Declan Brassil + Company

Volume 1:

Environmental Impact Assessment Report

To accompany a planning application for

Residential Development

At

Heuston South Quarter
St. John's Road West, Dublin 8

Submitted on Behalf of

HPREF HSQ Investments Ltd
32 Molesworth Street, Dublin 2

OCTOBER 2021

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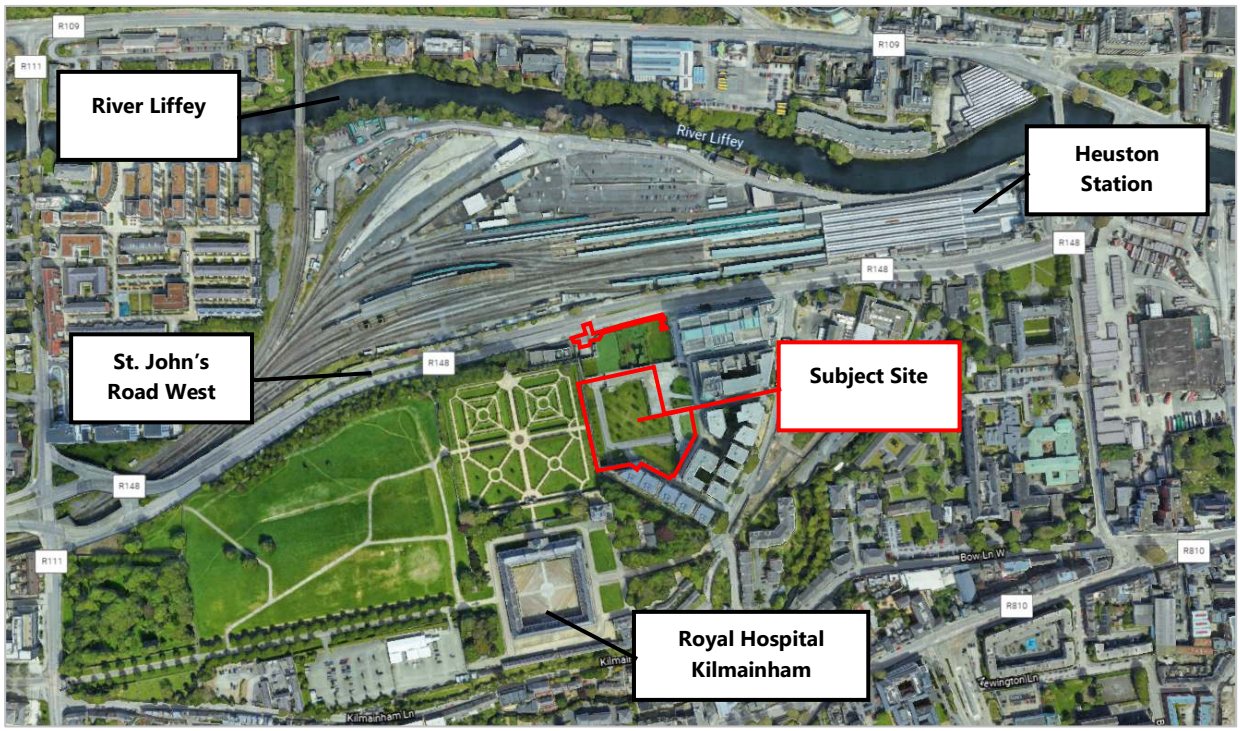
1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) accompanies a planning application that is submitted on behalf of HPREF HSQ Investments Ltd. for a multi-unit residential development, including ancillary communal facilities, a retail unit and associated site works and infrastructure provision on part of the larger Heuston South Quarter development site that is bound by St. John's Road West (to the north); Military Road (to the east and the Royal Hospital Kilmainham (RHK) and its attended grounds to the west.

This Strategic Housing Development (SHD) proposal comprises demolition and site clearance works, and the construction of 399 no. Build to Rent apartments, a retail unit, ancillary indoor and outdoor amenity areas, landscaped open spaces and supporting utilities and infrastructure (henceforth, the Proposed Development).

This EIAR presents an evaluation of the likely significant environmental impacts and applicable mitigation and monitoring measures associated with the construction and operation of the proposed development. It is the document which HPREF HSQ Investments Limited is required to submit to the Board to inform the Board's Environmental Impact Assessment (EIA) of the Proposed Development. This EIAR has been completed in order to comply with and exceed the requirements of all relevant legislation and guidance

Figure 1.1 Site Location in Context (source: google maps)



1.1 Nature & Extent of Development Proposals

HPREF HSQ Investments Ltd. is seeking planning permission for a Specific BTR development Strategic Housing Development from An Bord Pleanála (ABP). The proposed development comprises 399 no. Build-To-Rent apartments accommodated in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys over basement levels, with ancillary indoor and outdoor community facilities, landscaped open spaces and service infrastructure.

HPREF HSQ Investments Ltd. intends to complete the undeveloped part of the larger Heuston South Quarter (HSQ) development site through the implementation of two separate and standalone planning applications – the first of which comprises this proposed SHD scheme, and the second via a Section 34 Planning Application to Dublin City Council (DCC) for commercial development (Site A).

While submitted as two separate and standalone planning applications, these developments form part of a single development strategy for the site. Therefore, both projects are considered cumulatively, to avoid 'project splitting' for purposes of environmental impact assessment. Each application shall be accompanied by a standalone EIAR that references the other element as Cumulative development.

1.2 Need for an Environmental Impact Assessment Report

The subject site, and the adjoining site (Site B), formed part of the larger HSQ development permitted under ABP Ref. PL29S.206528 (the 'parent permission'). That application was subject to EIA and was accompanied by an Environmental Impact Statement (EIS) that related to the overall HSQ site that extended to approximately 3.9 ha.

The parent permission was subsequently amended by a permission granted on 26 May 2005 under DCC Planning Ref. 2218/05, which in turn was further amended on an incremental basis. The following development has been completed:

- Block 3/4 is situated at the corner of St. John's Road West and Military Road and is occupied by Eir - formerly Eircom). This development comprises in the region of 25,000 sq.m of Commercial floorspace
- Blocks 7A and 7B to the east of the application site comprise a mixed-use development of Commercial floorspace (approximately 10,750 and Residential (93 Units).
- Blocks 9a to 9h to the east of the application site comprise a mixed-use development of approximately 4,250 sq.m Commercial floorspace and 173 Residential units; and
- Blocks 8 / 10 situated to the south of the application site comprise a mixed-use development of approximately 2,150 sq.m of commercial development (including an existing Childcare facility and 79 residential units.

The completed HSQ development comprises of approximately 80,000 sq.m (GFA) commercial floorspace, and 345 apartments in Block 8 (Telford), Block 10 (Hibernia), Block 7b (Dargan), Block 9d-h (Sancton Wood) and Block 9a-c (Kestrel).

The proposed development represents an extension of a development that comes within the following Classes of development specified in Part 2 of Schedule 5 of the Planning and Development Regulations, 2001 (the 2001 Regulations):

- Class 10(b)(i): 500 residential units.
- Class 10(b)(iv): Urban development which would involve an area greater than 2 hectares in the case of a business district.

The proposed development also comes within the scope of Class 13:

"13. Changes, extensions, development and testing

(a) 'Any change or extension of development already authorised, executed or in the process of being executed (not being a change or extension referred to in Part 1) which would:-

(i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this Schedule,

and

(ii) result in an increase in size greater than –

- 25 per cent, or

- an amount equal to 50 per cent of the appropriate threshold,

whichever is the greater.'

The proposed number of units and site area do not exceed the Class 10 thresholds.

The quantum of development constructed under parent planning permission (as amended), in addition to the proposed development of 399 no. units exceeds the 500 unit threshold under Class 10 (b)(i) threshold of 500 dwelling units. The area of the site combined with the completed development also exceed the Class 10(b)(iv) area threshold for an 'urban development which would involve an area greater than 2 hectares in the case of a business district.

The proposed development of 399 units exceeds the 50% threshold (i.e., 250 units), being the greater of the thresholds under Class 13(a)(ii). The proposed development site of 1.08 ha also exceeds the 50% threshold (i.e., 1 ha), being the greater of the thresholds under Class 13(a)(ii).

Accordingly, this application is accompanied by an EIAR.

1.3 Scoping of EIAR

HPREF HSQ Investments Limited is committed to ensuring that the development of the Proposed Development takes place in an environmentally responsible manner.

The proposed development has been subject of pre-planning meetings with An Bord Pleanála, and various Departments of Dublin City Council. Informal scoping to identify the issues that are likely to be most important during the Environmental Impact Assessment of the proposed development has been carried out. This approach is consistent with the Environmental Protection Agency's *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* which provides that formal scoping, as per section 173(2)(a) of the Act, is not mandatory.

Where non-statutory consultation with public bodies and others has taken place, these have been described by the competent experts in chapters 5 to 16.

This EIAR addresses all of the issues listed in Schedule 6 of the Planning and Development Regulations 2001 (SI No. 600 of 2001) (as amended) (the **PDRs),** having regard to the requirements of Article 5(1) and Annex IV of Directive 2011/92/EU as amended by Directive 2014/52/EU (the **EIA Directive**).

- Population & Human Health
- Biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive Soil, land, and Geology
- Water
- Air, Dust and Climatic Factors
- Noise and Vibration
- Material Asset: Traffic & Transport
- Material Asset: Water Supply, Drainage & Utilities
- Cultural Heritage: Archaeology Heritage

- Cultural Heritage: Architectural Heritage
- Landscape & Visual Impact Assessment
- The interaction between the factors mentioned above

As referred to in section 1.4.4 below, the evaluation in this EIAR of the effects on the factors listed above 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 scoping process undertaken has directed what information should be contained in the EIAR and the most appropriate mechanisms to gather and assess that information to ensure that all potential impacts are adequately identified and appropriately mitigated against where necessary.

In accordance with Section 3.3.4 'Key Scoping Criteria' of EPA Guidelines, the prescribed environmental factors were assessed to identify core constraints and sensitivities. It was decided that no topics or headings of the prescribed environmental factors could be scoped out of the EIAR due to the urban location of the site, the historical context of this area and the planning history of the wider scheme.

1.4 Structure & Content of EIAR

This EIAR complies with the requirements of the following legislation:

- The Planning and Development (Housing) and Residential Tenancies Act 2016 (as amended)
- The EIA Directive
  - European Communities (Environmental Impact Assessment) Regulations, 1989 (S.I. No. 349 of 1989), as amended
  - Planning and Development Regulations 2001 (SI No. 600 of 2001), as amended
  - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018)

The EIAR contains all of the information specified in Schedule 6 of the PDRs as amended. Included under a separate cover is the Non-Technical Summary of this EIAR, which summarises the findings of the EIAR free from technical language and terminology. The preparation of the EIAR has been informed by the Environmental Protection Agency's Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports 2002 and Advice Notes On Current Practice In The Preparation Of Environmental Impact Assessment Reports (September 2003).

The content of this EIAR has also had regard to the Revised Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft) prepared by the EPA, August 2017; the Advice Notice for Preparing Environmental Impact Assessment Reports (Draft) prepared by the EPA, September 2015 and the Consultation Paper on Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems. These documents are currently Consultation Drafts and it was considered appropriate that regard was had to them on the basis they take account of the revised EIA Directive (2014/52/EU).

The preparation of the EIAR has also been informed by the European Commission's Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report 2017, and the Department of Housing, Planning and Local Government (DoECLG) Guidelines for

Planning Authorities & An Bord Pleanála on carrying out Environmental Impact Assessment, August 2018.

The EIAR has been prepared in the 'Grouped Format' structure, which examines each aspect of the environment as a separate section referring to the existing environment, the proposed development, likely impacts, and proposed mitigation measures. The EIAR has been systematically organised to provide the following information:

- Section 2 A description of the existing environment.
- Section 3 A description of the project.
- Section 4 Provides a Consideration of Alternatives
- Sections 5-15
  - Identification of likely significant adverse impacts during conduction and operation of the proposed development.
  - A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse impacts.
- Section 16 An assessment of the interactions and interrelationships of the different environmental factors / impacts that may occur as a result of the proposed development.
- Section 17 A summary of all mitigation measures forming part of the proposed development.

Impacts arising from the existence of the proposed development, the use of natural resources, the emission of pollutants, the creation of nuisances and the elimination of waste are described as direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative as appropriate.

An assessment of the environmental sensitivity of geographical areas likely to be affected, as set out in Schedule 7 of SI No. 600 of 2001, has also been undertaken. In this regard, particular consideration has been given to the cumulative impact of the development given its proximity to other developments and future works at the wider site. No part of the site is situated in or adjacent to areas which would be defined or designated as wetlands; coastal zones; mountain and forest areas; nature reserves and parks; areas classified or protected under legislation, areas in which the environmental quality standards laid down in the legislation of the EU have already been exceeded; or densely populated areas.

1.4.1 Construction Phase Overview

Construction of the proposed development is expected to take place over 24-30 months, commencing in Q2/Q3 2022. A detailed construction plan and schedule has been developed to ensure that the construction phasing allows for maximum efficiency while minimising the potential for environmental impact and this plan and schedule is annexed to this EIAR at Appendix 6A. A detailed description of the construction phase of the proposed development is presented in Sections 5 - 15 of this EIAR.

1.4.2 Operational Phase

During the operational phase of the Proposed Development the scheme will accommodate a residential population of approximately 886 persons, based upon an estimated occupancy rate of 2.22 persons per unit (CSO Average Household Size, 2016). The scheme will be maintained and managed by a private management company to ensure the safety and security of the development and its residents, as per

the Site Specific Apartment Management Strategy annexed to this EIAR at Appendix 1A.

1.4.3 Land

It is noted that the 'Land' has been introduced as a prescribed environmental factor by Directive 2014/52/EU amending the EIA Directive. Recital 9 of the Directive outlines the reasons for its inclusion and references '*the need to address the unsustainable increase of settlement areas over time ('land take')*'. Recital 9 goes on to state that '*public and private projects should therefore consider and limit their impact on land, particularly as regards land take, and on soil, including as regards organic matter, erosion, compaction and sealing: appropriate land use plans and policies at national, regional and local level are also relevant in this regard*'.

The proposed development provides for residential development plus associated works on the site of the former permitted and commenced but non-completed Blocks 1, 2, 5a and 6 that forms part of the wider HSQ mixed-use development precinct. The subject lands are bounded to the north by St. John's Road West – a 4-lane road and to the east and west by the completed Block 3/4 that is situated at the corner of St. John's Road West and Military Road (occupied by Eir - formerly Eircom) and Blocks 7A, 7B and 9A-H to the south thereof fronting Military Road to the east and comprising a mix of commercial and residential development. Adjoining the site to the south are the completed Blocks 8 / 10 that also comprise mixed use commercial and residential development. Immediately to the west of the site is the formal gardens of the Royal Hospital Kilmainham (RHK).

The subject site is situated at the western end of Dublin's inner city, south-west of Heuston Station and is identified as forming part of a Strategic Development and Regeneration Area (SDRA7), as designated in the Dublin City Development Plan, 2016-2022.

Matters relating to impacts on soil have been considered as relevant in the context of Land, Soil and Geology (Chapter 7) and Water: Hydrogeology and Hydrology (Chapter 8) Sections of this EIAR.

1.4.4 Vulnerability to Risks of Major Accidents and/or Disaster

Annex IV of the Directive 2011/92/EU as amended by Directive 2014/52/EU refers to both a proposal's potential to cause accidents/disasters and to the vulnerability of the proposal to accidents/disasters. These risks can be from both man-made and natural disasters and there is a requirement to build resilience into projects and to invest in risk prevention. Principle risks that have been evaluated include; accidental spillages, ground instability, collapse of existing structures, landslides, flooding, major traffic accidents, and work-place construction accidents.

In respect of man-made accidents and disasters, the site does not occur within the consultation distance of any Tier 1 or Tier 2 SEVESO III site. Road traffic information from the Road Safety Authority indicates that between 2005 and 2016 there has been one serious accident and twelve minor accidents in the vicinity of the site on St. John's Road West and Military Road.

Regarding natural disasters, the site does not occur in an area prone to earthquakes or volcanic eruptions. The site does not contain any coastal or fluvial flood risk areas, as per the CFRAM flood maps. The water infrastructure serving the development has been designed to accommodate a 1 in 100 flooding event.

The identification and assessment of risks of accidents and/or disasters is provided in chapters 6, 7, 8, 9, 10, 11, 12 ,13 and 14 of this Report for each of the relevant impacts/factors the subject matters to these chapters. No other major accidents/disaster risks (other than those which are identified in Chapter 6 -

14) arise.

1.4.5 Climate Change

The European Commission in its 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' document (2013) states that Climate refers to 'average weather', typically calculated over the 30 year period, in respect of mean and variability in aspects such as temperature, precipitation and wind. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as;

"..a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".

Annex IV of the EIA Directive refers to Climate Change with respect to Climate Change Mitigation and Climate Change Adaptation.

In respect of Climate Change Mitigation, it is noted that most projects will have an impact on greenhouse gas emissions both directly and indirectly through the construction and operational phases. For residential developments such as the proposed development direct emissions include those generated in the production of construction materials or the on-site consumption of fossil fuels to heat houses or for energy use. Indirect emissions include those related with transportation and travel to and from the site by future occupants or users.

Climate adaptation refers to the impacts that climate change may have on the project itself and the adaptations that need to be taking into account to allow the scheme to adapt, for example the impact of the proposed development on increased flooding risk due to climate change and the adaptations made to the scheme to account for flooding and sea level rises.

The impact of the proposed development on Climate Change is specifically assessed in Chapter 9 'Air, Dust and Climate' of this EIAR, which was prepared by TMS Environmental.

1.5 Methodology for Identification of Impacts

The identification and description of significant effects/impacts is central to Environmental Impact Assessment and therefore, forms a fundamental part of this EIAR. In each of the Chapters 5 to 15, inclusive, the competent experts have assessed the potential impacts of the proposed development with reference to the baseline scenario, and relevant Guidelines and standards as applicable. Where impacts are identified during the construction phase, operational phase or cumulatively, these are described using the terminology described in the EPA's 'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports' Draft August 2017, summarised below in Section 1.5.1. Where significant negative impacts are identified, the competent experts go on to describe mitigation and preventative measures.

Table 1.5.1 Summary Of Table 3.3 of the EPA's 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' Draft August 2017.

Type	Description
Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur – so that the CA can take a view of the balance of risk over advantage when making a decision.	**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.
Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects:** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities). **Neutral Effects:** No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error. **Negative/adverse Effects:** A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful	**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

Type	Description
	most of a sensitive aspect of the environment. **Profound Effects:** An effect which obliterates sensitive characteristics
Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects: Effects** lasting from seconds to minutes **Brief Effects:** Effects lasting less than a day **Temporary Effects:** Effects lasting less than a year **Short-term Effects:** Effects lasting one to seven years. **Medium-term Effects:** Effects lasting seven to fifteen years. **Long-term Effects:** Effects lasting fifteen to sixty years. **Permanent Effects:** Effects lasting over sixty years **Reversible Effects:** Effects that can be undone, for example through remediation or restoration **Frequency of Effects**: Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary Effects):** Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway. **Cumulative Effects:** The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects. **'Do-Nothing Effects'**: The environment as it would be in the future should the subject project not be carried out. **`Worst case' Effects:** The effects arising from a project in the case where mitigation measures substantially fail. **Indeterminable Effects**: When the full consequences of a change in the environment cannot be described. **Irreversible Effects:** When the character, distinctiveness, diversity or reproductive capacity of an

Type	Description
	environment is permanently lost. **Residual Effects:** The degree of environmental change that will occur after the proposed mitigation measures have taken effect. **Synergistic Effects:** Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

1.5.1 Cumulative Impacts

The EIA Directive and implementing legislation requires that the EIAR considers 'cumulative impacts'. Section 6.12 of the EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft 2017) states:

'The Directive requires that the EIAR describes the cumulation of effects . Cumulative effects may arise from:

- *The interaction between the various impacts within a single project;*
- *The interaction between all of the different existing and/or approved projects in the same area as the proposed project.'*

Cumulative impacts refer to impacts that result from incremental changes caused by other past, present and approved developments, and as far as is practicable from reasonably foreseeable development(s), together with the project.

Appendix 1B of this Report lists existing and permitted development in the immediate vicinity of the subject site.

Unless otherwise stated, the assessment of cumulative impacts in Chapters 5 to 15 of this EIAR assess and identify the impacts of the Proposed Development cumulatively with the future commercial development on the Applicant's lands to the immediate north of the subject site, and the permitted and existing development in the wider Hueston South Quarter development listed in Appendix 1B.

The proposed development comprises residential development within the Hueston Station and Environs Strategic Development and Regeneration Zone (SDRA 7), designated for development within the Dublin City Development Plan 2016–2022. This Plan was the subject of Strategic Environmental Assessment, and the SEA document forms Volume 5 of the Plan. Section 8.3 'Cumulative Impacts' of the SEA states that, in respect of a Development Plan, cumulative effects can occur from combined impacts from policies and proposals on specific areas or sensitive receptors. The SEA identifies two types of cumulative effect;

- Potential intra-plan cumulative effects: these would arise from the interactions between different types of potential environmental effects resulting from a plan or programme etc. The sensitivity mapping as set out in section
- Potential inter-plan cumulative effects, those arising when the effects of the implementation of one plan occur in combination with those of another plan/ programme, etc.

