated with a Bachelor of Electrical Engineering in 1997 and has over 20 years of experience within in both the contracting and consultancy sides of the construction industry across both Ireland and the UK. Richard's experience of the utilities is second to none having completed a range of projects across the span of his career.

Figure 19.1: Site Location.

19.2 Methodology

The assessment of the potential impact of the proposed development on the water bodies 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 Statement (EPA 2002 and 2017 (Draft)), EIA Directive, Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003), Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003), Development Management Guidelines (DoEHLG, 2007) and Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessments August 2018.

The following sources of information were used in the completion of this assessment:

- **Site Visits**
- **Site Investigation Report**
- **Civil Engineering Drawings Prepared by Barrett Mahony Consulting Engineers**
- **Geological Survey of Ireland (GSI) online maps and databases**
- **ECFRAMS Flood Mapping from OPW**
- **EPA online maps and databases**
- **Topographical Survey**
- **Local authority record drawings**
- **ESB record drawings**

- **BGE record drawings**
- **EIR record drawings**
- **Virgin Media record drawings**

All drainage (surface and foul) and water supply will be provided in accordance with the requirements of Dun Laoghaire-Rathdown County Council and with the following:

- **Greater Dublin Regional Code of Practice for Drainage Works**
- **Greater Dublin Strategic Drainage Study (GDSDS)**
- **Planning System and Flood Risk Management Guidelines**
- **Building Regulations (Part H)**
- **Irish Water Standard Details and Codes of Practice for Water and Wastewater Infrastructure**
- **CIRIA SuDS manual C753 (2015).**

This chapter also encompasses knowledge obtained from site visits, drainage and water services record information received from Irish Water and the Local Authority. Additionally, information from the EPA and GSI websites has been utilised.

EDC contacted each electrical, comms and gas utility provider in order to determine the existing infrastructure in the area in and around the site.

19.3 Baseline Environment

19.3.1 General

The subject site is c9.6 ha and is currently occupied by the Central Mental Hospital. There are other ancillary buildings on the site which are proposed to be demolished as part of the works, these include a swimming pool/sports hall, 2-storey red-brick building and temporary structures including portacabins.

The site is bounded on all sides by a boundary wall. The main point of access to the site will be via the Dundrum Road (R117) to the west. There is a general slope down from the high point of the southern side (+45.21m) to the northern end of the site (+39.31m). Please refer to figure 9.2 which is a summarised topographical survey.

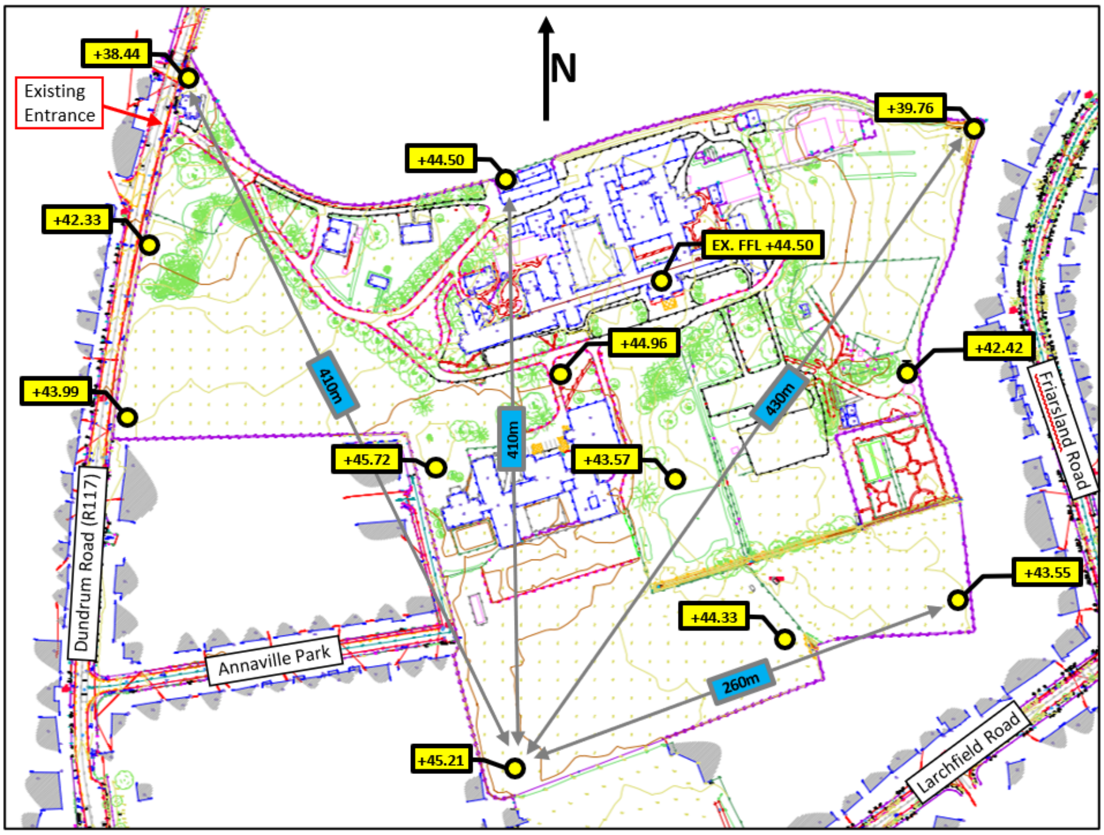

Figure 19.2: Summary of the Existing Site Topography Superimposed on Topographical Survey Drawing (Ordnance Datum Levels).

19.3.2 Foul Water Drainage

The foul drainage from the existing buildings on site drains to a combined drainage system on site which discharges to the Ø300mm combined buried sewer on the Dundrum Road. The combined sewer drains in a northerly direction towards the Dodder Valley Sewer System.

19.3.3 Potable Water Supply

There is an existing 9-inch buried public watermain in Dundrum Road. The existing buildings on site are serviced from this main. This watermain is to be upgraded to a ø250mm HDPE pipe, to Irish Water requirements, to cater for the development.

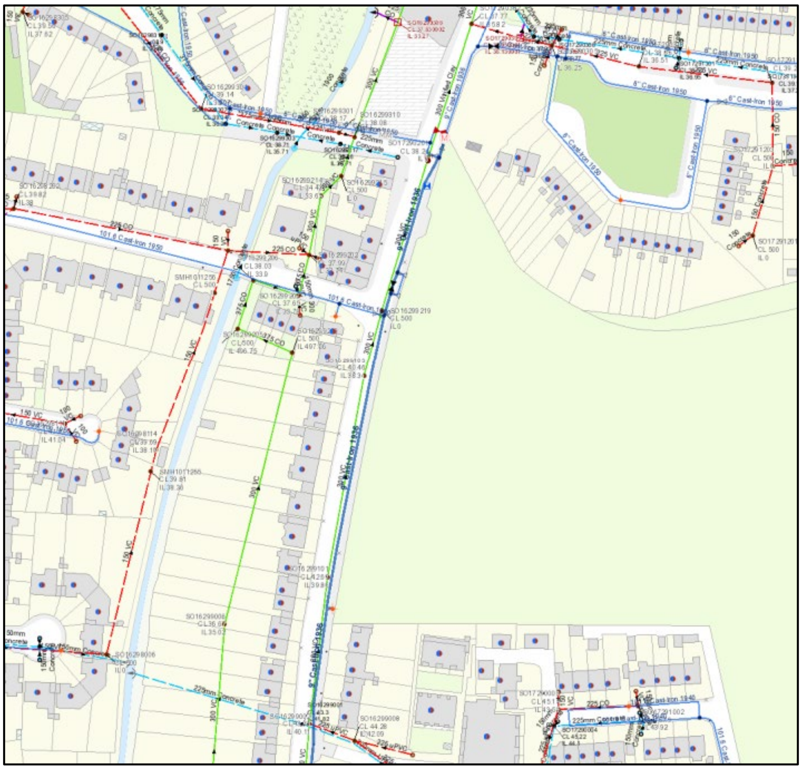

Figure 19.3: IW existing services map extract (western side of site).

19.3.4 Natural Gas

The site is served by a 250mm main entering Northwest on the site per diagram below. The pipe at 25mBar low-pressure gas network entering Northwest and extends to the Central Mental Hospital. See map that follows. There is an existing pressure reducing station within the site and the existing gas lines feed the hospital and swimming pool building.