Section 9.2.1 'Mitigation Through Consideration of Alternatives' indicates that the assessment of three growth scenarios, and the choice of the most appropriate growth outcome, mitigated against potential significant impacts. In adopting a growth scenario based on the targeted growth around identified growth centres, including SDRAs such as the subject site, signification impacts including cumulative impacts were mitigated against.

Future development in this locality will be subject to separate planning application(s) and detailed assessment by the Planning Authority of likely impacts on the environment, and consistency with the relevant statutory land use plans in effect at the time of the determination of those applications. The proposed development has been designed to be consistent with the Plan, and relevant ministerial Guidelines. Accordingly, the proposed development is responsive to potential cumulative, future development of the wider area.

1.6 Difficulties in Compiling the Specified Information

No major difficulties were encountered in compiling the specified information as set out in Schedule 6 of SI 600 of 2001, as amended. Any relevant difficulties encountered have been identified in the respective sections of the EIAR, as appropriate.

1.7 Specialist Contributors

The EIAR has been prepared and co-ordinated by Declan Brassil & Company. Specialist Inputs have been provided by the following Consultants:

Table 1.7.1 Specialist Inputs

Specialist Consultants	Aspect of Environment
Reddy Architecture and Urbanism (Project Architects) Mr. Eoghan O' Brien Mr. Rory Murphy	Consideration of Alternatives Description of Development
Biosphere Environmental Services Dr. Brian Madden	Biodiversity
TMS Environment Ltd. Dr. Imelda Shanahan	Air, Dust and Climatic Factors Noise and Vibration
Cronin Sutton Consulting Engineers Mr. David Rehill Mr Robert Fitzmaurice Mr. Gordon Finn	Description of Development Material Assets: Traffic and Transport Material Assets: Water Supply, Drainage and Utilities Lands, Soil and Geology

	Water
Archaeological Projects Ltd. Ms. Claire Walsh	Cultural Heritage: Archaeology
Howley Hayes Cooney Architects Dr. Niamh Marnham	Cultural Heritage: Architectural Heritage
Doyle & O'Troithigh Mr. Daithi O'Troithigh Mr. Dave O'Sullivan	Landscape and Visual Impact Assessment
Future Analytics Mr. Stephen M. Purcel	Population & Human Health
IN2 Engineering Mr. James Redmond	Description of Development Material Assets: Water Supply, Drainage and Utilities

All experts involved in the preparation of environmental impact assessment reports are qualified and competent in their respective aspect of the environment. Details of qualifications, expertise and experience of each of the contributing specialists has been provided in Table 1.7.2 below.

Table 1.7.2 Competency of Experts

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
Mr. Declan Brassil	Declan Brassil and Company Ltd.	EIAR Co-Ordination & Compilation Introduction	BA (Hons) from NUI Maynooth. (1990) Masters of Regional and Urban Planning from University College Dublin. (1992) Member of the Irish Planning Institute.	Declan Brassil is a Chartered Town Planner with over 20 years' experience and is the Principal in Declan Brassil & Company. During this time he has worked in the private sector and as an Inspector with An Bord Pleanála. Declan has extensive experience in leading multi-disciplinary teams in the preparation of Environmental Impact Statements, Local Area Plans, Masterplans and planning applications for large scale mixed use developments throughout the country. He has also advised on statutory planning processes and policy development and analysis on behalf of state agencies and private clients and acted as planning expert witness at oral hearings
Mr. Robert Fitzmaurice	Cronin Sutton Consulting Engineers	Material Assets: Utilities	BEng (Hons) in Civil & environmental Engineering from University of Bradford (1990) Post Graduate Diploma in Environmental Engineering from Trinity College Dublin (2006) Master's Degree in Industrial Engineering from	Robert is a Chartered Engineering with Engineers Ireland and has been practicing as a consulting engineer for over twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering, an advanced Diploma in Planning & Environmental Law and has a master's degree in Industrial Engineering.

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
			UCD (2009) Advance Diploma in Planning & Environmental Law from Kings Inn (2019)	
Mr. Gordon Finn	Cronin Sutton Consulting Engineers	Traffic and Transport	BA/BAI and MAI degree in Civil, Structural, and Environmental Engineering from the University of Dublin. (2016) Member of the Institute of Engineers of Ireland	Gordon holds BA/BAI and MAI degrees in Civil, Structural, and Environmental Engineering from the University of Dublin, and is a member of the Institute of Engineers of Ireland. His relevant professional experience includes the preparation of Traffic and Transport Assessments, Travel Plans, and Environmental Impact Assessment Report chapters for a broad range of residential, commercial, and institutional developments.
Mr. James Howley	Howley Hayes Cooney Architects	Cultural and Architectural Heritage	BA Architecture (Hons). Manchester Polytechnic (1979). Diploma in Architecture., University of Cambridge (1981). MA in Conservation Studies, University of York (1993). Fellow RIAI, (2000) Conservation Practice	Having completed his architectural education at the Manchester Art College and Cambridge University Schools of Architecture, James completed a masters in conservation studies at the University of York, since then he has amassed over twenty years' experience in the care, repair and reuse of historic buildings. To date he has completed more than 250 conservation reports and feasibility studies for the care, repair, adaptation and reuse of historic buildings and places, many of which have led to commissions for the implementation of construction works. He has given strategic advice on high profile conservation projects for the Department of Arts Heritage and the Gaeltacht, the

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
			Grade 1 RIAI (2006) Conservation Architect Grade 1 RIAI (2006) Specialist Conservation Architect, RIBA (2011)	Heritage Council, the Office of Public Works, numerous city and county councils, and many private clients and institutions. In 2000 he was elected a fellow of the Royal Institute of Architects of Ireland the citation for which noted design, conservation, education and architectural scholarship.
Dr. Brian Madden	Biosphere Environmental Services	Biodiversity AA Screening	BA Mod. (Hons.) in Natural Sciences from University of Dublin. (1984) Ph.D. (ecology) from National University of Ireland. (1990) Member of Chartered Institute of Ecology & Environmental Management.	Dr. Brian Madden, principal ecologist with Biosphere Environmental Services (BES), has over 30 years experience as a professional ecologist. His Doctorate research was in ecosystem processes in raised bogs, after which he was a Research Fellow in Trinity College, Dublin working on water quality issues in Dublin Bay. Brian has particular expertise in habitats and flora and is also an expert ornithologist. The consultancy BES specialises in energy related projects (wind farms, power lines etc) and has carried out research on the impacts of wind turbines on hen harrier in Ireland. Regular clients include Bord na Móna, Coillte, ESB, the IDA, and the National Parks and Wildlife Service. Brian has acted as expert witness at oral hearings and has been in attendance at various cases in the High Court.
Dr. Niamh Marnham	Howley Hayes Cooney Architects	Cultural and Architectural Heritage	PhD (Architectural History and Conservation) from National University of Ireland (2014)	Dr Niamh Marnham was an OPW Fellow in the School of Architecture in UCD and has a PhD in Architectural History and Conservation, a PgDIP in Conservation from the Architectural Association in London, and over 18 years' of experience working in architectural and multi-disciplinary design practices

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
			Graduate PgDIP in Conservation from the Architectural Association in London (2004) MA in Geographical Analysis: Landscape Heritage from National University of Ireland (1993) BA Hons in Geography & Greek & Roman Civilisation from National University of Ireland (1991).	in Dublin and London on some of the most sensitive and significant buildings and places. She has also lectured and written on a wide variety of architectural typologies and is the author of the NIAH's Architectural Heritage of Dublin South City.
Mr Rory Murphy	RAU	Project Architect Consideration of Alternatives	BA Architecture from the Dublin Institute of Technology (1988) Fellow RIAI	Over a 30-year career, Rory Murphy has worked in the construction industry both in Ireland and around the world. He has been involved in a wide range of projects in the retail, commercial, residential and hospitality sectors as well as completing numerous private commissions. Rory graduated from the School of Architecture in Dublin Institute of Technology in 1988. In his early career he worked with Denys Lasdun in London and Jean Nouvel in Paris before returning to Ireland. He is a fellow of the RIAI since 2016 and is an accredited Conservation Architect. Rory has also been a Studio Lecturer in

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
				Architecture at the School of Architecture at DIT Bolton Street.
Mr Stephen M. Purcell	KPMG Future Analytics	Population and Human Health Assessment	BSc. (Hons) Spatial Information Science/ Geomatics, TU Dublin. (2005) Master of Regional and Urban Planning, UCD. (2008) Master of International Business, TU Dublin. (2019) Member of the Irish Planning Institute Fellow of the Royal Institute of Chartered Surveyors Fellow of the Society of Chartered Surveyors Ireland	Stephen is a Chartered Surveyor and Town Planner with 16 years post-qualification experience. He is Co-Head of KPMG Future Analytics following the acquisition of his business, Future Analytics Consulting Ltd., by KPMG Ireland in 2020. Stephen has extensive experience spanning strategic planning and coordinating the consenting process for a range of projects, including Environmental Impact Assessment coordination for Strategic Housing, Strategic Infrastructure and Mixed-Development Schemes, together with Substitute Consents processes. Stephen has successfully advised Local, Regional and Central Government, major private sector clients and State Agencies on strategy, consenting coordination and evidence-based studies. He has strong experience in strategic infrastructure, residential, commercial, retail, healthcare and community development projects. A significant component of Stephen's project portfolio include the application of population projection modelling, population impact analysis and socio-economic profile data to inform forward planning and scheme composition. Assessing the likely impacts of development proposals (residential, mixed use development or infrastructure projects), Stephen considers matters such as traffic & transportation, air quality & climate, noise & vibration, landscape/townscape & visual, material assets – utilities, and the risk of major accidents and/or disasters within projects at

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
				varying scales. While such aspects are considered within their own dedicated chapter, from a Human Health perspective it is appropriate to consider these under the Population and Human Health chapter.
Ms. Sinéad O'Connor	Declan Brassil and Company Ltd.	EIAR Co-Ordination Compilation Introduction Site Location, Context and Planning History Description of Development Interactions Mitigation Measures	BA Mod. Hons. (Environmental Science) from Trinity College Dublin (2008). Masters of Regional and Urban Planning from University College Dublin (2011). Member of the Irish Planning Institute	Sinead O'Connor of Declan Brassil and Company Ltd. hold a B.A. Mod. Hons. In Environmental Science from Trinity College Dublin, and a Masters in Regional and Urban Planning (MRUP) from University College Dublin. Sinead has over 10 years of experience in Town Planning and the preparation of Environmental Reports, having worked as part of multi-disciplinary teams on residential, commercial and quarry schemes.
Mr. Dave O'Sullivan	Doyle and O'Troithigh	Landscape and Visual Impact Assessment	B.Ag. Sc. (HORT) from University College Dublin (1976) M.Ag. Sc. (HORT) from University College Dublin (1984)	David O'Sullivan is a Member of the Irish Landscape Institute with 25 years' experience in providing landscape architecture services for a wide range of projects involving residential, road, rail and air infrastructure, water and renewable energy. David has also delivered landscape and visual reports for a variety of successful residential and renewable energy developments.

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
			Master of Landscape Architecture from University College Dublin (1999) Member of the Irish Landscape Institute.	
Mr. Daithi O'Troithigh	Doyle and O'Troithigh	Landscape and Visual Impact Assessment	Dip ArchTech. Cork Institute of Technology (1997). BA Landscape Architecture Kingston University London (1999) Post Graduate Diploma Landscape Architecture Kingtson University London, (2021). Msc Urban Design University College Dublin (2007). Member of the Irish Landscape Institute	Daithi O'Troithigh is a Landscape Architect, Urban Designer and a founding director of Doyle + O'Troithigh Landscape Architecture Ltd with over 20 years' experience. Daithi has worked on a range of project sizes and complexities (Residential, Commercial, Educational and Tourism, for both public and private clients) in a variety of roles from sub consultant to lead consultant on multi-disciplinary teams in Ireland and the UK.

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
Mr. James Redmond	IN2 Engineering	Material Assets: Utilities	B.Eng. Hons. (Mechanical Engineering) from University of Glasgow (1998). Chartered Member of Engineers Ireland	James Redmond is a Chartered Mechanical Engineer and a Director in IN2 Engineering. James has over 20 years' experience as a consultant mechanical engineer delivering large commercial, residential and healthcare projects.
Mr. David Rehill	Cronin Sutton Consulting Engineers	Land, Soils and Geology Water, Hydrology and Hydrogeology	Bachelor of Engineering, UCD (2003) Diploma in Project Management, TCD (2006) Masters in Business Administration, UCD (2013)	David is a Chartered Engineering with Engineers Ireland and the Institute of Structural Engineers and has been practicing as a consulting engineer for over eighteen years. David holds an undergraduate degree in Civil Engineering, a postgraduate Diploma in Project Management, and a Masters in Business Administration.
Dr Imelda Shanahan	TMS Environment Ltd	Air, Dust and Climatic Factors Noise and Vibration	BSc (Chemistry) from University College Dublin (1980) PhD (Physical Chemistry) from University College Dublin (1984) Chartered Chemist Fellow of the Royal Society of Chemistry	Imelda Shanahan has over 30 years experience in environmental monitoring and consultancy. She is a Chartered Chemist and a Fellow of the Institute of Chemistry of Ireland and a Fellow of the Royal Society of Chemistry. Imelda specialises in Noise and Vibration and Air Quality Impact Assessment and also works in Compliance Assessment, Environmental Risk Assessment and Waste Management. Imelda provides consultancy services to both public and private sector clients and has provided expert witness evidence at oral

Expert	Company	Aspect of the Environment	Qualifications	Summary of Professional Expertise
				hearings, court hearings and planning appeals.
Ms Claire Walsh	Archaeological Projects Ltd.	Archaeological Heritage	BSoC Archaeology and Sociology from University College Dublin (1982)	Claire Walsh is a partner in Archaeological Projects ltd and has worked for over 35 years primarily in development archaeology.

2. SITE LOCATION AND CONTEXT

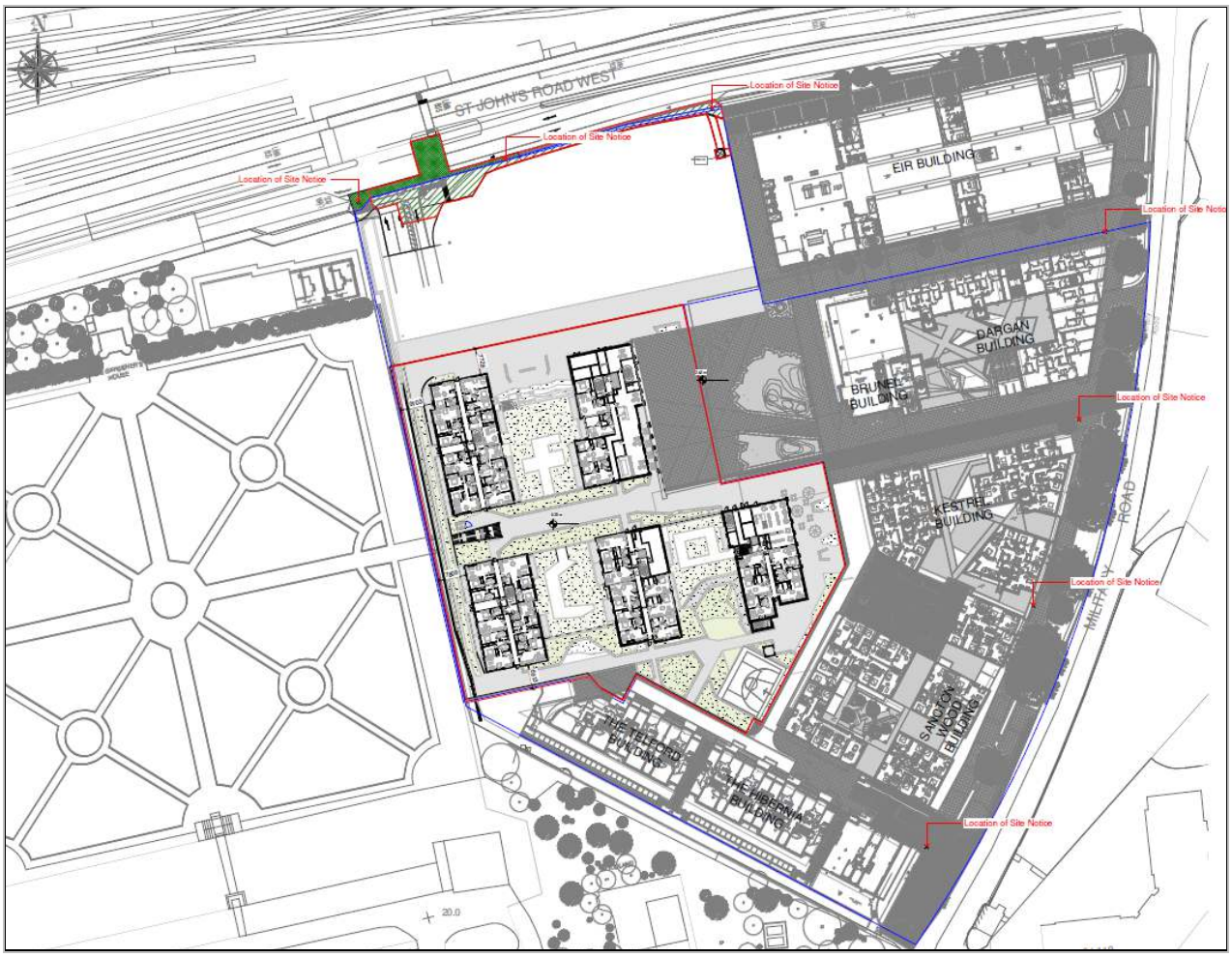
2.1 Site Location

The application sites form part of a larger development site known as Heuston South Quarter (HSQ). The HSQ site is bounded principally by St. John's Road West (to the north) and Military Road (to the east) and by the formal gardens of the Royal Hospital Kilmainham (RHK) to the west and south.

The HSQ site is in close proximity to Heuston Rail Station and the LUAS Red Line service and enjoy excellent connectivity to the City Centre. HSQ adjoins and is immediately accessible to major national and international tourist and cultural attractions including the Royal Hospital Kilmainham, IMMA, the Guinness Brewery and Collin's Barracks.

The St. John's Road West frontage is characterised as an urban road with the approach to Heuston station on the opposite side of the road. This transportation corridor is the main road and rail artery to the west of the country. The HSQ site provides a transition from the functional urban transportation character to the north to the high amenity grounds of the RHK and its formal gardens to the west.

Figure 2.1.1 Site Location: Excerpt from drawing No. P19-213D-RAU-ZZ-ZZ-DR-A-MPL-0002 prepared by Reddy Architecture and Urbanism.



The character of the HSQ site is defined by the established cluster of mixed-use buildings in office use,

residential use, cultural use and with retail at street level. The buildings are diverse in terms of built forms, façade treatments and material. The existing buildings address a network of open spaces areas, including urban hard landscaped areas and pedestrian routes and open space areas (local residential squares) and a Civic Plaza.

Vehicular access to the site is from St John's Road and Military Road, which lead to an existing communal basement level car park. The St. John's Road access is fully constructed and is serviced by a junction and traffic lights. Traffic approaching from the west can turn right at this junction and traffic from the City (east) can turn left as there is a slip lane designed to accommodate traffic onto St John's Road. The basement access ramp at St John's Road has been designed to accommodate incoming and outgoing traffic in a 4-lane design.

2.2 Site Description and Context

Approximately 60% of the larger HSQ site has been developed. These existing buildings are situated along the eastern parts of the site, addressing St. John's Road, Military Road and the RHK.

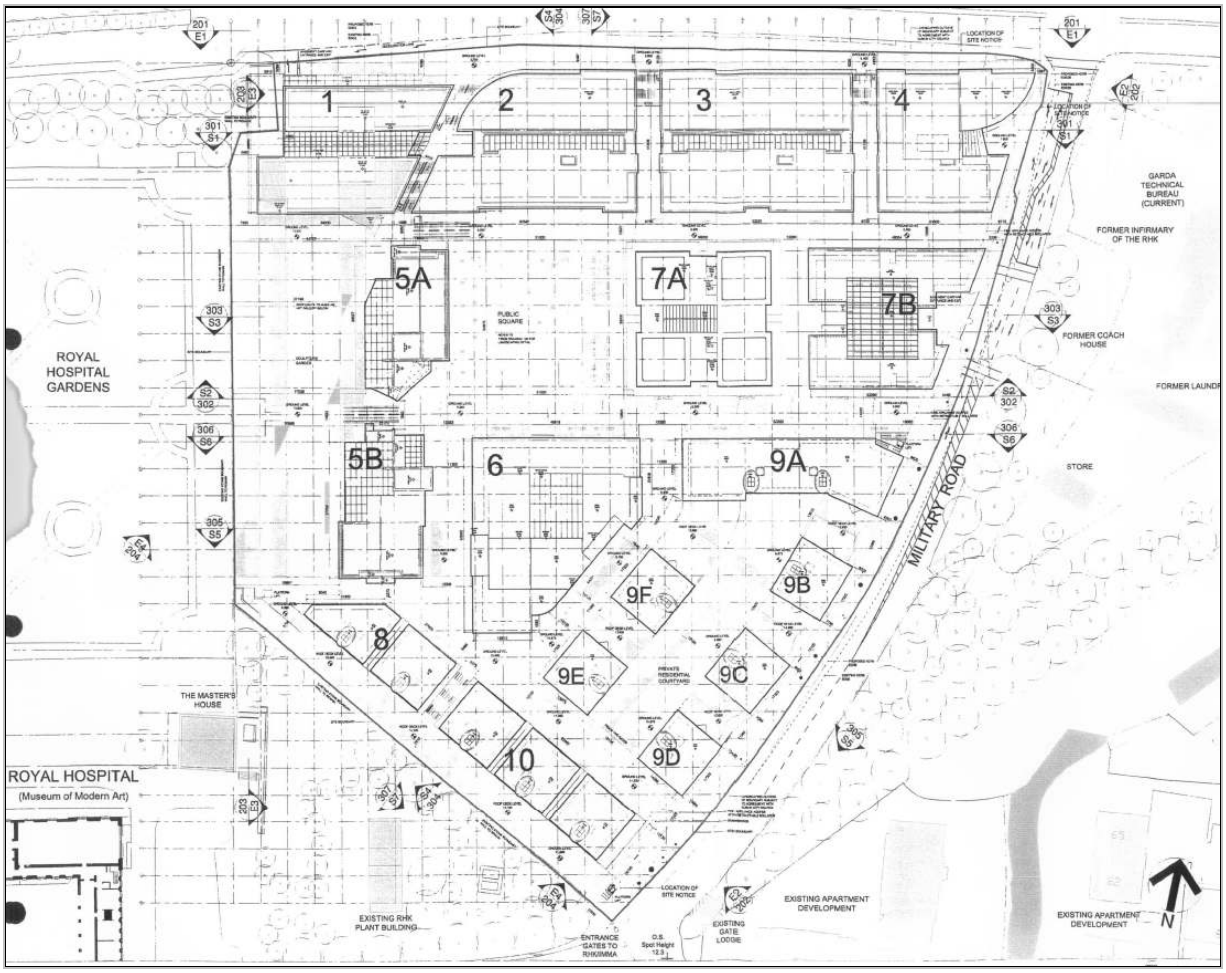
The subject site comprises part of an undeveloped area, which has been landscaped as an interim measure to improve the aesthetics of the site pending its complete redevelopment. The subject site is situated immediately to the north of The Telford and Hibernia Buildings (Blocks 8 and 10), adjoins the formal gardens of the Royal Hospital Kilmainham (RHK) to the west, and existing HSQ development to the east.

Adjoining the site to the north along St. John's Road West is an undeveloped site that is also controlled by the applicant. The applicant intends to develop this area for mixed use commercial purposes comprising an office block and hotel. This area will be the subject of a separate planning application to DCC under Section 34 of the Planning and Development Act over the coming months.

2.3 Relevant Planning History of the Wider HSQ Site

The planning history for the wider HSQ site dates back to September 2004 when the Parent Permission was granted under An Bord Pleanála Ref. PL29S.206528 (DCC Ref. 2656/03). After this grant of permission, a number of permissions for modifications of the parent permission and other planning permissions have been granted, as summarised below.

Figure 2.3.1 Site Layout Excerpt from the Non-Technical Summary Submitted in Support of Reg. Ref. DCC 2656/03, ABP Ref. PL29S.206528.



2.3.1 Overview of Relevant Planning History pertaining to the Larger HSQ Precinct

The 'Parent Permission' was granted on 16 September 2004 under An Bord Pleanála Ref. PL29S.206528 (DCC Ref. 2656/03). This permission provided for the development of the site for office, residential, retail, cultural and ancillary uses in 9 blocks.

The parent permission was subsequently amended by a modification permission granted on 26 May 2005 under DCC Planning Ref. 2218/05, which in turn was amended further on an incremental basis. A significant number of other modifications have been made to the Parent Permission within its lifetime. All elements of the Parent Permission have been modified in some way (Blocks 1 to 10 inclusive). These can be summarised as follows:

- Block 1 – Planning Ref. 1501/08;
- Block 2 – Planning Ref's 2218/05 and 1055/07;
- Blocks 5 and 6 – Planning Ref. 2821/06;

- Blocks 7a and 7b – Planning Refs. 1918/06, 3261/09, 2384/10; 2891/11; 3794/13; 2493/13; 3095/13; 2179/16; 3868/15; 2467/15 and 2378/16
- Blocks 8 and 10 – Planning Ref. 6434/05, 2264/07; 3465/11 and 2363/15
- Blocks 9 – Planning Refs. 4006/06, 5390/08; 2347/10; 2551/15 and 2366/18
- Front Boundary – Planning Ref. 2263/07.

2.3.1.1 Summary of Completed Development to Date (outside of application redline area)

- Block 3/4 is situated at the corner of St. John's Road West and Military Road and is occupied by Eir - formerly Eircom).
- Blocks 7A and 7B to the east of the application site comprise a mixed use development of Office, Retail and Residential development;
- Blocks 9a to 9h to the east of the application site comprise a mixed use development of Office, Retail and Residential development; and
- Blocks 8 / 10 that is situated to the south of the application site comprise a mixed use development of Office, Retail and Residential development.

2.3.2 Regularisation of 'As Built' Development – DCC Ref. 3494/13

DCC granted permission on 25 February 2014, under Planning Ref. 3794/13 for the retention of amendments to the permitted parent permission for a mixed use development at Heuston South Quarter (HSQ) under planning Ref. PL29S.206528 (Dublin City Council Ref. 2656/03, as subsequently amended planning permission Ref. 1918/06 in respect of Blocks 7Aa and 7B; planning permission Refs. 6434/05 and 2264/07 in respect of Block 8/10 and planning permission Ref. 4006/06 in respect of Block 9A to 9H. The principal amendments for which retention permission was granted under this permission relate to the following:

- External Alterations that affect the external appearance of the permitted blocks.
- Internal Alterations generally comprising of relatively minor internal reconfigurations that do not have a material impact in terms of increasing or decreasing previously permitted usable floorspace.
- Changes to the Configuration and Layout of Retail Units.
- Amendments to the Configuration, Layout and Sizes of Apartments.
- Changes of Use of permitted floorspace.
- Omission of a high level walkway along the Military Road elevation of the permitted buildings and on the return to St. John's Road.
- Alterations to the layout and configuration of circulation and common areas.

The permission has effectively regularised the 'as built' status of development on the developed parcel

of the HSQ site.

2.4 Planning History of the Subject Site

2.4.1 Interim Landscaping of Undeveloped Part of Site - DCC Planning Ref. 2724/13

DCC granted planning permission under Planning Ref. 2724/13 on the 19 November 2013 for temporary landscaping works in respect of the non-completed development areas of the site associated with Blocks 1, 2, 5 and 6.

The permitted works have been completed. The works provide for an interim landscaping strategy and site resolution works to mitigate the visual impact of unfinished building works, to enhance the aesthetic of the site and its relationship with the Royal Hospital Kilmainham Gardens, and to make temporary spaces that function within the context of the scheme. The development comprises of temporary landscaping works at Basement, Podium and Ground levels over an area of approximately 1.47 ha. These works include the treatment of ground and vertical surfaces, alterations to existing levels, provision of 4 no. temporary stair cores serving Basement -2; basement -1 and Podium Level; lighting, way finding signage, and boundary treatments including new boundary treatment to St John's Road West. The development also provides for the partial demolition of the partially constructed stair and lift core at the north-west corner of the site (adjacent to St Johns Road West) and the provision of low level HSQ branding signage and way finding feature on three sides (over an area of 176 sq.m approx.) on the retained element.

Condition 2 attached to this permission limits the duration of the permission to 8 years (2021) after which it is required that the *'permission shall cease and the structures shall be removed and the use hereby permitted shall cease, unless a further Permission has been granted before the expiry of that date.'*

2.4.2 DCC Planning Ref. 2774/14

An application was lodged under DCC Ref. 2774/14 and was withdrawn following a Third- and First-Party appeal against DCC's notification of decision to grant planning permission.

The development applied for was to complete the development on the Heuston South Quarter (HSQ) site. The proposed development comprised of 5 no. blocks on the sites of previously permitted, and commenced but uncompleted, Blocks 1, 2, 5, 6A and 6B (i.e. the subject site). The proposed development comprised of the following:

- 16,565 sq.m office floorspace;
- 565 sq.m retail floorspace;
- 1,099 sq.m fitness centre / gym;
- 4,187 sq.m of multi-purpose cultural space;
- 348 sq.m childcare facility; and

- 14,111 sq.m of residential development to provide 126 no. residential apartments, comprising of 21 no. 1 bedroom units, 79 no. 2 bedroom units and 26 no. 3 bedroom units.

A total of 235 no. car parking spaces and 328 no. bicycle parking spaces were proposed over two levels of extended basement, accessed from the existing vehicular accesses onto Saint John's Road West and Military Road.

The proposed development included for the demolition of elements of the partially constructed Blocks 1 and 2 (totalling 1,980 sq.m at Basement Levels -1 and -2). The development also included for public realm works, landscaping including parterre gardens, site preparation and excavation works, utilities connections, and provision of four no. ESB substations.

The proposed development was amended on foot of a request for Further Information. The principal amendments incorporated are as follows:

- Increase in the separation of the proposed new residential buildings 6A and 6B and the existing blocks 9A and 9H (minimum 18 m).
- Increase in the distance between the opposing facades between the proposed new residential buildings 6A and 6B to 18 m.
- The proposed amendments reduced the number of residential units by 15 no.

A first party appeal against the requirements of Condition 3 was submitted to ABP. However, as noted above this appeal was withdrawn prior to the determination of the first and third party appeals against DCC's decision.

3. DESCRIPTION OF DEVELOPMENT

3.1 Introduction

HPREF HSQ Investments Ltd. is applying to An Bord Pleanála for a permission to provide a residential development on an urban brownfield site of 0.93 ha. Sections 3.2, 3.3 and 3.4 of this chapter seek to provide the following information required by of Schedule 6 to the Planning and Development Regulations 2001:

> (a) a description of the physical characteristics of the whole proposed development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases
>
> (b) a description of the main characteristics of the operational phase of the proposed development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used, and
>
> (c) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.

The following consultants have been involved in the preparation of this chapter:

- Reddy Architecture and Urbanism (RAU) – Project Architects;
- Cronin and Sutton Consulting (CS)– Lead Engineers;
- IN2 Engineers (IN2) – M&E Engineers;
- Doyle + O'Troithigh (DOT)– Landscape Architects.

3.1.1 Overview of the Proposed Development

In summary, the proposed residential development accommodates the following:

The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over double basement level / podium level. The application site extends to 1.08 ha (10,825 sqm).

- Block A is part 12- and part 18-storeys in height. This block accommodates 154 no. apartments comprising: 12 no. studios, 108 no. 1 beds and 34 no. 2 beds;
- Block B is part 8- and part 12-storeys in height. This block accommodates 81 no. apartments comprising: 9 no. studios, 60 no. 1 beds and 12 no. 2 beds. It is proposed to provide a retail unit of 120 sqm (GFA) at the northern end of the block at podium level;
- Block C is part 9- and part 12-storeys in height. This block accommodates 86 no. apartments comprising: 19 no. studios, 45 no. 1 beds and 22 no. 2 beds. It is proposed to provide a 57 sqm amenity area in this block;
- Block D is a 5-storey in height and accommodates a total of 35 no. apartments comprising: 1 no. studio, 16 no. 1 beds and 18 no. 2 beds;

- Block E is a part 3-, part 5-storey block that accommodates a total of 43 no. apartments comprising: 5 no. studios, 21 no. 1 beds and 17 no. 2 beds.

It is proposed to provide a Retail unit of 120 sqm at podium level in Block B. The Retail space has a small garden to the east with an area dedicated for outdoor seating (150 sqm).

Indoor communal facilities with a total area of 533 sqm are proposed. Communal Outdoor Amenity space is provided in the form of rooftop terraces (totalling 1,179sqm), and lower-level communal courtyards between blocks (totalling 960sqm). Hard and soft landscaping works are proposed at podium level (totalling 1,680sqm).

Figure 3.1.1 Proposed Site Layout

Ancillary car parking to serve the proposed residential development is proposed at basement level. A total of 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces) and 4 no. motorcycle spaces are proposed to serve the proposed development. Secure bicycle parking is proposed at basement

level in the form of 300 no. double stacked cycle parking spaces providing capacity for 600 no. stored bicycles. An additional 52 no. Sheffield type bicycle stands are provided at podium level to provide 104 no. visitor cycle parking spaces.

Works proposed along the St John's Road West frontage include the omission of the existing left-turn filter lane to the vehicular ramped access to the HSQ development, re-configuration of the pedestrian crossings at the existing junction, and re-alignment of the existing footpath to tie into the reconfigured junction; and, provision of a link to a new lift to provide wheelchair access from St John's Road West to the HSQ podium.

A double ESB substation/switch room at ground / podium level within Block A, and a single substation/switch room at ground / podium level within Block B together with associated site development works, which includes the infilling of an existing vehicular access ramp at the southern end of the site between basement levels -1 and -2.

Table 3.1.1 Key Site Statistics

Site Statistics	Gross
Site Area	1.08 ha
Total Gross Floor Area Proposed	32,089 sqm
Footprint of Buildings	2,881 sqm
Plot Ratio	2.97
Site Coverage	26.7%

3.2 Characteristics of the Proposed Development

This Section has been laid out to describe the development under the following headings:

- Residential Development (Section 3.2.1)
- Ancillary Residential/Communal Facilities (Section 3.2.2)
- Commercial Development (Section 3.2.3)
- Open Spaces and Landscaping (Section 3.2.4)
- Public Lighting (Section 3.2.5)
- Service Infrastructure (Section 3.2.6)
- Demolition Works (Section 3.2.7)

3.2.1 Residential Development

The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over basement levels. The application site extends to approximately 1.08 ha, resulting in a gross residential density of c. 369 units per hectare. Each Block has an east / west aspect with dual aspect apartments on the corners. To the east, the residential

scheme faces on to a new public square. To the west the residential Blocks face the formal gardens of The Royal Hospital Kilmainham (RHK). It is proposed to provide private communal sunken courtyards for the residents between each Block and a new private communal landscaped garden to the southwest.

Figure 3.2.1.1 Ground Floor Plan Showing Block Layout

Block A rises from 12 storeys to 18 storeys from north to south. The total number of apartments in block A is 154 comprising; 12 studios, 108 no. 1 beds and 34 no. 2 beds. This block is served by one core. A communal roof garden (425sqm) is located at level 12 and is accessible from the main core of the Block. This communal garden stretches across the 'Bridge' element between Blocks A and B. There are 13 no. balconies on Block A on the east facing elevation.

Block B is 12 storeys at the highest level and steps down to 8 storeys to the south. This block is served by a single core. Block B accommodates 81 no apartments comprising: 9 no. studios, 60 no. 1 beds and 12 no. 2 beds. A roof garden is located on the 8th floor (136sqm). A retail unit of 120 sqm Gross Floor Area (GFA) is also included at the base (podium) level of Block B facing on to the new Public Square and walkway to RHK. There are a total of 38 balconies on Block B, 13 on the west facing façade, 15 on the east facing façade and 10 on the north facing façade.

Block C ranges in height from 9 to 12 floors. This block adjoins the public square to the north, a sunken courtyard to the west and garden to the south. Block C is served by a single central core and is connected with Block A via the 'bridge element' between floors 9-11 and has a private communal roof garden at level 9 (179sqm) and Level 12 (134sqm). This Block accommodates 86 no. apartments comprising: 19 no. studios, 45 no. 1 beds and 22 no. 2 beds. There are 16 balconies on Block C, on the east facing façade.

Blocks D and E are the most westerly blocks and directly face the RHK garden. Both blocks have sunken gardens at lower ground level facing west. Block D is a 5-storey building over basement with a set back at level 5 allowing for private patio area. This block accommodates 35 no. apartments comprising; 1 no. studios, 16 no 1 beds and 18 no. 2 beds. Block E ranges from 3 to 5 storey over basement also with a set back and private patio at level 5 and consists of 43 apartments, 5 no. studios, 21 no. 1 beds and 17 no. 2 beds. Both Blocks have a communal private amenity gardens at roof level (145 sqm and 160 sqm) There are 3 balconies on Block D and 4 balconies on Block E, facing west.

Table 3.2.1.1 Breakdown of Residential Unit Types

Description	Quantity	Mix %
Studios	46	11.5%
1 Bed, 2 Person Apartments	250	62.7%
2 Bed, 3 Person Apartments	13	3.3%
2 Bed, 4 Person Apartments	90	22.5%
TOTAL	**399**	**100**

Table 3.2.1.2 Description of Apartment Types

Type	Area	Aspect	Total No. of This Type
S.1	38	Single	10
S.1.1	38	Single	1
S.2	38	Single	8
S.3	39	Single	19
S.4	42	Dual	3
S.5	37	Single	1
S.6	41	Single	1
S.7	38	Single	2

Type	Area	Aspect	Total No. of This Type
S.8	41	Dual	1
1.1	52	Single	19
1.1.2	46	Single	3
1.1D	51	Dual	31
1.2	46.8	Single	32
1.2.1	45	Single	11
1.2D	47.8	Dual	70
1.3	46	Single	13
1.4	46.1	Single	10
1.4.1	46.1	Single	1
1.5	45.2	Single	12
1.5D	45	Dual	6
1.6	46.9	Single	11
1.6D	46.7	Dual	6
1.7	46.0	Single	1
1.8	63.8	Single	1
1.9	51.8	Single	12
1.10	45	Single	1
1.11	48.6	Single	2
1.12	52	Single	1
1.13	51	Single	7
2.1	76	Single	12
2.1D	76	Dual	1
2.2	77	Single	11

Type	Area	Aspect	Total No. of This Type
2.3	78.5	Single	1
2.3D	74.2	Dual	11
2.4	73.3	Single	17
2.5	74.3	Single	17
2.6	64	Single	12
2.7	75.8	Single	8
2.8	76.8	Single	1
2.8D	83.4	Dual	5
2.9	75.8	Single	4
2.10	73	Single	1
2.11	75	Single	1
2.12	63	Single	1
Total			399

Figure 3.2.1.2 Typical Floor Plan showing Block Layout

3.2.1.1 Design to Reduce Climate Impacts

The scheme has been designed to minimise the climate impacts of the scheme. Tables 3.2.1.1.1 to 3.2.1.1.5 list the design features of the scheme that are intended to reduce climate impacts through energy efficiency, reduction of waste and carbon emissions.

Table 3.2.1.1.1 Design measures to Reduce Energy Used for Lighting

Measure	Description	Benefit
Maximisation of natural daylighting to units	Apartments are designed with an east/ west aspect, avoiding north facing light. Large windows are included to all apartments to maximise daylight.	More daylight into the apartment
Energy Efficient External Lighting	External lighting will comply with the latest standards and achieve: • Low-level lighting • Utilise low voltage LED lamps	Lighting will be designed to achieve the required standards, provide a safe environment for pedestrians, cyclists, and vehicular traffic,

	• Minimum upward light spill Each light fitting is to be controlled via an individual Photoelectric Control Unit (PECU). The operation of the lighting shall be on a dusk-dawn profile.	provide surveillance and limit the impact on the artificial lighting on surrounding existing flora and fauna.