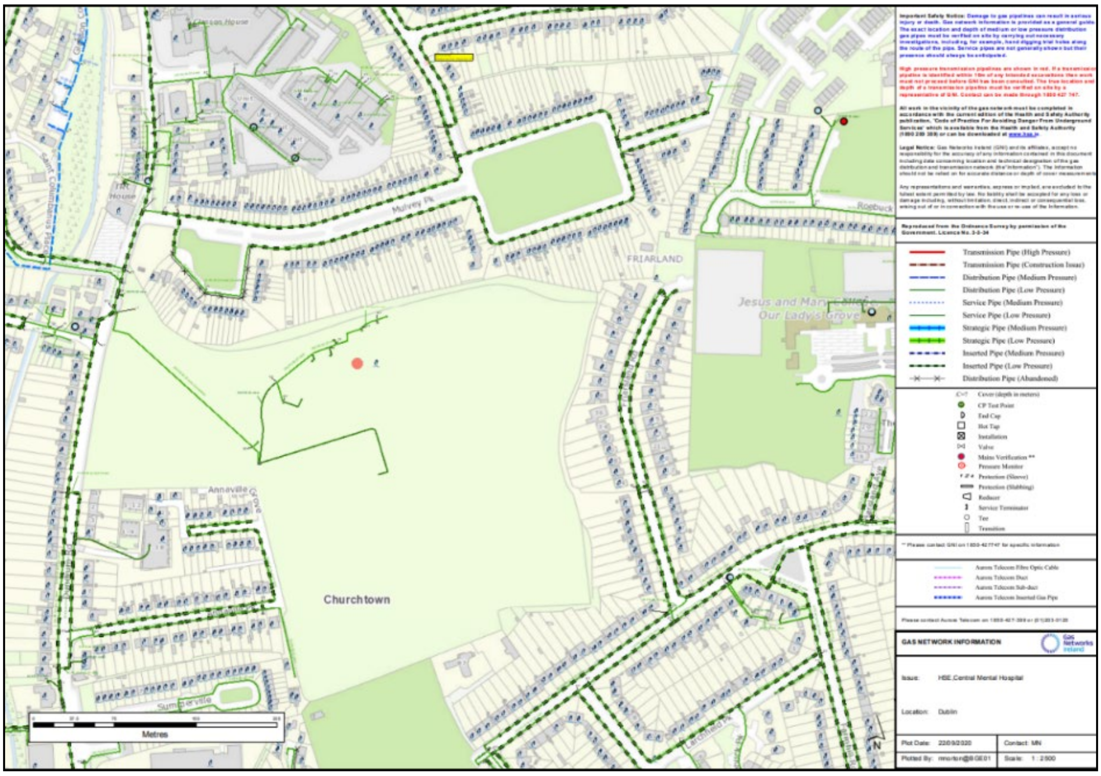

Figure 19.4: Drawing of the existing gas mains.

19.3.4 Electricity

The existing site consists of 2 ESBN supplies fed from 2 separate substations located on Larchfield Road and opposite St. Columbanus Road. Connection 1 is rated at 10KV/20KV/400V/230V and consists of an overhead line terminating at the end of Larchfield Road South of the site.

Connection 1 is tapped from the overhead line and is installed underground and terminates South of the site.

Connection 2 extends from the substation opposite St. Columbanus Road and terminates within the Central Mental Hospital grounds North of the main building. Connection 2 is rated at 10KV/20KV/400V/230V.

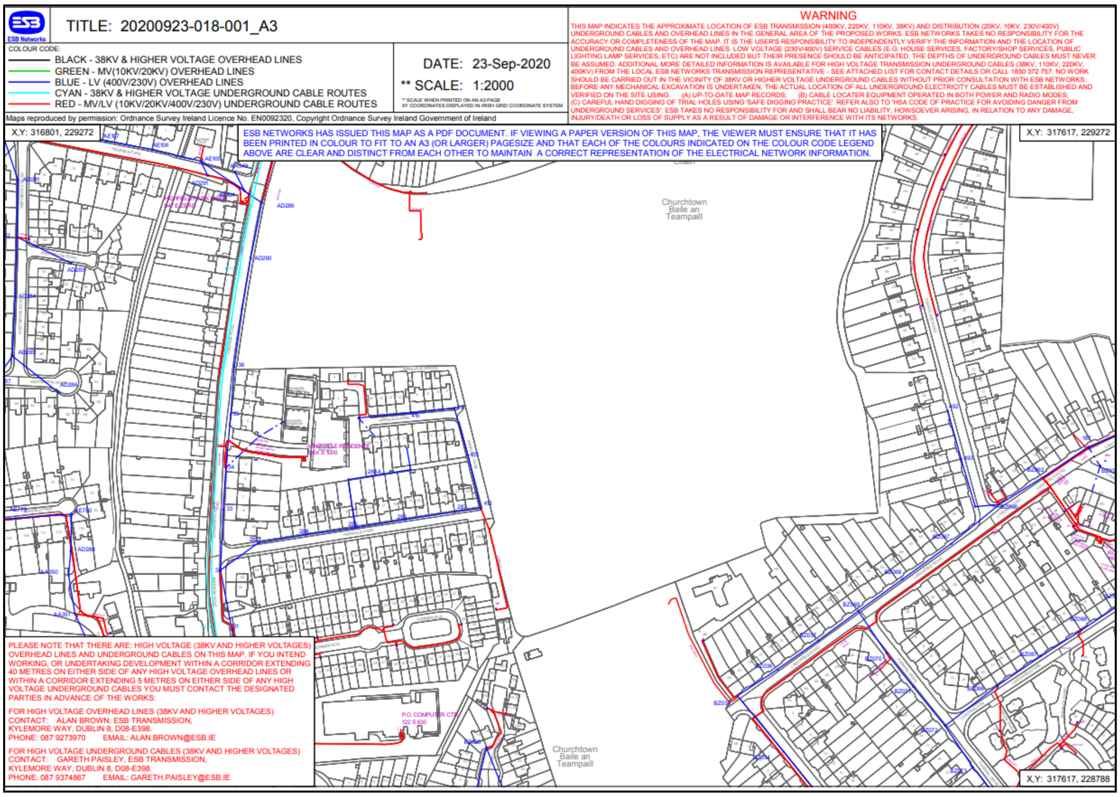

Figure 19.5: Drawing of the existing electrical infrastructure.

19.3.4 Telecommunications

The Central Mental Hospital is currently fed from the EIR network. The EIR network enters the site from the Dundrum Road. See drawing below.

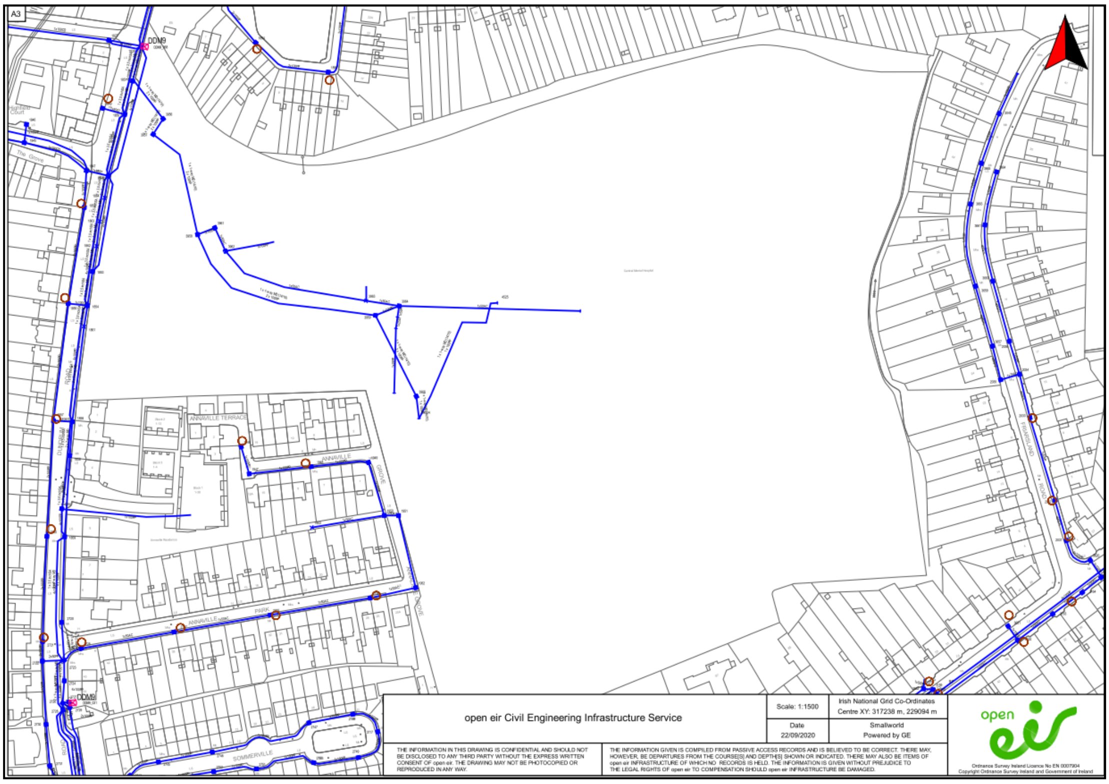

Figure 19.6: Drawing of the existing EIR network.

Virgin Media, although entering the site currently, is also currently available in the area with ample coverage around the site. A Virgin Media network extends around the perimeter wall adjacent to Dundrum Road. Refer to drawing that follows.

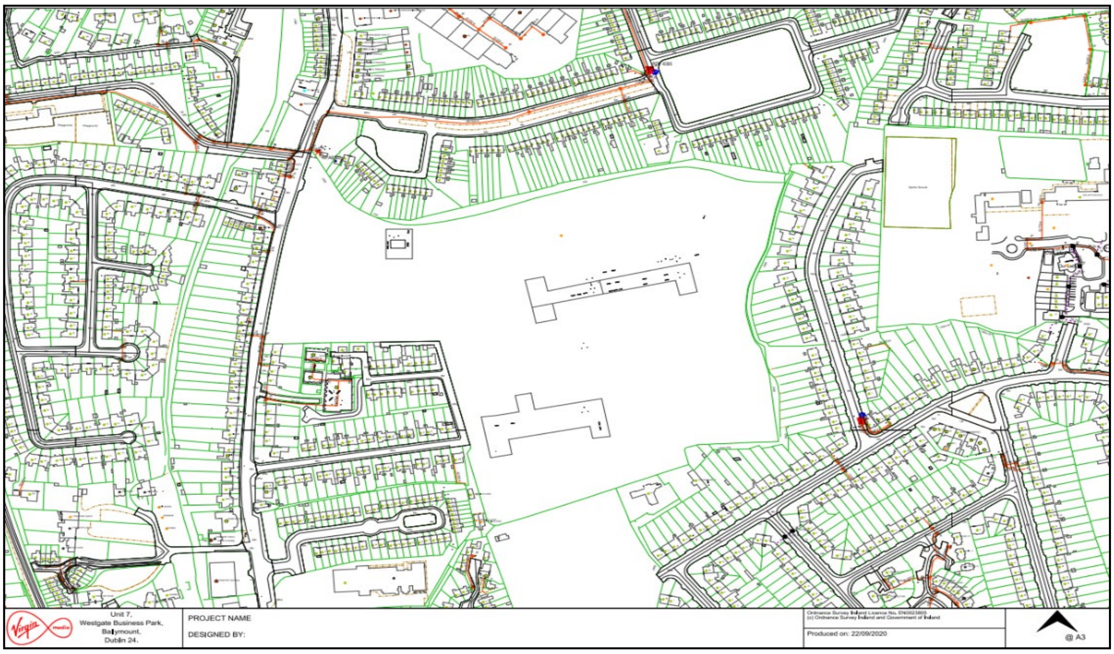

Figure 19.7: Drawing of the existing Virgin network.

19.4 Potential Impacts of the Proposed Project

19.4 Characteristics of the Proposed Development

19.4.1 Gas

To inform the proposed MEP utility requirements of the scheme some fundamental design principles were formed for the scheme. For example, a district heating system to supply the apartment blocks (primarily fuelled by air source heat pumps) and individual air source heat pumps for the townhouses. This then limits the requirement for natural gas to just restaurants, back up boilers and similar commercial type uses.

The new development will primarily require electrical driven heat pumps and air source heat pumps, so the gas load is anticipated to be limited to commercial facilities and possibly back up gas boilers for the DH system. The new gas load is forecasted to be in the order of 4.5-5MW and following discussions with BGE is not anticipated to be a concern. If the load proves challenging at a later date in design development, there is a larger 315mm gas pipe available. The gas infrastructure in generally good in this area.

19.4.2 Electricity

The new development will require a new HV infrastructure that will feed multiple substations around the site. The substation requirement has been assessed and allowed for within the architectural layouts. The final design details to be clarified by the ESB post planning.

ESBN conducted a capacity study and released their findings in April 2021. To facilitate the development, ESBN confirmed that a new High Voltage supply is required. ESBN will install a 1Km new HV ring entering from the Southeast and connecting to the new substations via a HV ring circuit.

The new substation will require unobstructed 24/7 access for the ESB in line with their guidelines. A formalised application process to the ESB will be required post planning once the planning process is concluded.

19.4.3 Telecommunications

The new development will consist of approximately 9 Comms rooms – to be finalised during detailed internal design. Each apartment block and commercial unit will have individual comms rooms to facilitate telecommunications. The new development will consist of separate underground networks connecting to all new apartment blocks and commercial premises.

It is important to note that two alternative suppliers are available to the end tenants/users for broadband and telecoms services. This infrastructure will ensure that the LDA can provide current and next generation broadband to each home.

19.4.4 Foul Water Drainage

The proposed foul drainage system will be designed to take discharges from the new residential units. There is a small amount of commercial/retail space on site. Drainage from any kitchen/canteen facilities will discharge through a grease separator designed in accordance with IS EN 1825 Part 1 and Part 2 and to Irish Water requirements. The foul system will connect to the Irish Water network at the existing 300mm combined sewer in the Dundrum Road surface.

It is calculated that the proposed development will have a total hydraulic loading of 451m^3 per day of foul effluent generated during the operational phase of the development. This equates to an average flow of 5.17 litres/second (over a 24-hour period) and a peak flow of 16.06 litres/second.

A Pre-connection Enquiry application was submitted to Irish Water to confirm capacity in the receiving network and a Confirmation of Feasibility letter was obtained on the 23rd of September 2021. The letter included site specific comments. A controlled and limited foul drainage outflow from the site has been requested to limit the impact on the Irish Water receiving system. This has been addressed by the provision of a controlled flow wastewater pumping station on site. Refer to BM drawings nr C1220 and C1221, and refer to the Civil Engineering Infrastructure Report for further details. A Statement of Design Acceptance was issued by Irish Water for the development on the 3rd of March 2022.

Residential Flow – 977 no. units

Dry Weather Flow (Daily)	= $(\text{Population})(\text{Consumption/Capita}) + (\text{Infiltration})$
Number of Residential Units	= 977
Population Estimate	= 977 x 2.7 = 2 638 persons
Consumption/Capita	= 150 litres / person / day
Infiltration	= 10% (as per App C Section 1.2.4 of CoP for WW Infrastructure)

Average Flow (DWF)	= (977 x 2.7 x 150 x 1.1) = 435 253 litres / day
= 5.04 litres/second	
Peak Flow	= $(\text{Average Flow}) \times (4.5)$ = 5.04 x 3
	= 15.11 litres/second

Commercial Flow – 3889 m^2

Combined Peak flow	= 0.952 l/s
Total Average Flow	= 0.135 l/s

Foul Network Design

The proposed pipe network has been designed in accordance with the relevant requirements of the Irish Water Code of Practice for Wastewater Infrastructure.

The proposed foul drainage network comprises of a series of 150mm, 225mm and 375mm diameter pipes, designed for a minimum velocity of 0.75m/s (self-cleansing) and maximum velocity of 3.0m/s. A pipe friction coefficient of 1.5mm has been assumed. Each residential block is serviced by 225mm diameter (SN8 uPVC) branch connections in accordance with the Irish Water Code of Practice for Wastewater Infrastructure. It is noted the proposed foul outfall pipe is 300mm diameter pipe at 1:100 minimum fall which has a capacity of approximately 100 l/s and is deemed adequate for the peak foul flows anticipated.