Table 3.2.1.1.2 Materials Chosen to Minimise Climate Impacts

Measure	Description	Benefit
Material selection.	Brick, Stone, Glass	Materials picked to be durable and to require less maintenance.
Green Roofs. Proposed	Sedum Roof	Allows for more insulation to roof, used to filter rain water

Table 3.2.1.1.3 Design Measures for Thermal Energy Efficiency

Measure	Description	Benefit
Nearly Zero Energy Building specifications (nZEB)	The development will achieve nZEB standards for energy consumption as defined within the Part L building regulations	Reduced energy consumption correlates with reduced carbon emissions
BER targets	A Building Energy Rating (BER) certificate will be provided for each unit in the proposed development. This will provide detail of the energy performance of the units. This is calculated through energy use for space and hot water heating, ventilation, and lighting and occupancy. It is proposed to target an A2/A3 rating for the apartments this will equate to the following emissions. A2 – 25-50 kWh/m2/yr with CO2 emissions circa 10kgCO2/m2 year A3 – 51-75 kWh/m2/yr with CO2 emissions circa 12kgCO2/m2 /year	A BER rating demonstrates a reduction in energy consumption and running costs
Highly insulated building fabric	Proposed U-Values will be in line with the requirements set out by the current & proposed Part L including Nearly Zero Energy Buildings targets. "Conservation of Fuel and Energy Buildings other than Dwellings".	Lower U-values will be achieved to reduce the amount of heat loss throughout the building fabric, lowering the consumption of energy and therefore carbon emissions.
Thermal bridging	Thermal bridging at junctions between construction elements and at other locations to be minimised in accordance Paragraphs 1.2.4.2 and 1.2.4.3 within the Technical Guidance Documents Part L. See Table 1 of Part L, Building Regulations (Appendix C).	Thermal bridging reduces the amount of heat loss throughout the building fabric, lowering the consumption of energy and therefore carbon emissions.
Airtightness	The building	Improved airtightness will be achieved to reduce the amount of heat loss throughout the building fabric, and

		lower the consumption of energy and therefore carbon emissions
Mechanical Heat Recovery Ventilation (MHRV)	The ventilation for the apartments shall be provided by a mechanical system with central extract and operating on the principle of Demand Control Ventilation (DCV)	Improved air quality and reduced costs in providing alternative heating etc.
Lighting	Shall be designed and specified in accordance with the BER requirements in each unit and in the landlord areas in accordance with Part L.	Lower consumption of energy and therefore lower carbon emissions.

Table 3.2.1.1.4 Design Measures to Reduce Waste During Operational Phase

Measure	Description	Benefit
Storage of Non-Recyclable Waste and Recyclable Household Waste	The inclusion of a centralised bin storage area. Access to all residents to Domestic waste management strategy in place: 1) Grey, Brown and Green bin distinction reduce the risk of littering within the scheme and reduces potential waste charges. 2) Regular tendering for waste management collection	Access to all residents to reduce the risk of littering within the scheme and reduces potential waste charges.
Composting and glass bins	Addition of organic waste bins to be provided throughout the development	Helps to reduce waste charges and the amount of waste going to landfill.

Table 3.2.1.1.5 Design Measures to Reduce Emissions from Transportation

Measure	Description	Benefit
Access to Public Transport	Luas Red Station 10 minutes Walk. Dublin Bus stop 2638 is 5 minutes walk serving 51D, 79, 79A and 717 routes. Heuston National Rail Station is 10 minutes Walk from Site.	This demonstrates the excellent connectivity of the site to range of transport modes serving the city and country.
Use of E-Car	There are a number of EV charging points being proposed in the new car park.	This will allow residents to charge cars on site.
Bike Friendly Scheme	A total of 500 secure bicycle parking spaces and an additional 78 surface bicycle stands is proposed in the scheme.	This benefits active travel and adds to the connectivity of the site for residents.

3.2.1.2 Access & Parking

The scheme is accessed on foot from the east via Military Road, through the existing Heuston South Quarter complex into the proposed public square. Access from the north is from St. John's Road into the proposed public square.

Bicycle access to the basement bike storage is via a dedicated bicycle lift from podium level, as well as via internal stair cores and lifts within the proposed buildings. Bicycle access to basement level is also possible via the existing protected bike ramp which runs in parallel to the vehicle ramp from Military Road. In

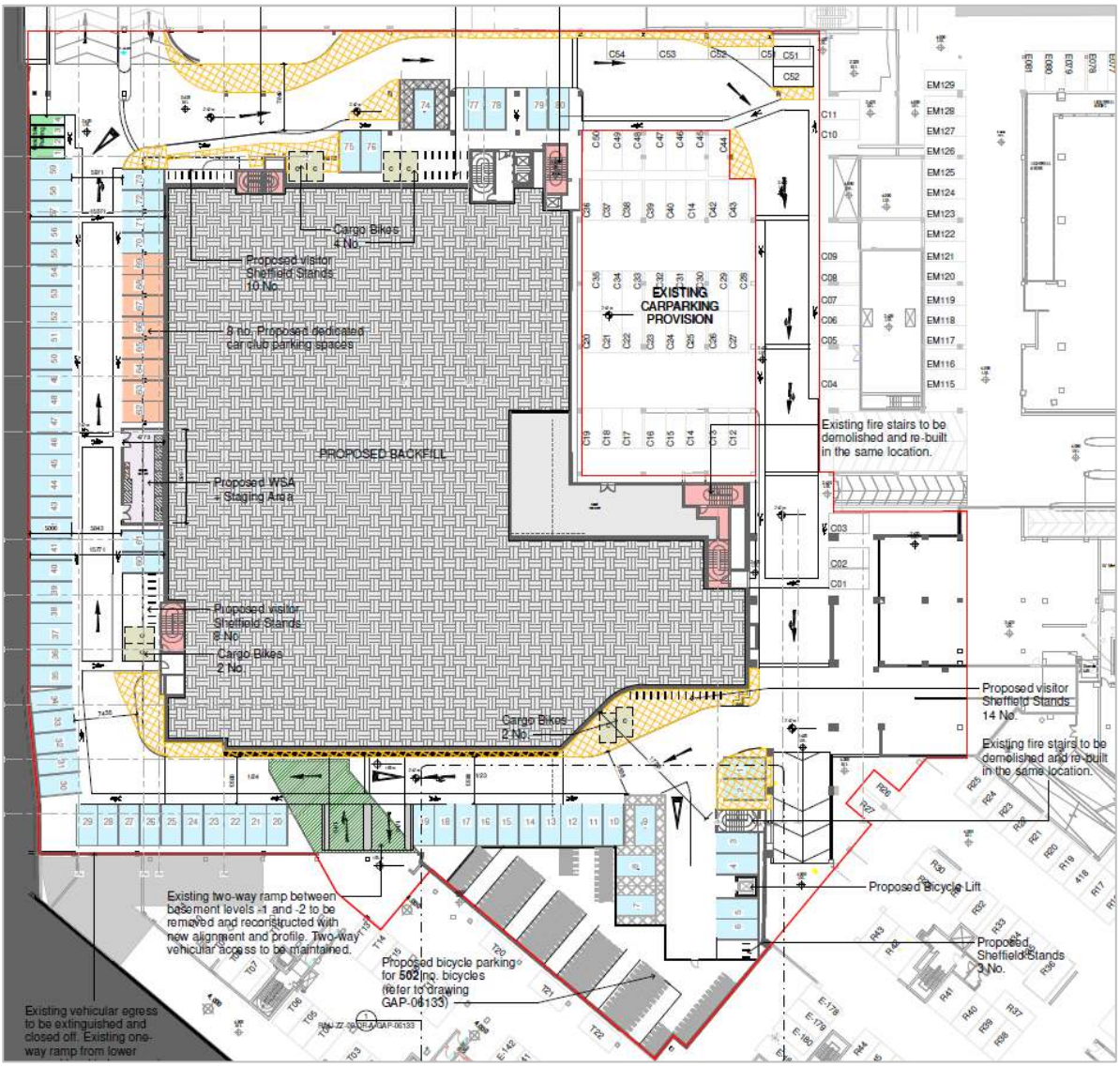
addition, there is an existing elevator to the south of Military Road. Finally, the elevator within the proposed Block A will facilitate the movement of bicycles from the central podium to the basement bike storage area.

A total of 710 no. bicycle parking spaces is provided within the scheme. It is proposed to provide 251 no. double stacked residents' cycle parking spaces within a secure bicycle store at basement Level -1, providing capacity for 502 no. bicycles. 49 no. Sheffield stands are also provided at basement Level -1, providing 92 no. visitor cycle parking spaces and an additional 6no. residents' cycle parking spaces. A further 55 no. surface Sheffield stands are provided at podium level, adding a further 110 no. visitor cycle parking spaces to the total (see Figure 3.2.1.2.1). Of the proposed Sheffield stands at basement and podium levels, 7 no. shall be spaced to accommodate cargo bikes (equating to 14 no. cargo bike spaces).

Vehicular access to the development will utilise the existing access locations at St John's Road and Military Road. The ramps at these two locations bring vehicles to the basement Level -1. A series of internal split level basement ramps further provide access to the lower basement Level -2 within the existing HSQ complex. The scheme will be served by 80 no. carparking spaces, of which, 4 no. are accessible spaces and 8 no. are dedicated car club spaces. 4 no. motorbike spaces are also included at this level. The basement level is connected directly to the residential blocks via dedicated cores that will bring the residents to their respective Blocks or to Podium Level.

Facilities for the charging of battery electric vehicles (BEVs) shall be provided at 8 no. internal car parking spaces, representing 10% of the development's total car parking provision. All remaining car parking spaces within the development shall be 'future-proofed' by the inclusion of ducting and/or cabling to permit the rapid future installation of BEV charging points, as defined in the ESB ecars specification document no. 18017 (Public Charge Points, last reviewed February 2012).

Figure 3.2.1.2.1 Proposed -1 Basement Plan



3.2.1.3 Description of Materials

The core design principles of Legibility, Variety and Proportion have been utilised to select appropriate materials for this sensitive site.

Legibility: The two central elements (Block A + B) at the bridge are clad in stone creating a more formal relationship with the RHK Art Museum and Gardens. The West Elevations of the proposed blocks do not have balconies as these facades face the RHK gardens.

Variety: Stone and Brick are the primary materials used in the scheme. The stone facades adjoin the more formal RHK gardens and building. Brick facades, with small portions of stone wrapping around the ground level of Blocks A and B, face east to create visual interest and variety at the public plaza.

The Stone will be a 40mm thick Portuguese limestone with a honed finish or similar. The brick will be a buff brick, Ivanhoe cream by Ibstock or similar. Each material will be agreed with the local authority on site prior to any construction taking place and a mock-up of the facades will be built in order to test and

agree the materials.

Proportions: The windows and upper levels of each block are designed to accentuate the verticality of the scheme. The proposed glazed bridge element creates an arched entrance to the scheme, and to city when viewed from RHK.

Figure 3.2.1.3.1 Proposed East Elevation

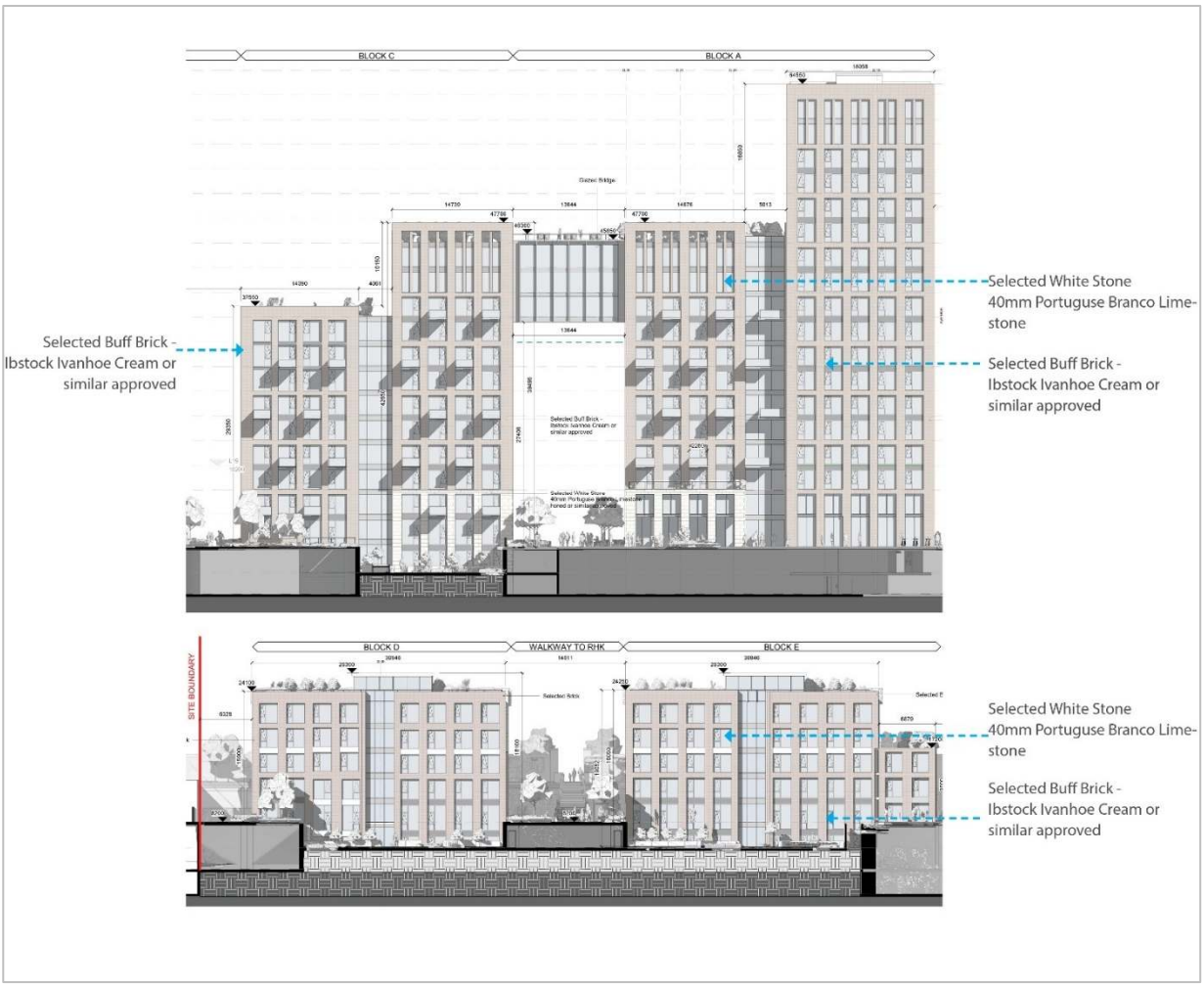
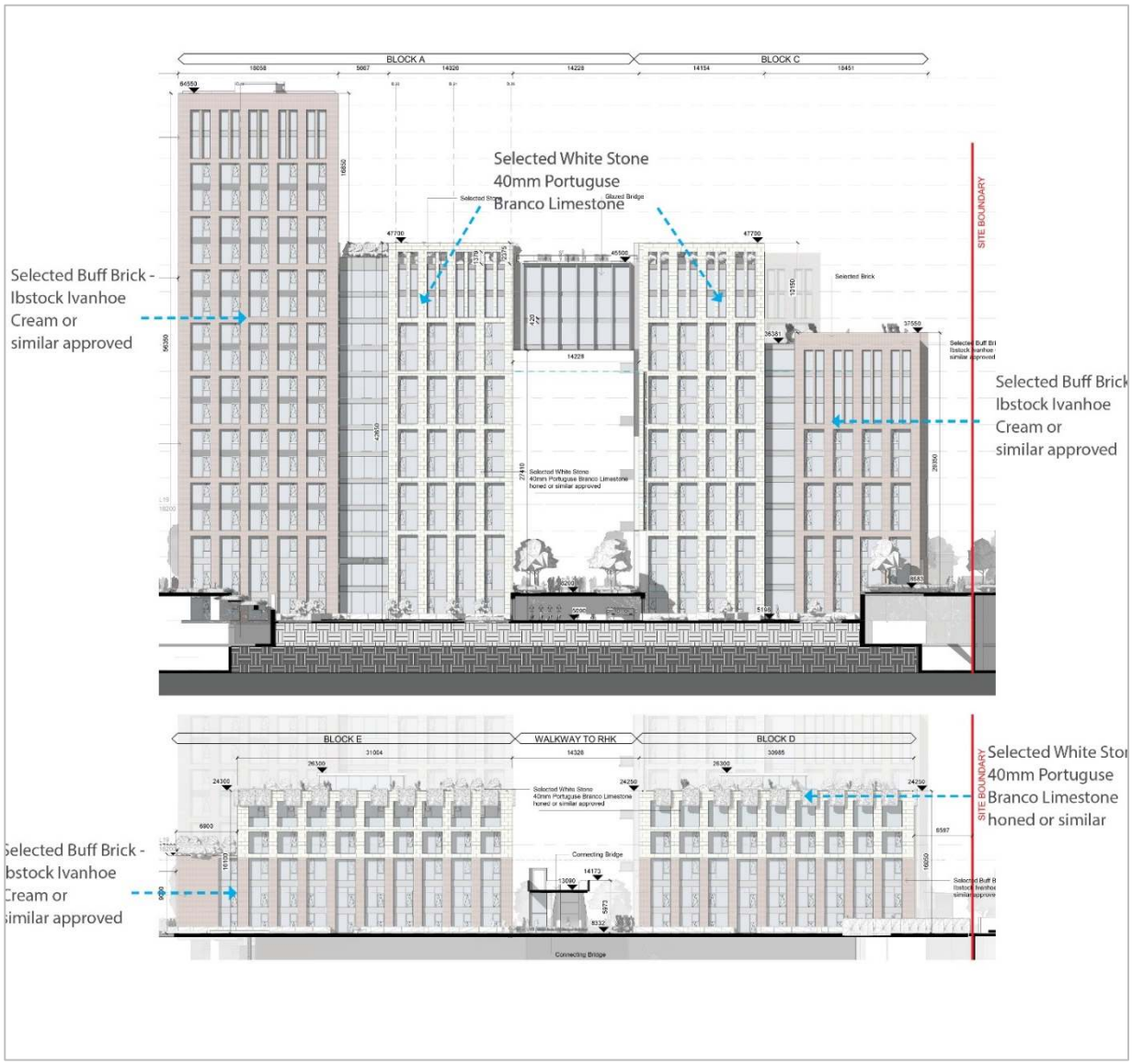


Figure 3.2.1.3.2 Proposed West Elevation



3.2.2 Ancillary Residential/Communal Facilities

The proposal includes internal and external amenity spaces available to all residents. These are spread out across the scheme easily accessible from all Blocks. The external courtyards are professionally landscaped and comprise a mix of planting, seating and a multi-use games area.

Figure 3.2.2.1 Location of Proposed Communal Facilities and Retail Unit

3.2.2.1 Internal Communal Amenity Facilities

In total, 533 sqm of internal community amenity space is proposed. The internal amenity areas for the residents are located within easy access of all Blocks and Cores. At Lower Ground Level it is proposed to provide a fully equipped gym (102sqm) with changing facilities and toilets included within. Next to the gym is a residents' lounge / co working area (178sqm). Both of these areas are accessed from the sunken courtyards and are easily accessible from all residents' cores without having to go outside. (see diagram above)

At Ground Level it is proposed to provide a residential foyer lounge of 78 sqm within Block A, which is intended to act as a lounge / informal gathering area with access to the Public Plaza. At this level there are an additional two lounge areas of 84 sqm and 34 sqm. In Block B there is a family / lounge room with direct access to the public square and walkway to the RHK (57sqm).

3.2.2.2 External Communal Amenity Facilities

It is proposed to provide 3,819 sqm of external communal amenity. A series of 3 no. landscaped sunken gardens with planting and seating are provided with direct access from all blocks and to the main gym / lounge area. These areas are 960sqm in total. At podium level is it proposed to provide a landscaped garden of 1,680 sqm in the southern end of the site, which will include a multi-use games area, seating, gardens and quiet spaces. Each of the proposed Blocks has access to landscaped private communal Roof

gardens with views towards the RHK gardens to the west and city to the east (total area 1179 sqm). Each roof garden has been designed to mitigate any wind to provide a comfortable secure space for residents to enjoy.

3.2.2.3 Private Amenity Areas

Balconies and Patio areas are proposed to provide private amenity to residents. The balconies are primarily located on the eastern elevation to preserve the views from RHK to the immediate west of the site. A total of 74 no. no. balconies are proposed. Private Patio gardens are provided at Lower ground level and ground level to 22 apartments. In total, 95 no. private open spaces are proposed, which represents 24% of the total scheme.

3.2.3 Commercial Development

It is proposed to provide a Retail unit of 120 sqm at podium level facing onto the Public Square in Block B. This unit provides active frontage on to the square on the southern side. The Retail space also has a small garden to the east with an area dedicated for outdoor seating (150 sqm).

3.2.4 Open Spaces and Landscaping

The layout of the external amenity areas to the development are proposed over three levels, with a lower level of communal courtyard gardens, a podium level providing a mix of public and communal open space and a series of roof terraces which deliver passive amenity to the residents.

There are three communal courtyard gardens located as follows, the first between block A and E, the second between block C and D and the third block B and C. These courtyard gardens have been designed to deliver passive and visual amenity to the residents and work as garden spaces. Their layouts have been designed taking into consideration their location, environment and aspect while providing a buffer of planting between their central communal area and the private apartments which surround them.

Courtyard 1 between block A and E provides a communal area of 390 Sq/mtr in which includes 135 Sq/mtr of ornamental planting, 160 Sq/mtr of grass areas 5 linear mtrs of bench seats and 90 Sq/mtr of pathways.

Courtyard 2 between block C and D provides a communal area of 340 Sq/mtr which includes 166 Sq/mtr of ornamental planting, 95 Sq/mtr of amenity grass area 7 linear mtrs of bench seats and 72 Sq/mtr of pathways

Courtyard 3 between block B and C has a communal area of 230 Sq/mtr which includes 53 Sq/mtr of ornamental planting, 81 Sq/mtr of amenity grass area 7 linear mtrs of. bench seats NS 89 Sq/mtr of pathways.