19.4.5 Water Supply

The proposed development will be connected to the new Ø250mm public watermain in the Dundrum Road upgraded by Irish Water to accommodate this development as per the Irish Water Confirmation of Feasibility Letter.

The proposed watermain system through the site will vary between 250mm diameter, 200 diameter, 150mm diameter and 100mm diameter – as shown on Barrett Mahony drawing C1040.

The peak flow demand during the operational phase of the development will be 26.6 litres/second, equivalent to an average daily demand of 410m^3. The installation of low flow fittings for the development will reduce the demand on the existing water supply network.

A Pre-connection Enquiry application was submitted to Irish Water to confirm capacity in the network and a Confirmation of Feasibility Letter was obtained. Refer to the Civil Engineering Infrastructure Report for further details. A Statement of Design Acceptance was issued by Irish Water for the development on the 3rd of March 2022.

Residential Demand – 977 no. units

Average Daily Demand	= (Population)(Consumption/Capita)
Number of Residential Units	= 977
Population Estimate	= 977 x 2.7 = 2638 persons
Consumption/Capita	= 150 litres / person / day
Average Daily Demand	= 2 638 x 150
	= 395 700 litres/day
Average Day/Peak Week Demand	= (Average Daily Demand) x 1.25
	= 494 625 litres/day
	= 5.72 litres/second
Peak Demand	= (Average Day/Peak Week Demand) x 5
	= 28.62 litres/second

Commercial Flow – 4350 m^2

Combined Peak flow	= 0.980 l/s
Total Average Flow	= 0.196 l/s

Watermain Network Design

All proposed water ring mains will be PE-80 SDR17 and (100, 150, 200, 250 internal diameter) SDR17, in accordance with Irish Water Standards. Individual houses will have their own connections (25mm O.D. PE pipe MDPE 80 SDR11) to distribution water mains via service connections and meter / boundary boxes. Individual connections are to be installed in accordance with Irish Water Standard Details. All apartment blocks will have their own metered connection with a bulkmeter in accordance with Irish Water requirements.

The proposed water main layout is arranged such that all buildings are a maximum of 46m from a hydrant in accordance with the Department of the Environment's Building Regulations "Technical Guidance Document Part B Fire Safety". Hydrants are to be installed in accordance with Irish Water's Code of Practice and Standard Details. Final positions of hydrants will be agreed as part of the Fire Safety Certificate requirements.

Sluice valves are provided at all junctions and appropriate locations to facilitate isolation of the system. Air valve at high points and scour valves at low points are also provided. Individual houses will accommodate minimum 24-hour water storage (in accordance with the requirements of Irish Water's Code of Practice) and include provision of water conservation measures such as dual flush water cisterns and low flow taps. Apartments will also incorporate 24-hour storage, either in a communal basement storage tank or individually in each apartment.

19.5 Potential Impacts of the Proposed Project

19.5.1 Construction Phase

19.5.1.1 Direct

Accidental spills of harmful substances such as petrol/diesel or oil during the delivery and storage of harmful substances or by leakages from construction machinery. Potential for building materials or silts to be washed into the surface water system, causing blockages and pollution.

During the connection of new mains to existing mains on site there is a small risk that contamination of the existing supply may occur. The potential impact on the local public water supply network would be short term and significant.

As part of the confirmation of feasibility, upgrade works are required. These works are outside the site extents and will be carried out independently by Irish Water.

Natural Gas Supply

The requirement for Gas will not impact the site as the gas usage is anticipated to be low. The impact is likely to be not significant.

Electrical Supply

ESBN conducted a capacity study and released their findings in April 2021. To facilitate the development, ESBN confirmed that a new High Voltage supply is required. ESBN will install a 1Km new HV ring entering from the Southeast and connecting to the new substations via a HV ring circuit.

The impact is likely to be neutral, imperceptible, and temporary.

Telecommunications

EIR/Virgin Duct networks can be extended along roadways to service the development. The impact is likely to be neutral, imperceptible and temporary.

19.5.1.2 Indirect

There is not anticipated to be any indirect affects to the built assets during the construction phase.

19.5.1.3 Worst Case Scenario

The worst-case scenario is that flooding occurs on-site and in the surrounding area due to this development. On-site measures are to be provided during construction as outlined in this chapter and the water chapter, to ensure such flooding does not occur.

19.5.2 Operational Phase

19.5.2.1 Direct

There are currently no SUDS measures in place on site. There will be an impact on the surface water in the area due to the new development. However, the surface water system will ensure the impact from the operational phase on surface water will be minimal and constitute a significant improvement from existing conditions.

There will be a decrease in the rate of surface water run-off from the new development due to the SUDS measures proposed and the total run-off rate will be no greater than the estimated greenfield run-off rate. Surface water run-off will also improve in quality due to these measures.

Given the proposed residential usage, there is very little risk of accidental spillages resulting in water quality issues during the operational stage.

The development will result in an increase in the wastewater discharged from the site to the public sewer system. The foul outflow from the site will be directed to the municipal treatment plant at Ringsend. Upgrade works are needed as the plant is not currently meeting its requirements under the Urban Wastewater Treatment Directive and increased outflow from development such as the proposed development will increase loading on the Ringsend WWTP. However, planning permission has recently been granted, under Bord Order ABP-301798-18 for an expansion to the WWTP at Ringsend which will increase network capacity by 50%. Irish Water have also confirmed feasibility for connection of the proposed development to the existing public sewer system subject to controlled flow provisions on the new development. Therefore, any impact from the increased wastewater flows on the existing drainage network will be temporary and not significant.

There exists a minor risk associated with the possibility of leakage from damaged foul sewers and drains within the development site. Any foul water leakage could result in minor contamination of groundwater in the area. The current foul water drainage system that is on site will need to be replaced. Placing a new system on site reduces the overall risk of leakage from damaged sewers.

Basement and undercroft car parking areas on site will discharge to the foul system via a petrol interceptor to prevent pollution from accidental oil spills.

The new development will lead to an increase in the water supply demand on the public water supply network. Irish Water has confirmed that there is capacity in the system to take additional demand. An upgrade to the existing public watermain on the Dundrum Road has been requested by Irish Water to facilitate the connection from the site. There is very little likelihood or accidental damage occurring to the water supply system during the operational phase of the development.

Natural Gas Supply

As there is very small requirement for Gas this will not impact the site. The impact is negligible and will be less than or similar to existing usage.

Electrical Supply

The impact of the proposed SHD development on the electricity supply is likely to be an increase in demand on the existing supply.

We have engaged with the ESB and they have advised that there will be capacity following a HT upgrade to facilitate the project.

The potential impact of the proposed SHD development on the electricity network is likely to be neutral.

Telecommunications

EIR & Virgin Duct networks are to be extended along roadway to service the SHD. The potential impact of the proposed development on the EIR/Virgin networks is likely to be neutral.

19.5.2.2 Indirect

When the development is in operational phase, there will be a decrease in surface water outflow from the development into the surrounding lands and soil, which will affect the existing pathways.

19.5.2.3 Worst Case Scenario

The worst-case scenario would be a failure of one of the systems on the site, which may cause flooding or pollutants to enter the surrounding environment and cause negative effects. There is very little risk of this occurring during the operational stage.

19.6 Mitigation Measures

There is no specific requirement for mitigation in the context of this chapter, however, the following construction measures are relevant to the installation of services on site.

19.6.1 Construction Phase.

BS_1: A method statement for all works to be carried out will be prepared by the contractor and agreed with DLRCC prior to commencement of works to outline what measures are to be taken to ensure there is no loss of service during the works.

BS_2: Dewatering measures should only be employed where necessary.

BS_3: If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.

BS_4: The existing surface drainage channel within the lands that serve adjacent lands will be retained and should.

BS_5: Construction methods used will comply with the noise and dust requirements as set out in the relevant EIAR chapters to reduce, as much as possible, dust and noise pollution.

BS_6: Comprehensive traffic management procedures, including the provision of access to all roads, and access/egress points will be prepared and agreed with the Local Authority. These traffic management measures will be implemented at times when traffic disruption may be experienced.

BS_7: Road sweeping and/or wheel wash facilities will be provided, as required.