Collectively Courtyards 1,2 and 3 provide 960Sq/mtr of communal open space.

The planting for the courtyard gardens has been selected to work within these shaded areas and includes light canopy trees (Betuala jacquemontii, Magnolia Galaxy, Sorbus aucuparia) ornamental shrub and hedge plants (prunus otto luyken, Rudbeckia goldstrum, Saracococca confuse, Helleborus orientalis, Hydrangea limelight, viburnum davidii, carpinus betulus) and bulb planting (Narcissus thalia, and Tulip 'Triumphator').

The layout and arrangement of each of the three courtyards allows for the provision of social spaces which can accommodate passive and small-scale active recreation for the residents, working as a 'garden space'. The pathway surface is a compacted 'ballylusk' gravel which provides safe tactile surface suitable for all age groups and abilities.

The podium level can be separated into three distinct areas. Area 1 is a continuation of the current plaza design intent, area 2 is the development of a east -west public route way from Military road to the gardens of the Royal Hospital Kilmainham. This routeway forms the central spine of the development with the public plaza Blocks A and E to the north of the route and Block B, C and D to the south. The materials proposed in the extended public plaza are as per those currently on site allowing for a seamless continuation of the current design to the façade of Block A to the west and the central spine pathway to the south. The materials of the central pathway are a continuation of those used in the current pathway extending into the built phase 1 development from Military Road. The sizing, colour and pattern of paving is as per those currently on site. The central spine route while delivering a direct east west connection from Military Rod to the gardens of the Royal Hospital Kilmainham also provides direct access to each of the 5 Apartment blocks A, B, C, D and E. The access thresholds to each is framed with natural paving and visitor bike parking of which there are 52 Nr. visitor bike stands to the podium level.

To the south of Block B, C and D a series of communal amenity areas are provided for the residents these areas provide opportunities for active and passive recreation. Their design includes, ornamental shrub planting feature tree planting, low seating walls, grass areas, ping pong tables, informal play areas and a MUGA (Multi Use Games Area). These communal areas are separated from the public area of the podium through a 1100mm high railing which where appropriate is set within the planting areas to reduce the visual impact.

Collectively the public and communal areas of the podium provide; 1,670Sq/mtr which includes ornamental planting, 89 Nr. trees, 794 Sq/mtr of amenity grass areas, 161 Linear mtr of low seating walls, 52 Nr. visitor bike stands allowing for the parking of 104Nr. Bikes, with an additional 6 Nr. cargo bike spaces a MUGA with an area of 135 Sq/mtr, 225 Sq/mtr of social amenity spaces and 1 ping pong table. The surface to the communal areas is a mix of precast concrete paving and a compacted 'ballylusk' gravel.

Similar to the courtyard gardens the planting to the public and communal areas of the podium have been selected to deliver year-round interest, includes species currently found within the gardens of the Royal Hospital Kilmainham and works within the post construction site environment. The tree species selected include Tilia eur 'Pallida', Fagus Syl Dawyck Gold, Acer campestre and, Betula pubescens, the ornamental shrub and grasses include Calamagrostis Karl Forester, Syringia vulgaris, Choisya ternate sundance. Allium, Tulip and Daffodills are also spread across the planted areas to provided burst of colour in spring and summer.

An important planted area of the podium level is the western boundary to the gardens of the Royal Hospital Kilmainham, the base of the wall is planted with shade tolerant Parthenocissus species including henryana, quinquefolia, tri veitchii with Trachleospernum jasminoides these climbers will establish to provide a 'green' façade to the boundary wall, the base of the wall is also planted with a Prunus Lusitanica. Angustofolia hedge.

Each of the Apartment Blocks A, B, C, D and E have been provided with roof terraces, these have been designed to deliver passive amenity areas maximising views west to the gardens of the Royal Hospital

Kilmainham. Each of the terraces provides planting with visual interest, seating, and amenity areas to allow for the creation of social spaces. The terraces to blocks D and E include outdoor gym / exercise areas which are finished in a soft rubber surface for use as a potential dance / yoga / gym / toddler play area.

The Block A roof terrace is 217 Sq/mtr in area, with 56 Sq/mtr of planting, 99 Sq/mtr of grass area, 5 linear mtr of. seats and 57 Sq/mtr of pathways. The roof terrace area above the link between Block A and C includes 27.5 Sq/mtr of planting, 65 Sq/mtr of grass area, 4 Linear mtr of seating and 111.5 Sq/mtr of pathway giving a total area of 208 Sq/mtr. The roof terrace to Block C has a total area of 313 Sq/mtr with 64 Sq/mtr of planting, 90 Sq/mtr of grass area, 9 Linear mtr of seating and 150 Sq/mtr of pathways

Collectively the Block A, Block C and Link / Bridge roof terraces have a combined area of 738 Sq/mtr.

The roof terrace to Block B, is 144 Sq/mtr in size with 20 Sq/mtr of planting, 56 Sq/mtr of grass area, 3.5 linear mtr of seats and 64.5 Sq/mtr of pathways. The minimum area required for the Block B roof terrace is 136 Sq/mtr.

To Block D, the terrace has an area of 145 Sq/mtr with 20 Sq/mtr of planting, 48 Sq/mtr of grass area and outdoor gym / exercise area of 28 Sq/mtr 8 Linear mtr of seating and 42 Sq/mtr of pathway

To Block E the roof terrace has an area of 160 Sq/mtr which includes 32 Sq/mtr of shrub planting, 26 Sq/mtr of grass area 40 Sq/mtr of an outdoor gym / exercise area 8 Linear mtr of seating and 55 Sq/mtr of pathways.

To all external areas the layout of the lighting as prepared by IN2 has been designed with the landscape to deliver the LUX levels required in a manner which is visually appealing to the overall aesthetic of the public and communal open space areas.

The location and positioning of the landscape open spaces have been considered in detail as part of the design development stage. They have been examined in terms of proximity to end users, their post construction environment, the delivery of year-round visual interest with areas of passive and active amenity for all age groups and abilities, benefitting the health and lifestyle of the end user. The open space arrangements are varied in size and form, aspect and function and will provide a range of opportunities for the future users of the scheme. These spaces have the ability with the surround-built elements to create a localised character offering an opportunity for living and play.

Figure 3.2.4 Excerpt from Landscaping Masterplan

3.2.5 Public Lighting

The proposed public lighting within the development has been designed by IN2 Engineering in accordance with the requirements of BS 5489-1 (2003) Code of Practice for the Design of Public Lighting.

3.2.6 Service Infrastructure

3.2.6.1 Potable Watermain Network

There is a 450mm diameter public watermain along Military Road, along the east of the existing HSQ complex, from which an existing potable water connection serves the development site. A Pre-Connection Enquiry has been submitted to Irish Water, to allow an assessment of the local & regional infrastructure's capacity to accommodate increased potable water demand from the proposed development. Irish Water has indicated its requirements for facilitating such demand, and has noted that a formal connection agreement will be required prior to services being made available.

Table 3.2.6.1 Proposed Potable Water Network

Surface Drainage Schedule		
Pipe Diameter (mm)	**Length (m)**	**Materials Used**
100 mm	474.5 metres	Polyethylene (PE)

3.2.6.2 Foul Network

There is a 300mm diameter dedicated foul public sewer along St. John's Road, flowing west to east. This dedicated line was constructed as part of the initial HSQ development works in 2003/2004. There is an existing connection from the development site to this combined sewer, and the proposed foul effluent generated by the proposed development will discharge to this manhole. As required, a Pre-Connection Enquiry has been lodged with Irish Water to allow an assessment of the local & regional infrastructure's capacity to accommodate foul drainage discharge from the proposed development. Irish Water has indicated its requirements for facilitating such discharge, and has noted that a formal connection agreement will be required prior to services being made available.

Table 3.2.6.2 Proposed Foul Drainage Network

Foul Drainage Schedule		
Pipe Diameter (mm)	**Length (m)**	**Materials Used**
225mm	681.2m	Concrete/ Thermoplastic SN8
100mm	51m	Concrete/ Thermoplastic SN8

3.2.6.3 Surface Water Drainage Network and SUDS Facilities

There is a dedicated 375mm public surface water sewer along St. John's Road, flowing from west to east. The sewer connects into the culvert of the River Camac. This dedicated line was constructed as part of the initial HSQ development works in 2003/2004. Attenuation is provided within the site, and the proposed surface water discharge is limited as per the Greater Dublin Regional Code of Practice for Drainage Works (Version 6). The attenuated flow will discharge to an existing private manhole, before flowing via gravity to the dedicated 375mm public surface water sewer on St. John's Road.

The proposed scheme will have a separate, attenuated storm water drainage system designed in accordance with the Greater Dublin Strategic Drainage Study and the Regional Code of Practice for Drainage Works. Both documents are used within the jurisdiction of Dublin City Council. The first aspect is to reduce any post development run-off to pre-development discharge rates. The second aspect is the policy of the Local Authority to include Sustainable Drainage Systems (SuDS) for all new applications. As such, it is proposed to use a range of SuDS devices for the scheme. These are listed below:

- Water butts for local water rainwater reuse;
- Use of green roof technology to cater for the initial interception storage (refer to architect's plans),
- Low water usage appliances, to restrict potable water demand; and
- Attenuation tank with flow control device, sized to contain a 1-in-100-year storm event and

increased by 20% for predicted climate change effects, to limit discharge from the site during extreme rainfall events.

The storm water flows from the development are released via a flow control device limited to 5.0l/sec, as per Dublin City council requirements.

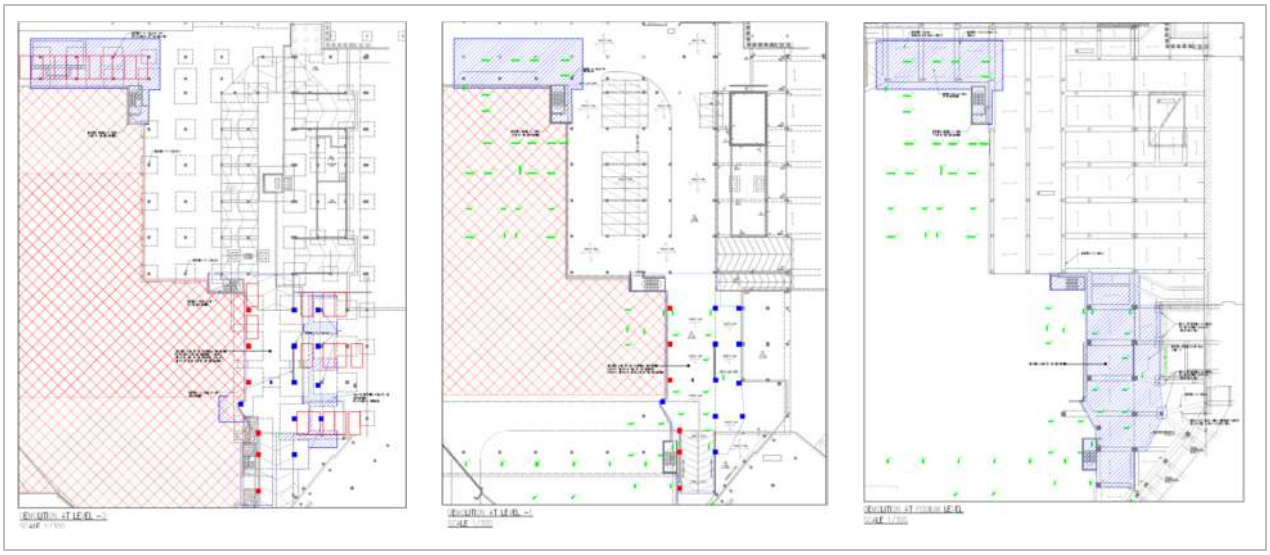
Table 3.2.6.3 Proposed Surface Water Drainage Network

Surface Drainage Schedule		
Pipe Diameter (mm)	**Length (m)**	**Materials Used**
225 mm	492.9m	Concrete/Thermoplastic SN8

3.2.7 Demolition Works

Some localised demolitions will be required at the interface of the proposed Blocks A and B and the existing podium, as shown below in Figure 3.2.7.1. The demolition will involve the removal of part of the podium and Level -1 reinforced concrete slabs. The works shall be carried out using non-percussive techniques, such as small scale Brokk Concrete Munchers (or similar). It is expected that 800 to 1,000 m^3 of waste material will be created as part of these demolition works. The demolition material shall be segregated and disposed of at the appropriately licenced facilities.

Figure 3.2.7.1. Area of Existing Development to be Demolished (shown in blue)



3.3 Construction of Scheme

3.3.1 Construction Phase & Land Use Requirements

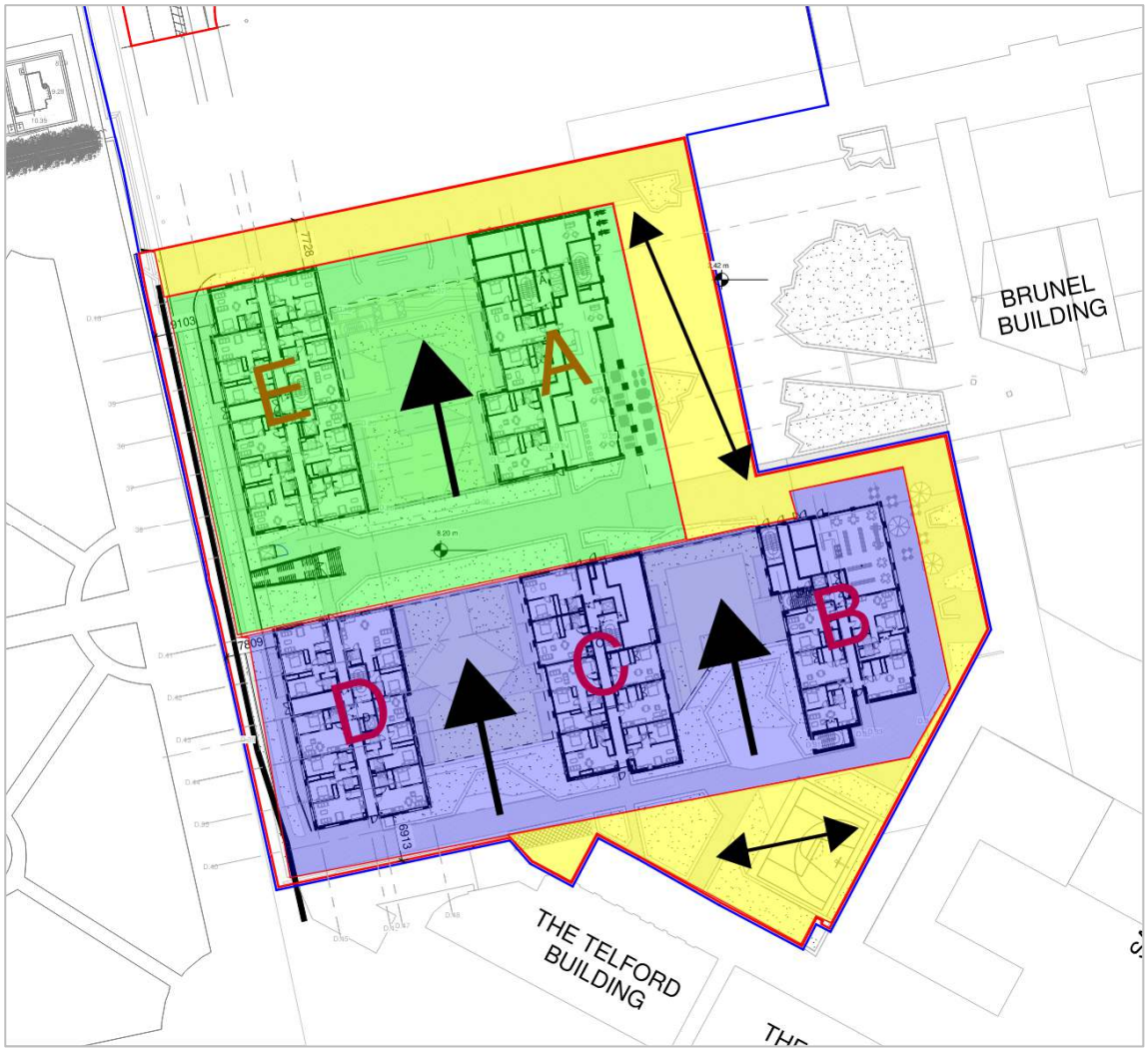
Subject to a successful grant of planning, it is intended for the works to commence in Q2 / Q3 2022. The proposed development is anticipated to be constructed over a period of approximately 24-30 months.

During the construction works, access to the existing development basement areas will be maintained, with car access encouraged to utilise the Military Road access point. An agreed traffic management

strategy for the existing basement carpark will be provided to all residents and staff currently utilising the basement. This traffic management plan will be monitored on an ongoing basis throughout the works and altered as required depending on construction sequence. Access for large servicing and delivery vehicles to the retail units, and delivery areas at basement level, shall also be maintained from St John's Road. Construction Traffic and the any interim temporary diversions of existing traffic, are addressed in the Traffic and Transport Assessment.

The shared access will necessitate a full time Traffic Management Operative at the St John's Road and Military Road access point for the duration of the works.

Figure 3.3.1 Indicative Phasing Plan



The current indicative phasing suggests that the blocks shall be constructed from South to North; i.e. Blocks B, C and D, followed by Blocks A and E (see Figure 3.3.1). Once the superstructures have advanced on the proposed blocks, the infill structure / podium will be constructed (as per yellow below). The final phasing, and associated Construction Traffic Management Plans shall be appointed by the appointed Contractor, and submitted to DCC for approval, prior to commencement.

The sequence and method of construction of the development will be confirmed with the appointed Contractor prior to commencement on site. The Contractor will be required to prepare a detailed

Construction Management Plan on foot of these proposals. The Construction Management Plan will ultimately include details on the following:

- Daily and weekly working hours;
- Agreed haul routes for incoming materials;
- Licensed hauliers to be used;
- Disposal sites;
- Travel arrangements for construction personnel;
- Appropriate on-site parking arrangements for construction personnel to prevent overspill parking on the local road network;
- Temporary construction entrances to be provided;
- Wheel wash facilities if required;
- Road cleaning and sweeping measures to be put in place if required;
- Temporary construction signage to be put in place and maintained;
- Any proposed traffic management measures such as temporary traffic lights and signage on any public roads.

A Traffic Management Plan (TMP) will be prepared for the works in accordance with the principles outlined below and shall comply at all times with the requirements of:

- Department of Transport Traffic Signs Manual 2010 – Chapter 8 Temporary Traffic Measures and Signs for Roadworks
- Department of Transport Guidance for the Control and Management of Traffic at Road Works (2010)
- Any additional requirements detailed in the Design Manual for Roads and Bridges (DMRB) & Design Manual for Urban Roads & Streets (DMURS)

3.3.1.1 Land Use

The exact location of the construction compound is to be confirmed in advance of commencement of the works (and agreed with Dublin City Council). The location of the construction compound is likely to be relocated during the course of the works, in line with the phasing of the development.

The construction compound will include adequate welfare facilities such as washrooms, drying rooms, canteen and first aid room as well as foul drainage and potable water supply.

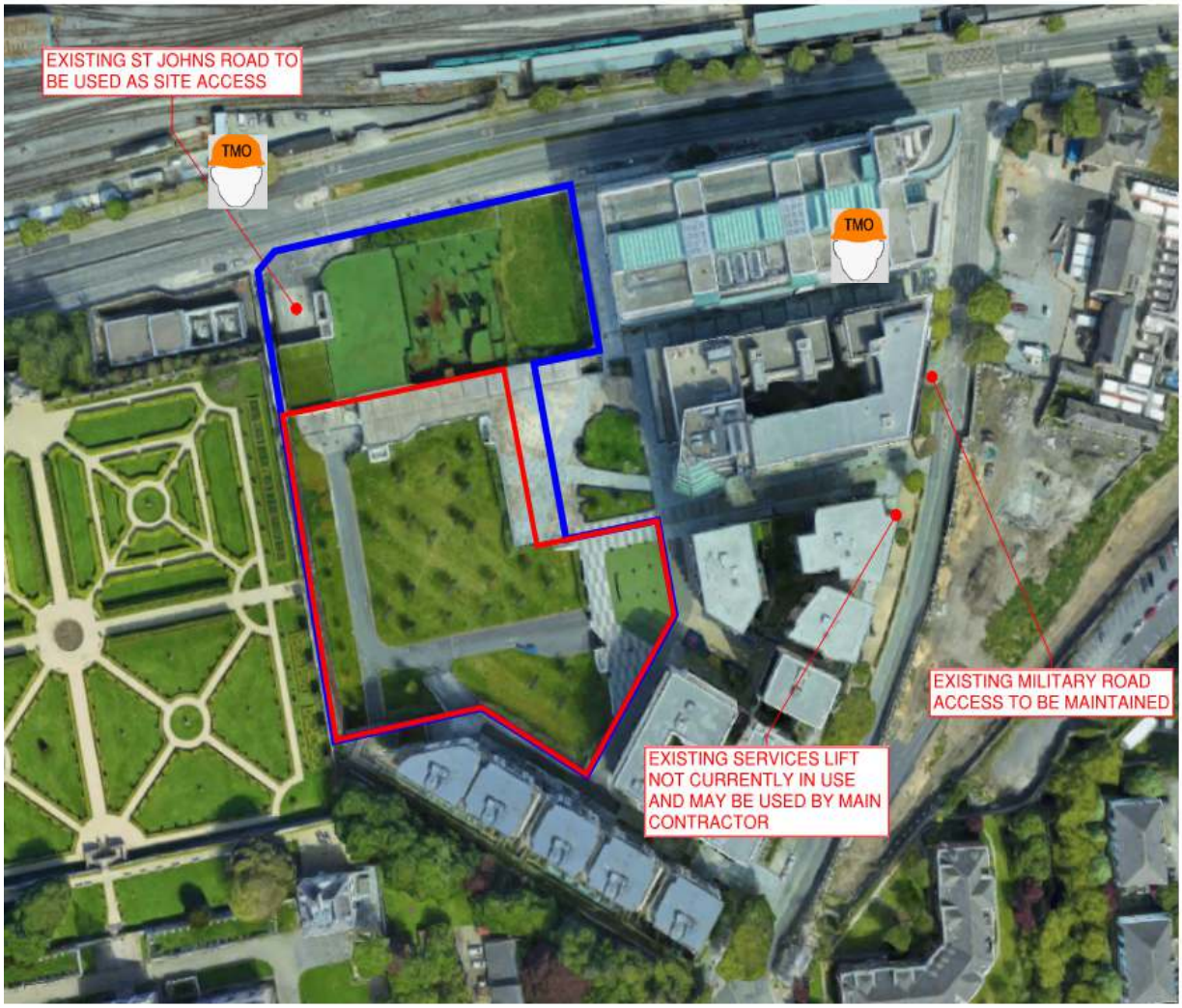
- Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials
- The construction compound will be enclosed by a security fence
- Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure
- A permeable hardstand area will be provided for staff car parking
- A separate permeable hardstand area will be provided for construction machinery and plant
- The construction compound will include a designated construction material recycling area
- A series of way finding signage will be provided to direct staff, visitors and deliveries as required
- All construction materials, debris, temporary hardstands etc. in the vicinity of the site compound will be removed off-site on completion of the works

3.3.2 Proposed Construction Works

3.3.2.1 Hoarding, Set-up of Site & Access/Egress Points

The site area will be enclosed with hoarding details of which are to be agreed with Dublin City Council as previously mentioned. Hoarding panels will be maintained and kept clean for the duration of the project. This will involve erecting the hoarding around the proposed site perimeter in line with the finished development description.

Figure 3.3.2.1 Location of Potential Construction Access to the Site



3.3.2.2 Removal of Services

Prior to site clearance, a utility survey will be carried out by the contractor to identify existing services. All services on site will be disconnected, diverted or removed as agreed with service providers.

3.3.2.3 Site Clearance

The existing land previously underwent construction works and the site may contain existing services and

hazards.

- The following is a high-level method statement for the demolition/break up of existing hardstanding.
- Establish a site set-up and welfare facilities.
- Prior to commencement of any earthworks, an invasive species inspection shall be carried out in accordance with the guidance outlined in the Wildlife Act 1976 and 2000 and further regulated through the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011). Should the survey identify any areas of Japanese Knotweed infestation, a Treatment Plan shall be developed in accordance with published guidelines (namely, *The Environment Agency, Managing Knotweed on Development Sites, Knotweed Code of Practice, 2013*). This survey will be undertaken to supplement the surveys undertaken to inform Chapter 6 of this EIAR, which did not record any invasive species.
- Carry out a detailed services survey of the site to identify all buried services, determine what services are live, redundant and potentially serve neighbouring properties. To be performed before any ground break up is performed on site.
- Carry out any necessary services diversions and decommissioning works.

Breaking ground will only take place following a full survey. Any materials identified as being hazardous will be removed and disposed of in strict accordance with the applicable legislation. All services will be disconnected and removed. Any existing slabs or hardstanding and concrete foundations will be broken by excavators. All reinforced concrete will be partially processed on site to separate the steel from the concrete. All materials will either be fully separated on site and disposed of to the applicable landfills / processing facility or failing that material will be sent to a processing facility for separation. Relevant certification and documentation confirming the final separation and most environmentally friendly disposal will be available.

3.3.2.4 Excavation

The current landscaped area to the center of the site was formed in 2013/2014. Approximately 3m of inert material was imported to form the landscaping. The excavated site below this imported material consists of virgin black boulder clay, typical of this area of the city. In addition, a perimeter secant pile wall was constructed around the proposed site in 2004/2005, with additional works carried out in 2013/2014. Therefore it will not be necessary to construct any further perimeter piled walls.

Before foundation works commence, site flooding mitigation measures must be put in place and appropriate method statements submitted to the design team.

The Contractor must prepare a Construction Waste Management Plan in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately licensed land fill site. The Contractor must also outline detailed proposals within the Construction Management Plan to accommodate construction traffic.

3.3.2.5 Foundation Works

It is likely that a mix of CFA piling (approx. 150no.) and traditional strips will be required for the substructure of the apartment blocks. The excavation and preparation of the foundation works will

generate spoil that must be disposed of at an appropriate licensed land fill site. The concrete operations associated with the foundation will require concrete deliveries to site.

3.3.2.6 Superstructure

The construction of the superstructure will involve complex sequencing of activities and various construction methodologies could be adopted to deliver the Contract. As noted the construction methodology and therefore the programme of the construction activities will be dictated by the Contractor.

The following are potential options for the superstructure design:

(a) Apartment Blocks

- RC Column & Flat Slab
- RC/Masonry Cross Wall & Precast Slab
- Precast Concrete Twin Wall & Precast Slab

(b) Building Structure:

- Demolition of the existing basement and podium structure where required.
- Construction of the foundations/substructure.
- Construction of rising elements to 1st floor and 1st floor slabs.
- Similar sequence of construction of rising elements and floor slabs.
- Note allowance for service construction concurrently or before superstructure.

(c) Envelope / Cladding:

- Envelope works will follow in a sequential manner.

(d) Mechanical & Electrical fit-out:

- First fix will commence at each level behind structure.
- This will be followed by the second fix and the final connections.

(e) Fit-out:

- Initial installation of any stud work when cladding is complete and floor is weather tight.
- Installation of equipment and associated connection to services.
- Completion of finishes.

(f) Commissioning:

- The final commissioning period will commence during fit-out.

The above is an indicative construction sequence. The final sequence will be dictated by the Contractor. The Contractor must issue a detailed construction programme outlining the various stages prior to commencement of works.

3.3.2.7 Erection and operation of cranes

It is envisaged that three to four tower cranes will be temporarily erected to accommodate the construction works for the distribution of reinforcing steel, concrete skips, concrete formwork element and general building materials. The Contractor will need to obtain all necessary licences from the Local Authority. A "mast climber" may be installed at some local areas to facilitate façade features. The mast climber is essentially a climbing platform that allows the user to safely access any level without the requirement for a full scaffold tower.

3.3.3 Duration & Timing

For the duration of the proposed works the maximum working hours shall be 07:00 to 19:00 Monday to Friday (excluding bank holidays) and 08:00 to 14:00 Saturdays.

No working will be allowed on Sundays and Public Holidays.

It may be necessary for some specific construction activities to take place outside of these times and in those case, a specific derogation will be sought from the Planning Authority.

Deliveries to site will be arranged to arrive within normal working hours as set out above.

There may be specific deliveries which need to arrive outside of these hours e.g. in respect of wide loads. In all such cases the applicant will again liaise and agree any necessary derogations with the Planning Authority.

3.3.4 Emissions & Nuisances

No significant impacts will arise in terms of emissions and nuisances during the construction and operational period of the development. A detailed assessment of the potential impacts on air quality and noise and vibration are provided in Chapters 9 and 10 respectively.

3.3.5 Risk of Accidents

The risk of accidents arising as a result of the development at both the construction and operational phase will be minimised through detailed design considerations and health and safety management.

3.3.5.1 Health & Safety

Safety, health and environmental issues on the development are a primary consideration in the construction methods adopted. The construction team will develop detailed health and safety plans, specific environmental, fire and accident procedures to suit the construction sequence of the development.

As required by the Safety, Health and Welfare at Work (Construction) Regulations 2013 (as amended), a

Health and Safety Plan will be prepared by the Contractor which will address health and safety issues from the design stages through to the completion of the construction and maintenance phases. This Plan will be reviewed as the proposed development progresses. The contents of the Health and Safety Plan will comply with the requirements of the Regulations.

3.3.5.2 Security

Security will be the responsibility of the contractor who will provide adequate security to prevent unauthorised entry to or exit from any working areas. The following measures may be used to prevent unauthorised access:

- Install CCTV and alarm systems where required. CCTV and security systems will be sited and directed so that they do not intrude into occupied residential properties;
- Provide adequate security guards and patrols;
- When there is no site activity, close and lock site gates and set appropriate site security provisions in motion;
- Consult with neighbouring properties and local crime prevention officers including Dublin City Council and An Garda Síochána on site security matters as required; and
- Prevent access to restricted areas and neighbouring properties by securing equipment on site such as scaffolding and ladders.

3.3.5.3 Hoarding and Fencing

A site boundary in the form of hoarding or fencing will be established around different phases of the site and along public roads/space before any significant construction activity commences in that working area. The hoarding/fencing will be 2.4m high to provide a secure boundary to what can be a dangerous environment for those that have not received the proper training and are unfamiliar with construction operations. Hoarding and fencing will be maintained to an acceptable condition to prevent unwanted access to working areas and provide appropriate noise attenuation, screening, and site security where required.

3.4 Operation of Scheme

As demonstrated in the later chapters of this EIAR, post-construction, the operation of this predominantly residential development is not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on population and human health, biodiversity, soils, water, air, climate, landscape.

It is stated in Section 3.2.6.3 above and in Chapter 8 that during the operational phase, storm water run-off will be limited to 5.0 litres per second. It is stated in Chapter 12 of this EIAR that approximately 177,954 litres per day (177.95m3/day) of foul water will be produced during the operational phase of this development.

During the operational phase no waste soils will be produced by the proposed development

It is stated in Chapter 9 of this EIAR that emissions to air during the operational phase arise from heating and traffic. It is stated that this proposed development will operate using natural gas boilers. As natural

gas is a clean fuel, it is stated in Chapter 9 that sulphur dioxide emissions will be negligible. Nitrogen oxide, particulate matter and carbon monoxide emissions from the proposed natural gas boilers are also predicted to be low. It is stated that expected changes in traffic volume during the operational stage are not significant and therefore a change in traffic volume will not result in a quantifiable change in emissions.

3.4.1 Waste Management During Operational Phase

The residential Waste Storage Areas (WSAs) are located on the lower ground floor and are accessible via an internal corridor connected to each core. On collection day, all residential waste from shared WSAs will be gathered at the designated collection point, which is at basement level. The waste management company can collect and transport the waste away safely, accessing the site via the entrance / exit at St. John's Road West.

The retail tenant will be responsible for transferring their own bins to/from their individual WSA to the street for collection from the Public Plaza.

Figure 3.4.1.1 Proposed Lower Ground Floor Plan Showing Waste Collection areas in purple.

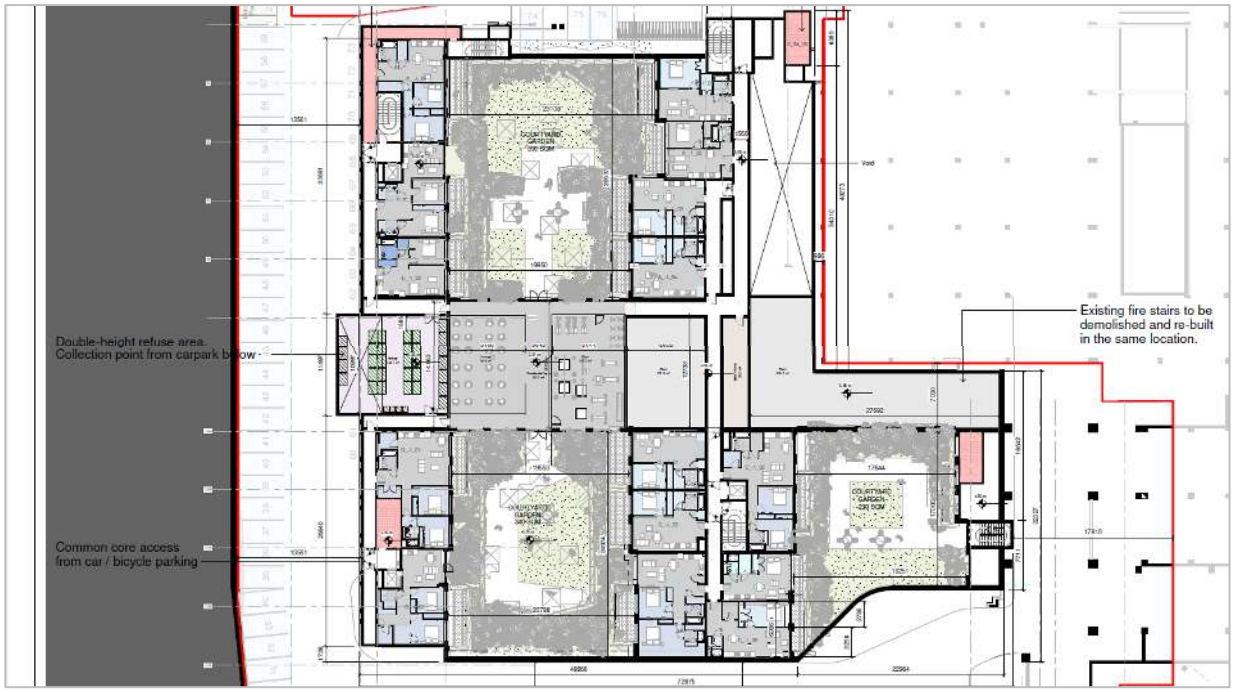
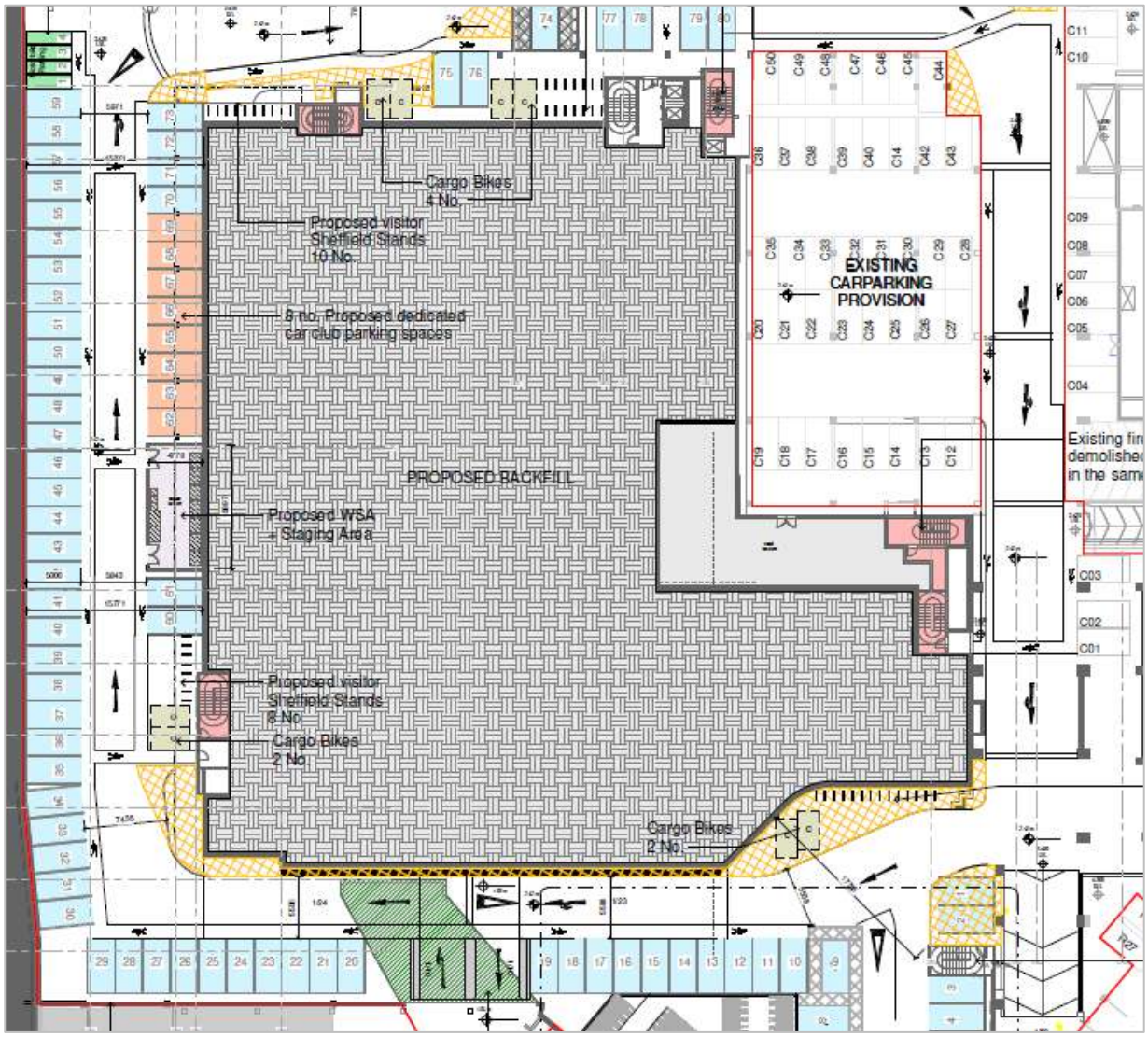


Figure 3.4.1.2 Proposed Basement Plan Showing Waste Collection areas in purple.



3.5 References & Definitions

Dublin City Development Plan 2016–2022, 'Strategic Environmental Assessment' (2016)

4. CONSIDERATION OF ALTERNATIVES

This Chapter provides *'a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects'* as required by Schedule 6 of the Planning and Development Regulations, 2001-2019

The preparation of this Chapter has had regard to the Revised Guidelines on the Information to be Contained in Environmental Impact Statements (Draft), September 2017. Regard has also been had to the previous EPA Guidance, to the European Commission Impact Assessment Guidelines, 2017, and EIA Directive 2014/52/EU, which states that information for the Environmental Impact Assessment Report should include:

> *'a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer.'*

The European Commission Guidelines summarise that the Developer needs to provide:

- A description of the reasonable alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regard to their environmental impacts.

The European Commission Guidelines provide that an alternative may be considered unreasonable/unfeasible if there are technological, budget, stakeholder or legal/regulatory obstacles preventing it from being carried out.

The principal rationale for the development proposal is outlined in this section, to provide context for the proposed development and the selection of the proposed development site. The section goes on to identify the reasonable alternatives considered in terms of size and scale, and the environmental factors considered in respect of each alternative and the main reasons for select the option chosen. The identification of reasonable alternatives has been carried out in the context of the nature and scale of the development proposed being predominantly residential, together with the established regulatory context.

This chapter is structured as follows:

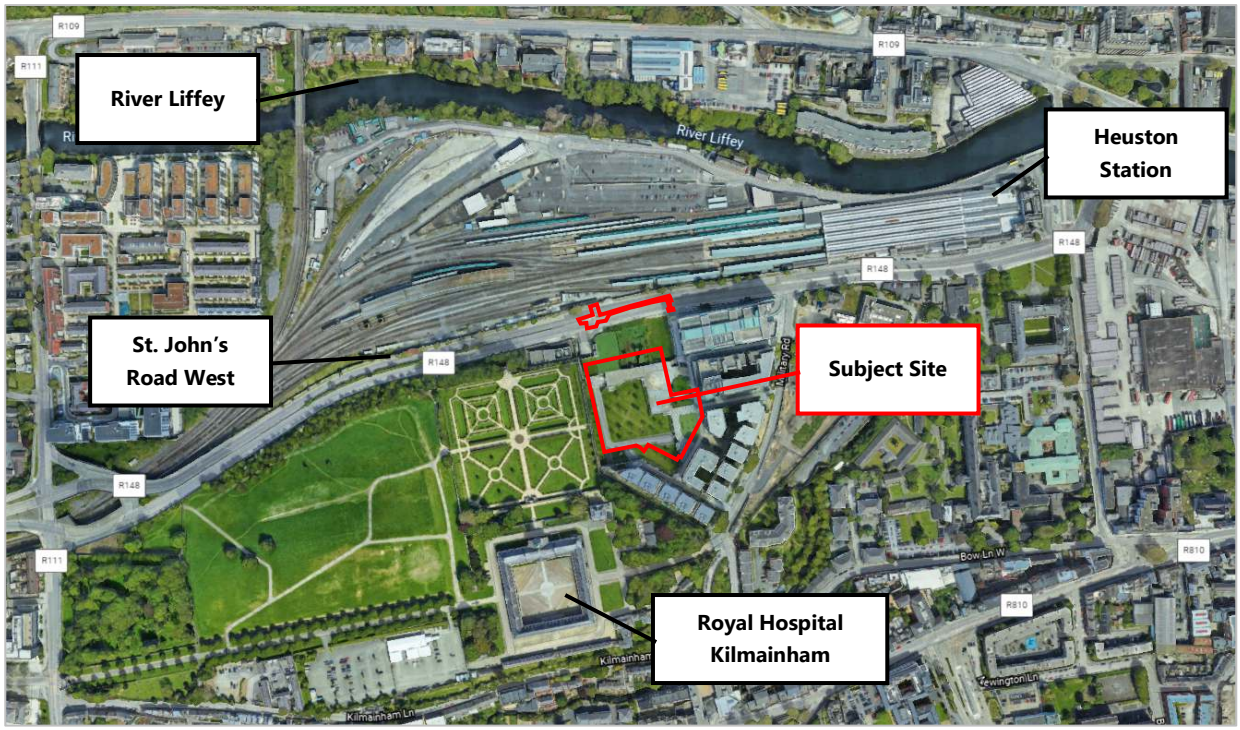
- Alternative locations (Section 4.2)
- Alternative construction (Section 4.3)
- Alternative layouts and designs (Section 4.4)
- Alternative materials (Section 4.5)
- Alterative mitigation measures (Section 4.6)
- "Do Nothing" Alternative (Section 4.7)

4.1 Introduction

4.1.1 Description of Development

The application sites form part of a larger development site known as Heuston South Quarter (HSQ). The HSQ site is bounded principally by St. John's Road West (to the north) and Military Road (to the east) and by the formal gardens of the Royal Hospital Kilmainham (RHK) to the west and south.