BS_8: All oils/diesel stored on site for construction equipment are to be located in appropriately bunded areas.

BS_9: Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages.

BS_10: All onsite sewers should be tested and surveyed prior to connection to the public sewer to prevent any possibility of ingress of ground water.

BS_11: All sewers will be inspected and where necessary sealed to ensure that uncontrolled ground water inflow does not occur.

BS_12: Any leakage from the foul sewer will be cordoned off and the contaminated effluent and soil collected and disposed by licensed contractors.

BS_13: The contractor will adhere to any specific requirements, required by the local authority when introducing a new watermain connection.

BS_14: Commissioning of the system to be carried out in accordance with the engineering specifications set out in the drawings and specifications document.

BS_15: Provision of Utilities will be carried out in accordance with the recommendations of the relevant statutory bodies (ESB, Gas Networks Ireland, Irish Water, EIR, Virgin, City and County Councils etc.).

BS_16: The watermain connection to the public system is to be in accordance with the Irish Water requirements to avoid any contamination risk.

19.6.2 Operational Phase

BS_17: SuDS measures on site include green roofs, blue roofs, attenuation tanks/soakaway's, permeable paving and detention basins

BS_18: Dual & low flush toilets and water economy outlets will be used to reduce flows from the development.

BS_19: The site water main system will be metered as directed by the Council to facilitate detection of leakage and the prevention of water loss.

BS_20: Dual & low flush toilets and water economy outlets will all be considered to reduce the water demand.

19.7 Residual Impacts

Implementation of the mitigation measures and adherence to the Construction and Environmental Management Plan prepared for the project will ensure that any potential residual impacts will be short term and negligible.

19.8 Monitoring

19.8.1 Construction Phase

General monitoring during the Construction Phase of the development will consist of the following and be carried out by the contractors QA team:

- Normal quality control inspection of the works.
- Pressure testing and CCTV inspections of the foul sewers following completion of stages of the construction is recommended to ensure that the required construction standards are being maintained.
- Upon completion of the development, monitoring of the discharges from the development will be undertaken as required.

19.8.2 Operational Phase

Monitoring of the system will be undertaken by Irish Water to ensure that the foul water and potable water systems are maintained.

19.9 Interactions

The design team has been in regular contact with each other throughout the design process to consider and minimise environmental impacts where possible and to ensure a sustainable and integrated approach to the design of the proposed development.

19.9.1 Public Health

There is the potential for public health issues to arise due to the contamination of the surrounding water service networks due to the construction works. There is a potential for disruption to services due to accidents on site during the construction process. If the proposed mitigation measures are applied during the construction process, then the danger to public health will be negative, significant, and short term.

19.9.2 Any Other Applicable

There are interactions between material assets (built services) and the land, soils, geology, and hydrogeology. During the installation process of the necessary built services, excavations will be required. These excavations will be limited in their depth and therefore any impact they have on the land, soils, geology, and hydrogeology will be negative, imperceptible, and temporary.

There are interactions between material assets (built services) and biodiversity. This is identified on the basis that during the construction phase of development, there is the potential for impacts on local biodiversity and downstream impacts on proximate watercourses and designated sites via excavation and installation works during the proposed implementation of infrastructure throughout the site. During the operational phase of development, there is a direct hydrological pathway to designated conservation sites located within Dublin Bay via surface water drainage. There is an indirect hydrological pathway to designated conservation sites located within Dublin Bay via the proposed outfall of foul wastewater drainage to Ringsend WwTP. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 18, the predicted effects on biodiversity are short and long term, imperceptible, and neutral.

19.10 Cumulative Impacts

We understand that Irish Water considered cumulative impacts in their network capacity assessment (foul drainage and water supply). Other service provides also considered network capacity. Surface water discharge from each site will be controlled to the greenfield run-off rate Q-Bar. So there should be no cumulative impact on the receiving environment (surface sewers and watercourse). Below is a list of proposed developments in the surrounding area.

- D16A/0818 – Site of approximately 1.23 hectares at Greenacres, Kilmacud Road Upper, Dublin 14.
- ABP31013821 – Mount Saint Mary's and Saint Joseph's, Dundrum Road, Dundrum, Dublin 14.

- D19A/0162 – Former Shell Garage, Roebuck Road, Clonskeagh, Dublin 14.
- ABP30835320 – The Car Sales Premises Currently Known as Vector Motors, Goatstown Road, Dublin 14, D14FD23.
- D20A/0328 – University College Dublin, Belfield, Dublin 4.
- ABP30943021 – 2.12ha At Our Lady's Grove, Goatstown Road, Dublin 14.
- ABP31128721 – c0.9ha at No. 97A Highfield Park (D14P710), and No. 1 Frankfort Castle (D14 HY03), No. 2 Frankfort Castle (D14DE72) and Frankfort Lodge (D14C9P2), Old Frankfort, Dublin 14.
- ABP31182621 – Lands at Knockrabo, Mount Anville Road, Dublin 14.
- TC06D.311553 – Old Dundrum Shopping Centre and Other Properties, Main Street, Dundrum, Dublin 14.
- CMH Future S34 – Lands at Central Mental Hospital, Dundrum Road, Dublin 14.
- ABP312935-22– Sommerville House, Dundrum Road, Dublin 14.

19.10.1 Construction Phase

There may be construction being undertaken on the above-mentioned sites in the vicinity of the proposed development when it is under construction. It is anticipated that each site will be managed under an individual construction and demolition plan. As such, no cumulative impacts will arise that would result in significant effects on the environment.

19.10.2 Operational Phase

All proposed developments are required to submit a Pre-connection Enquiry form to Irish Water, for the foul water effluent and potable water supply. Irish Water confirm that there will be no cumulative operational negative affects by issuing their Letter of Confirmation of Feasibility. The other service providers also carry out network assessments.

19.11 'Do-Nothing' Effect

Under a '*do-nothing'* scenario there would be no increase in demand on public services in the vicinity of the site.

19.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in completing this section.

19.13 Conclusion

This chapter of the EIAR has assessed the impacts of the proposed Strategic Housing Development (SHD) at the lands at the Central Mental Hospital, Dundrum Road, Dundrum, Dublin 14 on the material assets (built services). The built services in question relate to potable water supply, foul water drainage, gas, and telecommunications. In the case of the potable water supply and foul water drainage, these assets are managed by Irish Water. Irish Water operate and maintain the built service assets in Ireland. A Pre-connection enquiry form was issued to Irish Water, which included a proposed site plan, the proposed connection points to the national system and the expected demand that the site will generate. Irish Water have issued their letter of confirmation of for the site and have also issued a Statement of Design Acceptance on the 3rd of March 2022. Therefore, it can be assumed that although the site will generate more demand on both the foul water drainage and potable water systems, this affect will be negligible, long term and negative.

19.14 References

Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002) and Advice Notes on Current Practice in the preparations of Environmental Impact Statements (EPA 2003)
BS EN 752:2008 “Drain and Sewer Systems outside Buildings”
Part H of the Building Regulations
Greater Dublin Strategic Drainage Study
Ciria C697 “The SUDS Manual”
Sewers for adoption: 6th Edition
Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002) and Advice Notes on Current Practice in the preparations of Environmental Impact Statements (EPA 2003)
BS EN 752:2008 “Drain and Sewer Systems outside Buildings”
Part H of the Building Regulations
Greater Dublin Strategic Drainage Study
Ciria C697 “The SUDS Manual”
Sewers for adoption: 6th Edition
Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002) and Advice Notes on Current Practice in the preparations of Environmental Impact Statements (EPA 2003).
Dun Laoghaire Rathdown County Council Water Main Map.

20.0 INTERACTIONS

20.1 Introduction

This Chapter of the EIAR has been prepared by Tom Phillips + Associates and deals with likely interactions between effects predicted as a result of the proposed development.

In addition to the requirement under the *Planning and Development Regulations 2001 (as amended)* to describe the likely significant effects of the proposed development on particular aspects of the environment, it is also required to consider the interaction between impacts on different environmental factors. As such, these are assessed below.

The interaction of effects within the Proposed Development in respect of each of the environmental factors, listed in Article 3(1) of the EIA Directive, has been identified and addressed in the respective chapters in this EIAR. This chapter presents an overview of these interactions of impacts, from the Proposed Development, between the various environmental factors.

This Chapter outlines the areas where potential interactions may arise as a result of the proposed development.

The potential cumulative impact of the proposed development with committed or planned development projects in the surrounding area is also recognised as an interaction between potential environmental impacts. Cumulative impact has been addressed in detail in Chapter 21 below.

20.2 Description of Potential Interactions

All aspects of the environment are likely to interact to some extent and to various degrees of complexity. The likely significant interactions between factors arising from the proposed development are set out in the matrix provided as Table 20.1 below.

Table 20.1: summary of interactions between effects predicted as a result of the proposed development.

Interactions Between Environmental Factors												
	Population & Human Health	Biodiversity	Land, Soils, Geology and Hydrogeology	Hydrology	Air Quality/ Climate	Noise & Vibration	Landscape & Visual	Architectural Heritage	Cultural Heritage and Archaeology	Roads and Traffic	Waste	Built Services
Population & Human Health					✓	✓						✓
Biodiversity				✓	✓			✓		✓	✓	
Land, Soils, Geology and Hydrogeology				✓					✓	✓		✓
Hydrology								✓				✓
Air Quality/ Climate										✓		
Noise & Vibration										✓		
Landscape & Visual								✓				
Architectural Heritage									✓			
Cultural Heritage and Archaeology												
Roads and Traffic												
Waste												
Built Services												

20.2.1 Interactions between *Population and Human Health* and *Land, Soils, Hydrology and Hydrogeology*

As set out in Chapter 7 and 9, there is the potential for public health issues to arise due to the contamination of the land and soils due to the construction works. If the proposed mitigation measures are applied during the construction process, then the danger to public health will be negative, imperceptible and short term.

20.2.2 Interactions between *Population and Human Health* and *Air Quality and Climate*

As set out in Chapter 7 and 11, there is potential for interaction between population, human health and air quality on the basis that an adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is short-term and imperceptible with respect to human health in the construction stage and long term and imperceptible with respect to human health in the operational phase.

20.2.3 Interactions between *Population and Human Health* and *Noise and Vibration*

As set out in Chapter 7 and 12, there is potential for population, human health and noise arising from noise/ vibration emissions during the construction phase. Whilst the potential for negative, significant and short-term impact at the closest receptors arises in respect of noise, with the proposed mitigation measures in place, it is not expected that any residual impact to human health will arise. It is further considered that with the proposed mitigation measures and design recommendations in place, there will also be no residual impact upon human health in respect to noise.

20.2.4 Interactions between *Population and Human Health* and *Landscape and Visual*

As set out in Chapters 7 and 13, there are potential interactions between population and human health and landscape and visual on the basis of the potential effects arising from visual effects upon surrounding existing dwellings and their occupants. However, as Chapter 13 confirms, even where the proposed development is more readily visible in its surrounding context, the magnitude of impact is deemed to be in the higher range, but the quality of effect is deemed to be neutral or positive. The impact upon population and human health is therefore not considered to be significant.

20.2.5 Interactions *between Population and Human Health* and *Material Assets (Roads and Traffic)*

As set out in Chapters 7 and 17, there are potential interactions between population and human health and material assets (roads and traffic) arising from increased traffic volumes at construction and operational phase and the associated impacts surrounding air quality and noise. However, as outlined within the respective chapters, with the proposed mitigation in place, the resultant potential impact is not considered to be significant.

20.2.6 Interactions between *Population and Human Health* and *Material Assets* (*Waste Management)*

As set out in Chapter 7 and 18, there are potential impacts on human beings are in relation to incorrect management of waste during construction and / or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific C&D RWMP and OWMP (Appendices 18.1 and 18.2, respectively), will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be long-term, imperceptible and neutral.

20.2.7 Interactions *between Population and Human Health* and *Material Assets (Built Services)*

As identified by Chapter 7 and Chapter 19, there is the potential for the built services to interact with population and human health on the basis that there is the potential for public health issues to arise due to the contamination of the surrounding water service networks due to the construction works. There is a potential for disruption to services due to accidents on site during the construction process. If the proposed mitigation measures are applied during the construction process, then the danger to public health will be negative, imperceptible and short term.

20.2.8 Interactions between *Biodiversity* and *Land, Soils, Geology and Hydrogeology*

As set out in Chapter 8 and 9, there is a potential interaction between biodiversity and land, soils, geology and hydrogeology during the construction phase where excavation and re-profiling works are proposed. This is identified as having the potential to give rise to local biodiversity impacts resulting from the loss of some vegetation on site, but this is but this is not expected to impact significantly on surrounding areas Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 9, the predicted effects on biodiversity are short to long term, imperceptible, and neutral**.** The biodiversity of the subject site is likely to improve following the completion of landscaping works.

20.2.9 Interactions between *Biodiversity* and *Hydrology*

As set out in Chapters 8 and 10, there are potential interactions between biodiversity and hydrology. This is identified on the basis that during the construction and operational phases of development, there is the potential for downstream impacts on the on-site drainage ditches, proximate watercourses, and designated conservation sites via contaminated surface water runoff. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 10, the predicted effects on biodiversity are short term, imperceptible, and neutral.

20.2.10 Interactions between *Biodiversity* and *Air Quality and Climate*

As set out in Chapter 8 and 11, there is potential for interactions between biodiversity and air quality and climate. This has been identified on the basis that during the construction phase of development, given the nature and scale of the proposed works, there is the potential for dust and materials to enter the existing surface water sewer, drainage ditches, and proximate watercourses during site clearance and re-profiling works with the potential for downstream impacts on biodiversity and designated conservation sites. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 11, the predicted effects on biodiversity are short term, imperceptible, and neutral.

20.2.11 Interactions between *Biodiversity* and *Noise and Vibration*

As set out in Chapter 8 and 12, there is potential for interactions between biodiversity and noise and vibration on the basis that during the operation phase of development there will be an increase in disturbance including noise and vibration that could potentially impact on birds on site. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 12, the predicted effects are short term, slight imperceptible, and neutral outside the proposed development site.

20.2.12 Interactions between *Biodiversity* and *Material Assets (Waste)*

As set out in Chapter 8, there is potential for interaction between biodiversity and material assets (waste) on the basis that there is the potential for impacts on local biodiversity and the potential for downstream impacts on proximate watercourses and designated sites via the storage and transportation of waste and pollution from the subject site during the construction phase of development. Following the implementation of mitigation measures designed 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 as outlined in Chapter 8 and Chapter 18, the predicted effects on biodiversity are short long term, imperceptible, and neutral.

Chapter 18 deals with this particular interaction in Section at 18.4.1.

20.2.13 Interactions between *Biodiversity* and *Material Assets (Built Services)*

As set out in Chapter 8 and 9, there is potential for interaction between biodiversity and material assets (built services). This is identified on the basis that during the construction phase of development, there is the potential for impacts on local biodiversity and downstream impacts on proximate watercourses and designated sites via excavation and installation works during the proposed implementation of infrastructure throughout the site. During the operational phase of development, there is a direct hydrological pathway to designated conservation sites located within Dublin Bay via surface water drainage. There is an indirect hydrological pathway to designated conservation sites located within Dublin Bay via the proposed outfall of foul wastewater drainage to Ringsend WwTP. Following the implementation of mitigation measures outlined in Chapter 8 and Chapter 18, the predicted effects on biodiversity are short and long term, imperceptible, and neutral.

20.2.14 Interactions between *Land, Soils, Geology and Hydrogeology* and *Hydrology*

As set out in Chapter 9, there are potential interactions between land, soils, geology and hydrogeology and surface water, with some surface water conveyed and stored in SuDS features such as soakaways and discharging to the ground where possible, replicating the existing greenfield site drainage as closely as possible. The likely impact will be permanent, slight and neutral.

Chapter 10 also notes that, during the construction phase, there is an inter-relationship between soils, geology and hydrogeology and surface water due to the potential increasing of sediments loading in run-off as a result of the excavation required to facilitate site levelling and construction of the new foundations. Adherence to the mitigation measures in Chapter 9 and 10 and the requirements of the CEMP, will ensure the effect is long-term, imperceptible and neutral.