Figure 1. Site Location in Context (source: google maps)



The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over double basement level / podium level. The application site extends to 1.08 ha or 10,825 square metres (sqm).

- Block A is a rectangular shaped block that occupies the north-eastern corner of the application site. This block rises in height to 18-storeys above podium level and includes a lower ground floor level to provide a total of 154 no. apartments (comprising 12 no. studios; 108 no. 1 beds and 34 no. 2 beds). Block A has a Gross Floor Area (GFA) of 11,814 sqm.

- Block B is a rectangular shaped block that occupies the south-eastern corner of the application site. This block is part 8- and part 12-storeys in height above podium level and includes a lower ground floor level to provide a total of 81 no. apartments (comprising 9 no. studios; 60 no. 1 beds and 12 no. 2 beds). Block B has a Gross Floor Area (GFA) of 5,446 sqm, which includes a retail unit at the northern end of the block at podium level of approximately 120 sqm (GFA).

- Block C is situated between Block B to the east and Block D to the west. Block C varies in height up to a maximum of 12-storeys above podium level and includes a lower ground floor level to provide

a total of 86 no. apartments (comprising 19 no. studios; 45 no. 1 beds and 22 no. 2 beds). Block C has a Gross Floor Area (GFA) of 6,024 sqm,

- Block D is a 5-storey over basement level rectangular block that occupies the south-western corner of the application site. It accommodates a total of 35 no. apartments (comprising 1 no. studio; 16 no. 1 beds; 6 no. 2 bed /3 person and 12 no. 2 beds). This block has a Gross Floor Area (GFA) of 2,786 sqm.

- Block E is a part 3-, part 5-storey over basement level rectangular block that occupies the north-western corner of the application site to the west of Block A. It accommodates a total of 43 no. apartments (comprising 5 no. studios; 21 no. 1 beds; 7 no. 2 bed / 3 person and 10 no. 2 bed / 4 person units). This block has a Gross Floor Area (GFA) of 3,321 sqm.

It is proposed to provide a Retail unit of 120 sqm at podium level in Block B. The Retail space has a small garden to the east with an area dedicated for outdoor seating (150 sqm).

Indoor communal facilities with a total area of 533 sqm are proposed as follows; a shared co-working area / lounge (178 sqm) and gym (102 sqm) at lower ground floor level, and lounges on either side of a residential foyer at ground floor / podium level within Block A (196 sqm), and a TV Room / lounge (57 sqm) at ground floor / podium level within Block C.

Communal Outdoor Amenity space is provided for residents in the form of rooftop terraces (totalling 1,179sqm), and lower-level communal courtyards between blocks (totalling 960sqm). Hard and soft landscaping works are proposed at podium level which includes the extension and completion of the public plaza to the east of Block A; the provision of footpaths; a MUGA (Multi Use Games Area) and informal play areas for children (totalling 1,670sqm).

A double basement is provided that will be integrated within the existing basement levels serving the wider HSQ development and will be accessed from the existing vehicular ramped accesses/egresses onto/off St. John's Road West and Military Road to the north and east, respectively. Basement level -1 provides: a refuse store; 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces); 4 no. motorcycle parking spaces; and, secure bicycle parking / storage in the form of 251 no. double stacked cycle parking spaces providing capacity for 502 no. secure bicycle storage spaces for residents. An additional 49 no. Sheffield type bicycle stands are provided at basement level -1 to provide 98 no. visitor cycle spaces (inclusive of 8 no. designated cargo bike spaces, that will also be available for the shared use with residents of the scheme) and a further 55 no. Sheffield type bicycle stands are provided at podium level to provide 110 no. cycle parking spaces (108 no. visitor cycle parking spaces (inclusive of 6 no. designated cargo bike spaces) and 2 no. cycle parking spaces in connection with the retail unit). All bicycle parking at basement level is accessed via a dedicated cycle lift from podium to basement level -1 that is situated to the south of Block B.

Works proposed along the St John's Road West frontage include the omission of the existing left-turn filter lane to the vehicular ramped access to the HSQ development and re-configuration of the pedestrian crossings at the existing junction together with the re-configuration of the existing pedestrian crossing over the westbound lanes of St. John's Road West leading to an existing pedestrian refuge island. Re-alignment of the existing footpath along the site frontage onto St John's Road West to tie into the reconfigured junction arrangement and provision of a link to a new lift to provide wheelchair access from

St John's Road West to the HSQ podium.

A double ESB substation/switch room at ground / podium level within Block A, and a single substation/switch room at ground / podium level within Block B together with associated site development works, which includes the infilling of an existing vehicular access ramp at the southern end of the site between basement levels -1 and -2.

4.1.2 Rational for Development

Since the economic collapse in 2008 consistently low levels of housing have been constructed, especially in the main cities and urban areas where there is ongoing under-supply. The recovery of the economy and increasing population and employment is creating a significant increase in demand for new homes to support a growing and working economy, and to address the significant level of social housing need. Under-provision of housing is one of the last significant legacies of the economic downturn to be tackled. Accelerating delivery of housing for the private, social and rented sectors is a key priority for the Government.

Construction 2020 - A Strategy for a Renewed Construction Sector and the *Social Housing Strategy 2020*, both of which were published in 2014, contain measures to address issues and constraints in the construction and development sectors and in the provision of a range of social housing outcomes, respectively. The Government's *Action Plan for Housing and Homelessness, Rebuilding Ireland*, July 2016 seeks to ramp up the delivery of housing from its current under-supply across all tenures to help individuals and families meet their housing needs.

The proposed development provides for the delivery of residential development on available, serviced and appropriately zoned lands within Dublin City Centre. The Heuston Gateway area is identified as a Strategic Development and Regeneration Area (SDRA 7) in the Dublin City Development Plan, focused on the nation's busiest public transportation interchange. The SDRA area will develop as a Western Cluster and a counterpart to the Docklands at the eastern end of the City.

Development at the site is guided by the nine principles set out in the Development Plan:

1. To develop a new urban gateway character area focused on the transport node of Heuston Station with world class public transport interchange facilities, vibrant economic activities, a high-quality destination to live, work and socialise in, a public realm and architectural designs of exceptional high standard and a gateway to major historic, cultural and recreational attractions of Dublin City.

2. To incorporate sustainable densities in a quality contemporary architecture and urban form which forges dynamic relationships with the national cultural institutions in the Heuston environs.

   - To ensure the application of best practice urban design principles to achieve:

   - A coherent and legible urban structure within major development sites

   - A prioritisation on the provision of public space

3. A successful interconnection between the development site and the adjacent urban structure

4. To protect the fabric and setting of the numerous protected structures and national monuments, many of which are major national cultural institutions.

5. To incorporate mixed-use in appropriate ratios in order to generate urban intensity and animation. This will require the major uses of residential and office to be complemented by components of culture, retail and service elements.

6. To improve pedestrian and cycle linkages throughout the area and through key sites, with a particular focus on seeking the following new linkages/improvements: along St John's Road West; from St John's Road to the Royal Hospital Kilmainham via Heuston South Quarter, subject to agreement with the OPW/RHK, on the nature of the proposed linkage; from Dr Steevens' Hospital to IMMA, with consideration give to a new path along the banks of the river Camac.

7. As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy. Sites particularly suited for tall buildings include:

   - OPW building: corner site on OPW lands adjacent to Dr Steevens' Hospital and Park, and opposite the south façade of the station building.

   - CIE building: site to the north of the station building on the river relating to the West Terrace and River Terrace. Any new mid or high-rise buildings must provide a coherent skyline and not disrupt key vistas and views.

8. The 'cone of vision', as set out in the 2003 Heuston Framework Plan, represents a significant view between, the Royal Hospital Kilmainham and the Phoenix Park extending from the west corner of the north range of the Royal Hospital Kilmainham, and the north-east corner of the Deputy Master's House to the western side of the Magazine Fort and east edge of the main elevation of the Irish Army Headquarters (former Royal Military Infirmary) respectively. Any new developments within this 'cone' shall not adversely affect this view. A visual impact analysis shall be submitted with planning applications to demonstrate this view is not undermined.

9. Other important visual connections to be respected include Chesterfield Avenue to Guinness Lands and from key parts of the City Quays to the Phoenix Park (Wellington Monument).

4.2 Consideration of Alternative Locations

The lands on which the application is made are zoned Land-Use Zoning Objective Z14: 'To seek the social, economic and physical development and/or rejuvenation of an area with mixed use, of which residential and 'Z6' **would be the predominant uses'** under the Dublin City Development Plan 2016-2022. Under this Plan the site forms part of SDRA 7 'Heuston Station and Environs', which has an estimated capacity for 1,200 units.

The Development Plan was the subject of Strategic Environmental Assessment (SEA). The issue of alternatives is a critical function of the Strategic Environmental Assessment (SEA) process and is necessary to evaluate the likely environmental consequences of a range of alternative development strategies for

the county within the constraints imposed by environmental conditions. Section 4 of the SEA assessed four growth alternatives for the Plan as follows;

- Alternative 1 – Targeted Growth around existing identified growth centres
- Alternative 2 – Market Led Growth
- Alternative 3 - Selected Concentration of growth targeted on existing SDRAs/KDC/SDZ areas
- 'Do-Nothing' Scenario

The SEA assessment concluded that Alternative 1, the Targeted Growth around existing identified growth centres scenario, is the preferred scenario. This alternative seeks to target and consolidate growth around the Z5 city-centre mixed use zoning area as well as existing identified growth centres such as the Key District Centres(KDCs), the SDRAs, the Strategic Development Zones and areas identified in Local Area Plans. Under this preferred growth scenario, development is preferred in locations such as the subject site as opposed to lands outside of targeted growth areas such as SDRAs.

The subject site forms part of an unfinished development permitted under An Bord Pleanála Ref. PL29S.206528 (DCC Ref. 2656/03). Under DCC Reg. Ref. 2724/13 permission was granted for temporary landscaping works to improve the visual impact of the undeveloped areas of the site, including the current subject site. Condition 2 of Reg. Ref. 2724/13 limits the duration of the permission to 8 years (2021) after which it is required that the *'permission shall cease and the structures shall be removed and the use hereby permitted shall cease, unless a further Permission has been granted before the expiry of that date'*.

Notwithstanding that future planning applications are required at the site under Condition 2 of Reg. Ref. 2724/13, it is considered that the use of this site for residential development is preferable to the use of any undeveloped or greenfield site as much of the fundamental basement works have already been completed at the subject site. Undertaking these works at another site would involve unnecessary use of building materials and the disposal to landfill of soils.

Based on the foregoing, it was not considered necessary to appraise any alternative locations for the proposed residential development.

4.3 Alternative Construction

Considering the site is currently vacant and can be hoarded off easily the residential development is envisioned as a single-phase development. The Advantages of single phase are outlined below:

- As a single phase the project will be completed faster than multiple phases.
- Multiple phases are more expensive and complicated to manage.
- A single phase will lessen the impact on neighbouring residents / properties.
- Multiple phasing increases the possibility in delays with more complicated sequencing issues.

4.3.1 Alternative Construction Methods

A range of construction methods were considered for this design and ultimately the contractor will determine which method suits based on a number of factors including:

- Pre-cast modular: This system involves manufacturing walls, floors etc off site and assembling on site. Co-ordination of all elements would need to be completed before fabrication and delivery to site.

- Traditional In-situ construction: This is a more labour-intensive system and would require a larger workforce but less up-front co-ordination.

- Twin Wall System: the twin wall system is a hybrid system that combines the speed of pre-cast and involves the wall units being assembled and reinforced on site with the gaps between the pre-cast units filled with concrete. This type of construction may not be suitable for taller buildings so may only be considered for the construction of Blocks D+E.

Ultimately It will be up to the contractor to choose the most appropriate method that suits them based on the following factors:

1. Cost – the cost effectiveness of each system

2. Speed – each system has pros and cons in relation to speed of construction, the speed of pre-cast involves much more co-ordination upfront whereas the traditional method allows for a more agile construction with less co-ordination upfront.

3. Market availability – the labour market and availability of materials / manufacturing will need to be considered.

4.4 Alternative Layouts & Designs of Main Residential Development Site

A number of reasonable alternative layouts for the proposed development were considered over the design process. In addition, the proposals for the development were subject to detailed discussion with the Planning Authority prior to the principles of the proposed layout being finalised.

The initial layouts, and alternatives considered have been based on the guidance in the Development Plan, including the need to respect the cone of vision from the Royal Hospital Kilmainham (RHK). The interface between the RHK and its gardens informs the urban design, form, massing, height and design quality of the proposed development. Alternative heights, materiality and rhythm were assessed by the Design Team to ensure the development respects the historic significance of this place.

- **Design Iteration 1:** Full Residential Scheme

- **Design Iteration 2:** Full Commercial Scheme

- **Design Iteration 3:** Mixed Use Scheme

- **Design Iteration 4:** Current Residential Scheme

The significant environmental issues and potential effects which informed the proposed layout included architectural heritage, visual impact. population and human health, and transportation. Other factors that were fundamental to informing and directing detailed design included the provisions of the Development Plan in respect of SDRA 7 'Heuston and Environs'.

At the early stages the entire site was included in the design options. For the purposes of this application, the residential element has been separated from the commercial element, which will be subject to a separate application and faces on to St. Johns Road. Please see map with redline boundary below:

4.4.1 Design Iteration 1: Full Residential Scheme

The alternative future development layout in Figure 4.4.1.1 comprises a study that explored the option of utilising the entire site for residential development. The design comprised a series of courtyards formed by the residential blocks varying in height from 3 to 16 floors with a total of 600 residential Units.

The layout was cut along the cone of vision to allow a clear uninterrupted view of the Wellington monument.

This option was discounted due to the commercial zoning of the lands on St. Johns Road and the result of the smaller narrow courtyards resulting in little daylight penetrating the ground level which led to a hostile enclosed environment. Furthermore, the orientation of the apartments led to north facing units which would affect the quality and enjoyment of the apartments and led the design to explore east/west blocks which would result in much brighter apartments with no north facing units.

The design featured a number of enclosed and semi enclosed courtyards with access to the Public Square to the east. Stepping up from third level at the western most element of the site to 15th floor at the most north easterly part of the site. The diagrams and CGI in the following pages show the design of floor plans and elevations.

Figure 4.4.1.1 Design Iteration 1: Height to Respect the Cone of Vision

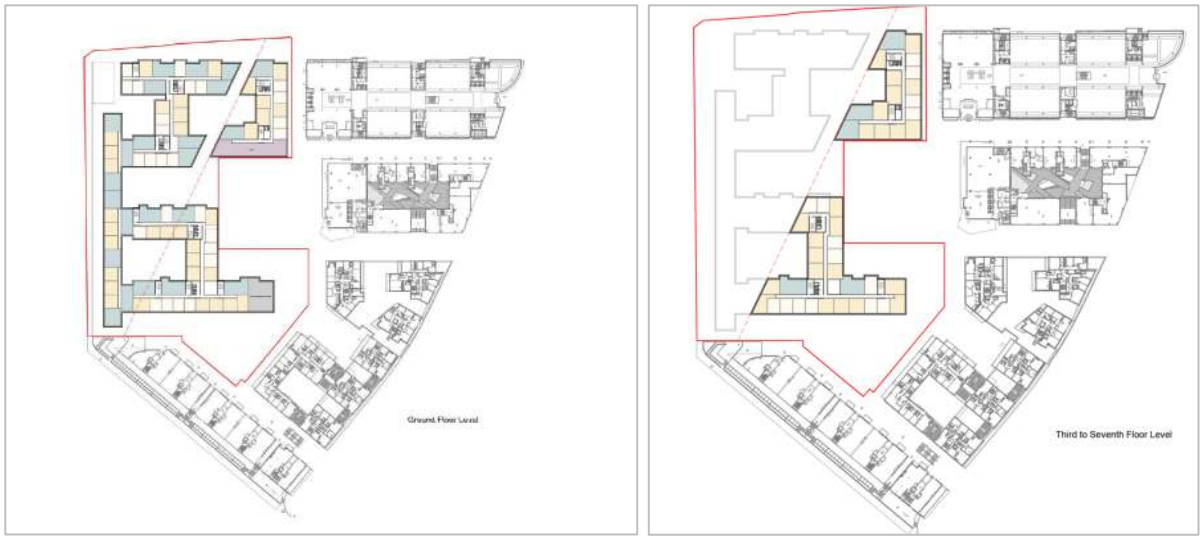


Figure 4.4.1.2 Design Iteration 1: CGI of the scheme from the RHK Gardens

4.4.2 MDS Design Iteration 2: Full Commercial Scheme

The alternative future development layout in Figure 4.4.2.1 comprises a study that explored the option of maximising the commercial potential of the site with a full commercial use. This incorporated commercial office buildings and a hotel. The layout is similar to the first iteration in that the buildings are cut back at an angle to allow the view of the Wellington monument to be unaffected by the development. The building heights vary from 3 to 11 storeys with the taller elements towards the centre of the site an on the edge of St. Johns Road. This was discounted for a number of reasons namely :

- The over concentration of office/retail was deemed to be unacceptable from a planning perspective.
- The quantum of commercial office in this part of the city was deemed to be too large.
- The urban masterplan created no link or permeability to the RHK gardens.
- The commercial block essentially closed off the site and created a dead end with no connection westwards.

Figure 4.4.2.1 Design Iteration 2: first and Second Floor Level.

Figure 4.4.2.2 Design Iteration 2: first and Second Floor Level.

Figure 4.4.2.3 Design Iteration 2: Eight to Tenth Floor Level.

4.4.3 MDS Design Iteration 3: Mixed Use Scheme

The alternative future development layout in Figure 4.4.3.1 comprises a study that explored the option of a mixed-use development that splits the site into residential and commercial uses based on the zoning and the proximity to the main road.

The design comprised a hotel and office building on St. Johns Road with residential development to the South. This provided a residential scheme of 320 units in a series of separate blocks arranged perpendicular to the main road giving the apartments an East-West orientation. Heights ranged from 3 to 16 floors.

Figure 4.4.3.1 Design Iteration 3

The Above plans (Figure 4.4.3.1) show the arrangement of the Blocks in an all-residential proposal. The Blocks are aligned to the north south axis. This allowed the aspect of the apartments to be east/west with dual aspect apartment forming the corners of each residential Block.

This option was discounted for the following reasons:

- The close proximity of the blocks to each other resulted in a hostile public realm between blocks and reduced the light available to apartments.
- The lack of connectivity to the RHK to the west.
- The dis jointed nature of the Blocks with a lack of meaningful enclosure.

Figure 4.4.3.2 Excerpt from an Assessment of Site Uses

A further sub study of this option (Figure 4.4.3.2) explored the possibility of an office tower to St. Johns road and also the A hotel tower on the same site. This sub study was discounted as the hotel option was deemed to large for a site this far from the centre of the city.