20.2.15 Interactions between *Land, Soils, Geology and Hydrogeology* and *Material Assets (Roads and Traffic)*

As set out in Chapter 9, there are potential interactions between lands and soils and material assets (roads and traffic) on the basis that throughout the construction stage of the project, there will be an increase in traffic on the roads due to deliveries to and from the site, site personnel and construction works. This impact will be negative, temporary and significant. There will be an increase in traffic in the general vicinity of the site during the operational stage, this will be negative, permanent and slight.

20.2.16 Interactions between *Land, Soils, Geology and Hydrogeology* and *Material Assets (Waste)*

As set out in Chapter 9 and 18, during the construction phase, excavated soil, stone, clay and made ground (c. 56,677 m3) will be generated from the excavations required to facilitate site levelling and construction of the new foundations. It is estimated that c. 49,478 m3 of excavated material will need to be removed off-site. However, it is envisaged that c. 7,199 m3 material will be reused on-site as fill. Where material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 9 & 18 and the requirements of the C&D RWMP (Appendix 18.1), will ensure the effect is long-term, imperceptible and neutral.

20.2.17 Interactions between *Land, Soils, Geology and Hydrogeology* and *Material Assets (Built Services)*

As set out in Chapters 9 and 19, there are potential interactions between lands and soils and material assets (built services) on the basis that during the installation process of the necessary built services, excavations will be required. These excavations will be limited in their depth and therefore any impact they have on the land, soils, geology, and hydrogeology will be negative, imperceptible, and temporary.

There are also interactions between land, soils, geology and hydrogeology and material assets, with the construction of basements and drainage/utilities impacting the quantity of soil and subsoil as these materials will be removed to facilitate construction. The likely impact will be moderate, permanent and negative.

20.2.18 Interactions between *Air Quality and Climate* and *Roads and Traffic*

Chapter 11 identifies potential interactions between air quality and climate and roads and traffic, noting that interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on the surrounding road network and the proposed scheme. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

20.2.19 Interactions between *Air Quality and Climate* and *Land, Soils, Geology and Hydrogeology*

Chapter 9 and 11 identify potential interactions between air quality and climate and land and soils on the basis that construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils.

20.2.20 Interactions between *Noise and Vibration* and *Roads and Traffic*

Chapter 12 and 17 note potential interactions between noise and vibration and road and traffic on the basis that the noise impacts have been fully considered in respect of traffic flow projections associated with the development.

20.2.21 Interactions between *Architectural Heritage* and *Landscape (Townscape) and Visual*

Chapters 13 and 14 identify a potential interaction between architectural heritage landscape (townscape) and visual on the basis that the development of the historic landscape significantly changes the character of the development site, including views into and out of the site.

20.3.22 Interactions between *Cultural Heritage and Archaeology and Land, Soils, Geology and Hydrogeology*

Chapter 9 identifies a potential interaction between archaeology and land and soils on the basis that there is potential for direct impacts on archaeological features as a result of construction activities including ground excavation.

20.3.23 Interactions between *Microclimate - Wind* and *Landscape (Townscape) and Visual*

Chapter 16 notes an interaction between microclimate wind and landscape on the basis that the landscaping proposals are incorporated into the wind modelling.

20.3.24 Interactions between *Material Assets (Roads and Traffic)* and *Material Assets (Waste Management)*

As identified by Chapter 18, waste has the potential to interact with roads and traffic on the basis that local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the Site during the construction and operational phases of the proposed Development. The increase in vehicle movements as a result of waste generated during the construction phase will be temporary in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 17 (Material Assets - Roads and Traffic). Provided the mitigation measures detailed in Chapter 17 & 18 and the requirements of the OWMP (included as Appendix 18.2) are adhered to, the predicted effects are short to long-term, imperceptible and neutral.

20.2.25 Interactions between *Archaeology and Cultural Heritage* and *Architectural Heritage*

Due to the nature of Chapters 14 and 15, there are potential interactions between *Archaeology and Cultural Heritage* and *Architectural Heritage* on the basis that heritage considerations form the basis of both chapters. It is however concluded in Chapter 14 that following the implementation of the mitigation measures laid out in Chapter 15, in relation to the architectural heritage resource, there would be a remaining moderate negative residual impact on the cultural heritage of the original asylum complex. This is offset by the fact that the site and its heritage, at operation, will be publicly accessible.

21.0 CUMULATIVE IMPACTS

21.1 Introduction

This Chapter has regard to the potential cumulative impact upon the environment arising from the proposed project, in combination with other developments (committed or planned projects) in the surrounding area. This Chapter should be read in conjunction with Section 3.7.1 and 3.7.2.

The accepted meaning of "cumulative impacts" is as set out in the Guidance on the Preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU) as:

> "*changes to the environment that are caused by activities/projects in combination with other activities/projects.*"

This very broad interpretation has been further defined in the Irish context in the EPA's 2017 Guidelines on the Information to be Contained in Environmental Impact Assessment Report to mean:

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

The EPA guidance goes on to provide that while a single activity may itself result in a minor impact, it may, when combined with other impacts (minor or significant), result in a cumulative impact that is collectively significant.

Having regard to the built-up urban environment within which the subject lands are located, there is a significant amount of new development either under construction, permitted or proposed. In recognition of this, and the potential for cumulative impacts upon the environment, an extensive exercise has been undertaken to identify projects within the surrounding area that have the potential to give rise to cumulative impact, when considered in combination with the proposed development. The methodology surrounding the identification of relevant projects is set out below.

As noted throughout this EIAR, the future Section 34 planning application that will deliver the second component of the site wide Masterplan has been considered as a planned project for the purposes of cumulative impact assessment. Given the close relationship between this future project and the proposed SHD project, and the level of information known about this project by the Applicant Team, it is considered in greater detail.

21.2 Methodology

A scoping exercise was first undertaken to identify an appropriate study area in respect of cumulative assessment. This comprised an initial survey of all planning applications within a spatial limit of c. 2km radius of the site boundary. An initial radius of c. 2km was selected for the reasons outlined in Table 21.1 below.

For the purposes of this initial survey, a search of all planning applications which were recorded on the National Planning Applications Database (DoHPLG) with extant permissions or were otherwise under consideration at the time of writing were included. A further review of An Bord Pleanála's website was undertaken to identify any requests submitted for SHD pre-application consultation.

A screening exercise was then undertaken to determine whether each identified project has the potential to generate cumulative impacts of significance on the environment, when considered in combination with the proposed development. There were two stages to this:

1. Identifying projects of a scale and nature ('major' projects) with the potential to generate cumulative impacts of significance (in line with the parameters set out in Table 21.1 below);
2. The record of applications resulting from (1) was further reviewed by the expert consultants to determine whether the identified 'major' projects, located within a 2km radius of the subject site, have the potential, in respect of each environmental aspect, to interact with the proposed development from a cumulative impact perspective.

Following the above screening exercise, a consolidated list of projects emerged, including both committed and planned projects that were determined to have the potential to give rise to cumulative impacts with the proposed development. Some of the projects were identified by more than one expert consultant whereas others were identified in relation to only one environmental aspect.

This final list was then distributed to the expert consultants undertaking the assessment of each environmental aspect. For completeness, despite the initial screening process, each chapter has regard to all of the projects identified in Chapter 3 (Sections 3.7.1, 3.7.2 and 3.7.3)

As part of the cumulative assessment, the future Section 34 proposal (detailed in Section 3.7.3) which forms part of the same site wide Masterplan as the proposed project, has been considered as a planned project. In acknowledging that this planned project has a close relationship with the proposed project and forms an integral component of the delivery of the site wide Masterplan for the lands, each chapter has given particular regard to the cumulative impact of the proposed project and the Section 34 proposal. It is noteworthy in this regard that while the specific relationship between these two projects from a Masterplan delivery perspective is acknowledged, this refers to the fact that the delivery of both projects is required to fully realise the objectives of the Masterplan, which is tied to the Applicant's remit as a state agency. That said, from a design and assessment perspective, these two projects are independent of one another i.e., one can be fully implemented with, or without the other. It is further noted that the extent of cumulative assessment in relation to these two projects varies from chapter to chapter, depending upon the environmental aspect being assessed and the design detail available at the time of writing.

Table 21.1: Parameters/ Terms adopted in determining the study area and relevant projects for cumulative impact assessment with the proposed development.

Parameter/ term	Detail/ Definition	Justification
2 km radius	The initial 2 km radius was adopted to undertake the initial survey which identified all extant permissions within the area surrounding the planning boundary.	Having reviewed a number of recent EIARs that relate to development within existing built up areas, the general spatial catchment adopted in respect of cumulative impact assessment is 1km. For the purposes of this project, the EIAR team have had particular regard to the spatial catchment from a visual impact and traffic impact perspective which are determined to have the furthest reaching potential impacts. Otherwise, any further impacts are considered to be very localised. In addition to this, we have also considered the potential nature and extent of pedestrian circulation in the surrounding area (i.e. where are people likely to travel to on foot), having regard to surrounding public open spaces, employment locations and social infrastructure. Whilst 1km was considered by the competent experts to be sufficient to capture any potential cumulative impacts arising, it was decided to extend the spatial catchment to 2km to ensure that the assessment is as thorough and robust as possible given the scale of the proposed project. It is however noteworthy that following the screening exercise by the competent experts, the majority of projects identified as having potential for cumulative impact are within a 1km radius of site.
Extant Permissions	Planning permissions relating to committed development projects that have the potential to be implemented, at the time of writing.	The identification of all extant permissions ensures that any development that has the potential to interact with the proposed project from a cumulative impact perspective is identified (subject to the other parameters outlined in this section). This

		excludes planning permissions that have been granted but have since lapsed or been fully implemented/ operational at the time of writing. Implemented/ operational projects are captured as part of the assessment of the baseline environment.
SHD Pre-Application Consultation	The mandatory step required prior to making an application for a Strategic Housing Development (SHD), involving submitting a request by a prospective applicant, in writing, to An Bord Pleanála for a Pre-Application Consultation meeting. The request is supported by a suite of documents relating to the Pre-Application proposal. The public are notified, via An Bord Pleanála's website, together with a brief overview of the scale and nature of the proposed SHD. Full details of the proposal are not published.	The identification of SHD Pre-Application Requests to An Bord Pleanála enables the cumulative impact assessment to have regard to any potential development projects that are likely to interact with the proposed project. It is noteworthy that due to the little amount of detail that is published in respect of SHD Pre-Application Requests, the exact detail of such potential projects is not known. Their inclusion in the cumulative impact assessment is therefore limited to high level considerations.
Major projects	All development within 2km was screened for projects of a 'major' scale and nature. For the purposes of this exercise, the following developments were excluded: • Minor change of use applications; • New residential schemes of less than 50 units; • New commercial schemes (including change of use) of less than 3000 sq m) • Retention applications;	The parameters for determining whether development is identified as 'major' or not was first considered in the context of Schedule 5, Part 1 and 2 of the *Planning and Development Regulations 2001* (as amended), in respect of development that requires mandatory EIA. The parameters were set to ensure that all surrounding development of a scale and nature requiring mandatory EIA would be captured, in recognition of their potential for significant environmental impact. Further to this, recognising that sub-threshold development (in an EIA sense) has the potential to give rise to significant environmental impact, both on its own or/ and in combination with other projects, the stated parameters were selected. In our opinion, this strategy is considered sufficient to capture the potential for incremental impact

	• Minor amendments to permitted applications; • Minor signage applications; • Other development types of scale that would not exacerbate significant environmental concerns (including car parking proposals, internal reconfigurations etc.) It is noteworthy that where sub-threshold development (in the context of the above criteria) was considered to have the potential for potential significant interactions with the proposed project, it was not screened out of the assessment.	associated with the combination of a number of smaller projects. Notwithstanding this, as noted, where sub-threshold development (in the context of the selected parameters/ criteria) was considered to have the potential for significant interactions with the proposed project, it was not screened out of the assessment.
Committed Projects	Development projects with an extant planning permission, including projects currently under construction.	This parameter aligns with EIA Guidance surrounding the projects that should be included for cumulative impact assessment.
Planned Projects	Development projects (i.e. planning applications) that have been submitted to a Planning Authority for a decision, but were yet to be decided at the time of writing. Or potential projects that are at pre-application stage and within the public domain.	This parameter aligns with EIA best practice surrounding the projects that should be included for cumulative impact assessment.
Time of writing	9th March 2022.	Considered to be appropriate cut-off date to enable to completion of the EIAR and submission of planning application. The scope of cumulative assessment, which gives consideration to planned projects,

		ensures that pipeline planning applications, if in the public domain, are captured by the assessment.
Expert consultants	The consultants that are responsible for the preparation of the chapters in respect of each environmental aspect assessed within the EIAR. The EIAR team, together with their qualifications, is outlined in Chapter 1 (Table 1.3).	This aligns with the amended EIA Directive (Directive 2014/52/EU) which 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."*

21.3 Potential Cumulative Impact

Each Chapter which addresses a specific environmental factor provides a detailed cumulative impact assessment in respect of the committed and planned projects identified in Chapter 3 (Sections 3.7.1, 3.7.2 and 3.7.3), including the future Section 34 application in respect of the wider Masterplan lands. The aforementioned chapters should be referred to for full details of the assessment; this chapter provides a summary of the cumulative impact assessment.

Table 21.2: Summary of the conclusions of the Cumulative impact assessment undertaken in respect of each environmental aspect.

Chapter/ Environmental Factor	Potential Cumulative Impact
Population and Human Health	Chapter 7 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR and concludes that other than the potential (short term and temporary) significant cumulative impacts arising from construction noise upon human health (addressed in detail in Chapters 7 and 12), no further significant adverse cumulative effects would arise.
Biodiversity	Chapter 8 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR and concludes that there would be no significant adverse cumulative effects arising.
Land, Soils, Geology and Hydrogeology	Chapter 9 has undertaken a cumulative impact assessment of the proposed development in combination

	with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR and concludes that there would be no significant adverse cumulative effects arising.
Hydrology	Chapter 10 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.
Air Quality and Climate	Chapter 11 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.
Noise and Vibration	Chapter 12 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising from the operational phase of the project. In respect of the construction phase, the assessment concludes that there is potential for cumulative construction noise impacts to arise which are expected to be negative, moderate to significant and short-term.
Landscape (Townscape) and Visual	Chapter 13 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.
Cultural Heritage and Archaeology	Chapter 14 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.
Architectural Heritage	Chapter 14 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.
Microclimate - Wind	Chapter 16 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.

Material Assets (Roads and Traffic)	Chapter 17 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR. The estimated traffic arising from the development incorporates a number of committed and planned projects deemed to have potential cumulative interactions with the development. In this regard, Chapter 17 concludes that *"the likely effect of the proposed development during the operational phase will be additional traffic which will have a significant long-term impact in the immediate vicinity of the proposed development on Dundrum Road and a moderate long-term adverse effect on the adjoining section of Dundrum Road and a slight traffic impact on the wider road network."*
Material Assets (Waste Management)	Chapter 18 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.
Material Assets (Built Services)	Chapter 19 has undertaken a cumulative impact assessment of the proposed development in combination with the projects outlined in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, and concludes that there would be no significant adverse cumulative effects arising.

21.4 Mitigation and Monitoring

Having regard to the conclusions set out in Table 21.2 above, the proposed project, when considered in combination with the committed and planned projects set out in Sections 3.7.1, 3.7.2 and 3.7.3 of this EIAR, is not expected to give rise to significant cumulative impacts.

It is therefore further concluded that no further mitigation or monitoring measures are required, beyond those proposed by each chapter in respect of the proposed project.

21.5 'Do-Nothing' Effect

If the proposed project does not proceed, there will be no cumulative impacts arising.

22.0 ENVIRONMENTAL COMMITMENTS/ MITIGATION MEASURES

22.1 Introduction

Paragraph 2(d) of Schedule 6 to the *Planning and Development Regulations 2001*, as amended by the 2018 regulations, provides that the following information must be contained in an EIAR:

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

This Chapter provides a consolidated list of all of the environmental commitments/ mitigation measures that have been recommended by the various specialists throughout the Chapters of this EIAR.

The mitigation and monitoring measures have been recommended on that basis that they are considered necessary to protect the environment during both the construction and operational phases of the proposed project.

22.2 Summary Table

Table 22.1 (contained at Appendix 22.1) provides an overview of all mitigation measures proposed in respect of the environmental assessment contained within this Report. The mitigation measures should be read in conjunction with the associated chapters and assessment contained within.

APPENDICES

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To be read in conjunction with the relevant chapters of this EIAR.