4.4.4 Design Iteration 4: Current Residential Scheme

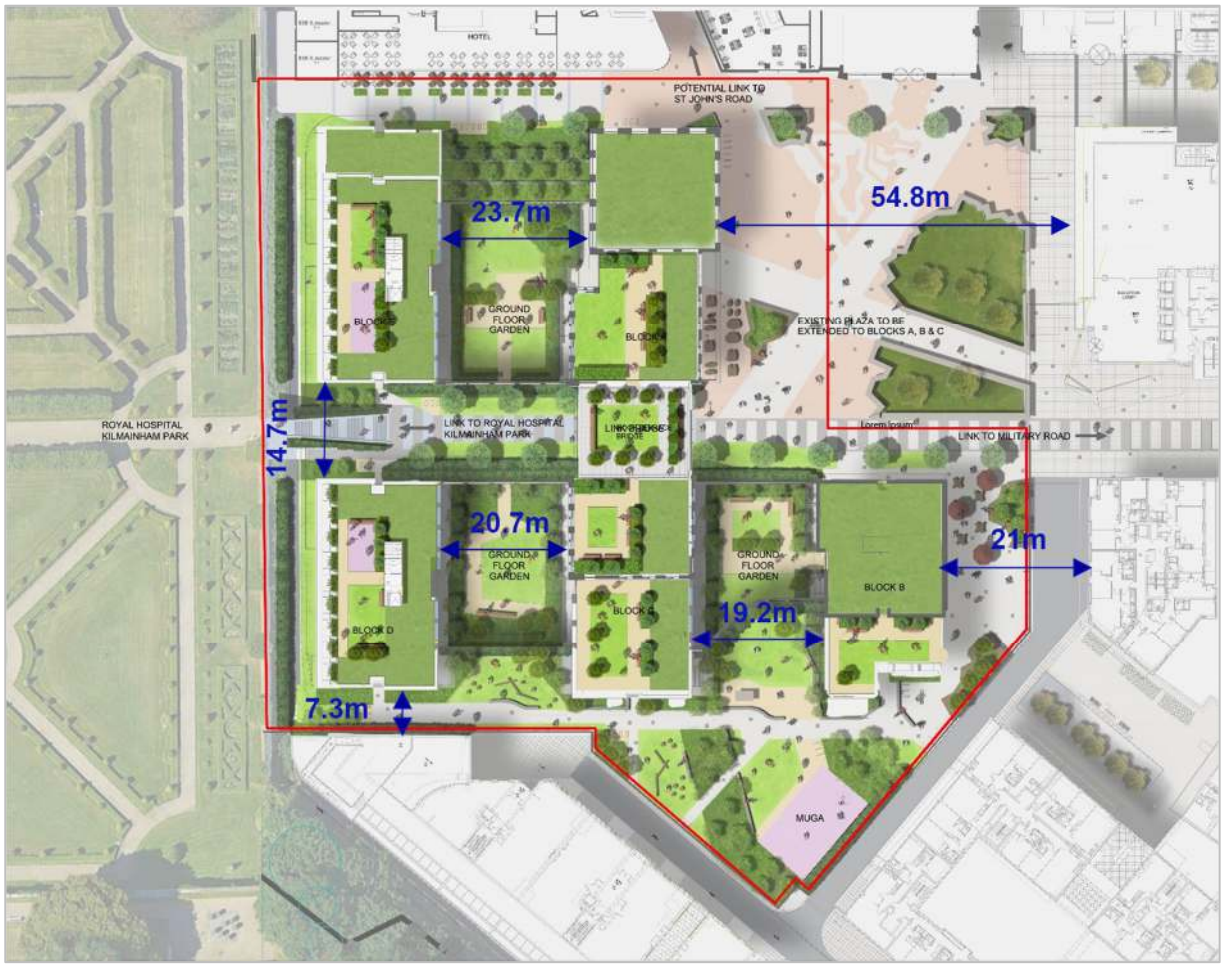
The alternative future development layout in Figure 4.4.4.1 is the proposed design. The previous alternative designs have led to this proposal with each iteration and consultation with DCC informing the decisions that led to the current layout of 5 Blocks on an east/west axis with a connection to RHK. The current design also addresses the view to the Wellington monument, the RHK gardens and COV.

An angled street was introduced to resolve the issue with the view of the monument. The treatment of the central arch and its massing were also studied in greater detail in developing this option.

This layout has been developed into the current proposed scheme, the site area was reduced at this stage to encompass only the residential zone.

The commercial scheme will be the subject of a separate application.

Figure 4.4.4.1 Design Iteration 4



The diagrams show the layout of the proposed scheme with the central public courtyard and link routes east/west linking the site to military road and RHK gardens and the link to the north which also allows for a vista towards the Wellington Monument. The ground floor of the scheme facing the square has a mix of active uses including retail and amenity uses. And between each block is a private sunken courtyard either side of the public link to the RHK gardens. The heights and density of the scheme is shown in the diagram below:

Figure 4.4.4.2 Diagram Showing the heights of each Block.

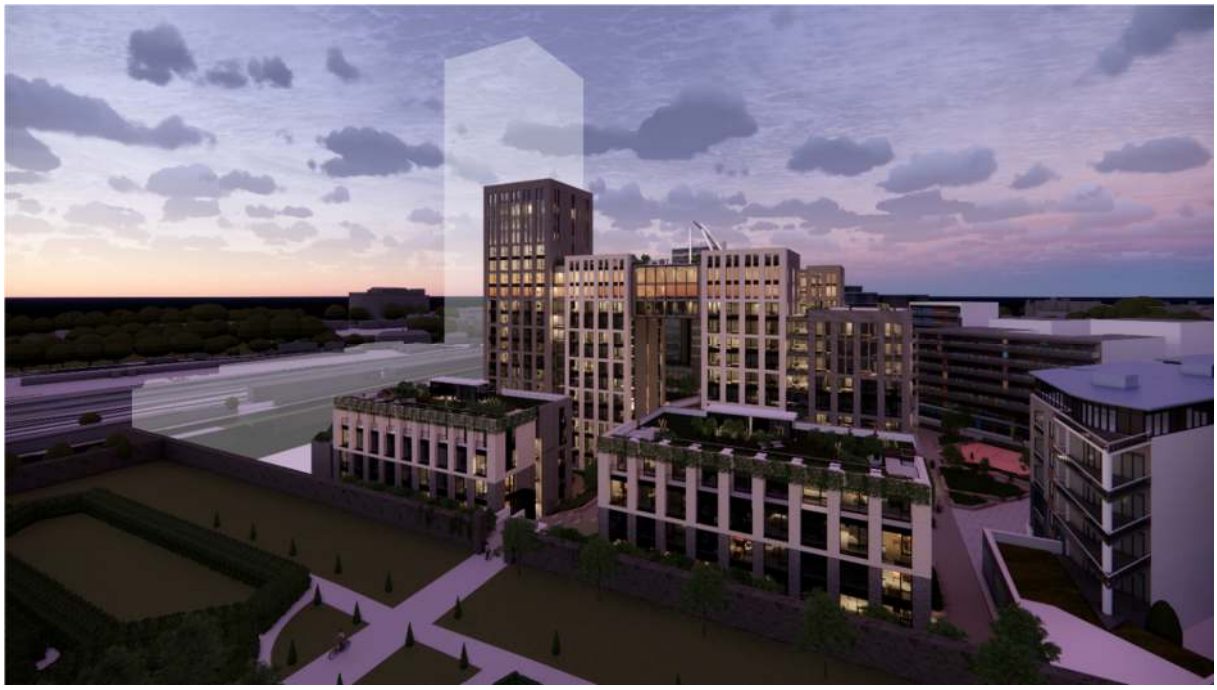
Figure 4.4.4.3 The east / west connection to RHK can be seen clearly in the image above.

Figure 4.4.4.4 Evening View of the Public Courtyard Space

Figure 4.4.4.5 View of Link to East / West under the Arch

Figure 4.4.4.6 View from RHK

Figure 4.4.4.7 Evening View from RHK



4.4.5 Consultations with Planning Authority – Dublin City Council

In total, three separate consultation meetings took place between the applicant and Dublin City Council. The issues identified with and our response to each is summarised below :

- *Relationship with RHK / Cone of Vision – DCC*

The SDRA 7 establishes a cone of vision (COV) extending from the western corner of the north of the Royal Hospital Kilmainham and the north-east corner of the Deputy Maters house to the western side of the Magazine fort and east edge of the main elevation of the Irish Army Headquarters designed by renowned Architect James Gandon in 1786. The extends of the COV are outlined in yellow in the figure below.

The Design response to the COV was to lower Blocks D&E in order that the viewer could see the Gandon building in the distance. The architectural language of the facades of the blocks facing the RHK were designed to create a formal visual dialogue with the RHK gardens and the addition of Rooftop Gardens on the Blocks soften the edge facing the RHK. Please refer to the Architectural Heritage Impact Assessment (AHIA) submitted with this application.

- *Heights : issue of heights to be determined having regard to visual impact analysis. Views from RHK and Phoenix park to be included in summer and winter.*

The Urban Development and Building Heights Guidelines for Planning Authorities 2018 include strategic policy considerations and a more performance criteria driven approach alongside statutory development plans and the National Planning Framework to achieve compact growth in urban areas. The subject side is deemed to be suitable as it is a brownfield site with excellent existing transport links close to the city centre.

As part of considering height early visual impact assessments were used to determine impact on the surroundings in particular from the RHK and Phoenix Park. As a result a number of iterations were considered before arriving at the current proposal.

- *Public Square – need for 18 hour animation and ground floor activation*

As a response to concerns raised by DCC regarding activation of the Public Square a Café / Retail element and internal amenity spaces which add to the activation of the Square.

- *Mix of units, dual aspect, balconies and sunlight / daylight standards.*

Section 16.10.1 of the DCDP provides guidance on Build to Let apartment schemes and advises that up to 42-50%of the total units may be in the form of 1 bed or studio units. SPPR 8 if the apartment guidelines state that for proposals that qualify as a specific BTR development in accordance with SPPR &'(i) No restrictions on dwelling mix and all of the requirements of these guidelines shall apply unless specified otherwise.'

The proposed development has a combined proportion of 77% 1 bed and studio. The mitigation for this is that the scheme will be an exemplar BTR scheme, exceeding the minimum amenity standards. And with 50% of the proposed scheme being dual aspect units.

A further concern raised by DCC was the quantum of Balconies, it was agreed that balconies facing west would be minimised in order to respect the RHK gardens. As a response to this concern a number of extra balconies were added to the east facing apartments and placed in order to maximise daylight and sunlight into the apartments below the balconies.

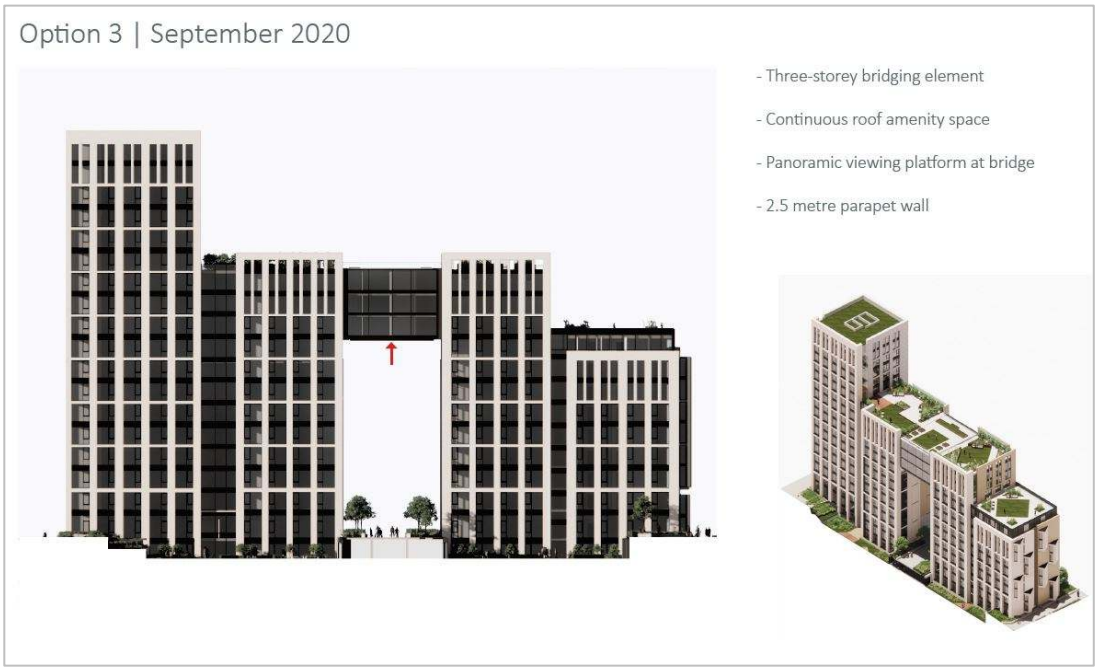
- *East / West Access into RHK*

As part of the design iterations, a walkway from east to west with a direct link was suggested and developed with the planning authority.

- *4 Storey Bridge / Arch element.*

The Planning Authority expressed concerns regarding the 'bridge' element between Blocks A+C. The concerns related to the bridge being overbearing and large. A number of iterations were tested and presented leading to the current design solution. (see figure 4.4.5.1 below)

Figure 4.4.5.1 Illustration. of Bridge/Arch element



- *Amenity spaces*

Concerns were raised early in the scheme at the quantum of amenity provided for the residents. As a response to the concerns a mix of amenity spaces including private balconies and private gardens / patios, communal rooftop spaces (available on every block), communal exterior spaces including sunken gardens and a mix of internal communal spaces including a gym, lounge areas, quiet rooms etc.

- *Materiality – design and colour to by sympathetic to RHK buildings.*

In response to this concern raised by DCC a classically proportioned stone façade with deep reveals was incorporated into the scheme facing the RHK. On the eastern side facing the city a brick façade with the same proportions and a typical brick reveal is proposed.

4.4.6 Planning History of the Site

The subject site comprises part of the undeveloped part of the larger HSQ development site. The planning history for this larger site dates back to September 2004 when the Parent Permission was granted under An Bord Pleanála Ref. PL29S.206528 (DCC Ref. 2656/03).

The most recent and relevant planning history relates to interim landscaping works permitted under DCC Ref. 2724/13 which has been built. The most recent DCC Ref. 2774/14 planning was sought for the completion of the HSQ development to deliver a mixed use scheme of 5no Blocks. However, this application was withdrawn following a first and third party appeal against DCC notification of decision to grant permission.

This application included the entire site with the residential element contained in 3 L-shaped blocks facing north/south and east/west. This resulted in 126 residential apartments. This arrangement was discounted as an alternative as it delivered too few apartments and also created a number of north facing units which contradicts the apartment guidelines (2020)

4.5 Alternative Materials

The materiality of the development has been carefully considered from the outset.

At an early stage render was considered for the residential courtyards but this was discounted due to issues with the quality and longevity of the material and the maintenance requirements. (refer to Fig.4.5.4)

Brick and Stone was identified from the outset as an appropriate palette of materials given the context of the site next to the RHK. Various alternative combinations and proportions were considered and discounted including :

- Stone on Block A (tower) only with the rest of the proposal in brick, this was discounted as it read as disjointed.

- Stone on the west façade of Blocks A, D + E facing the RHK gardens. It was decided that this more formal approach with stone facing historic gardens was more appropriate. This was discounted as the result looked too monolithic.

Figure 4.5.1 Façade Studies Brick and Stone Combination

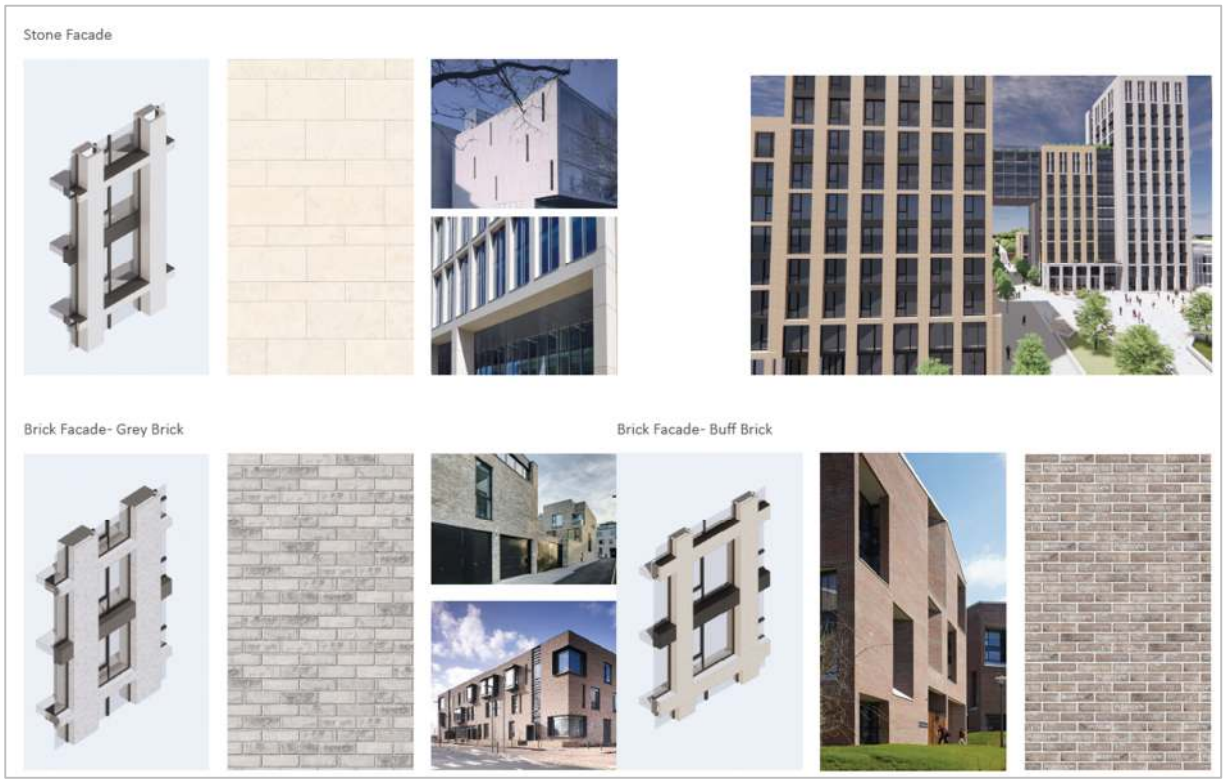


Figure 4.5.2 Façade Studies Stone Finish

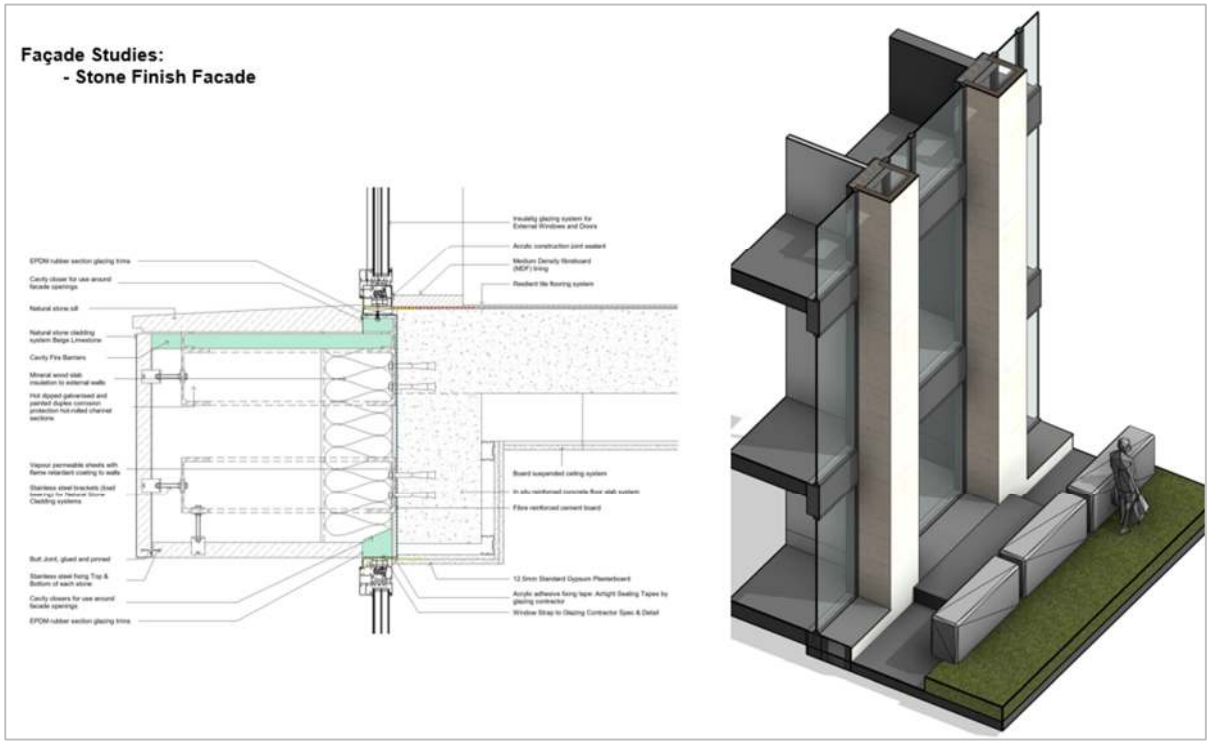


Figure 4.5.3 Façade Studies Brick Finish

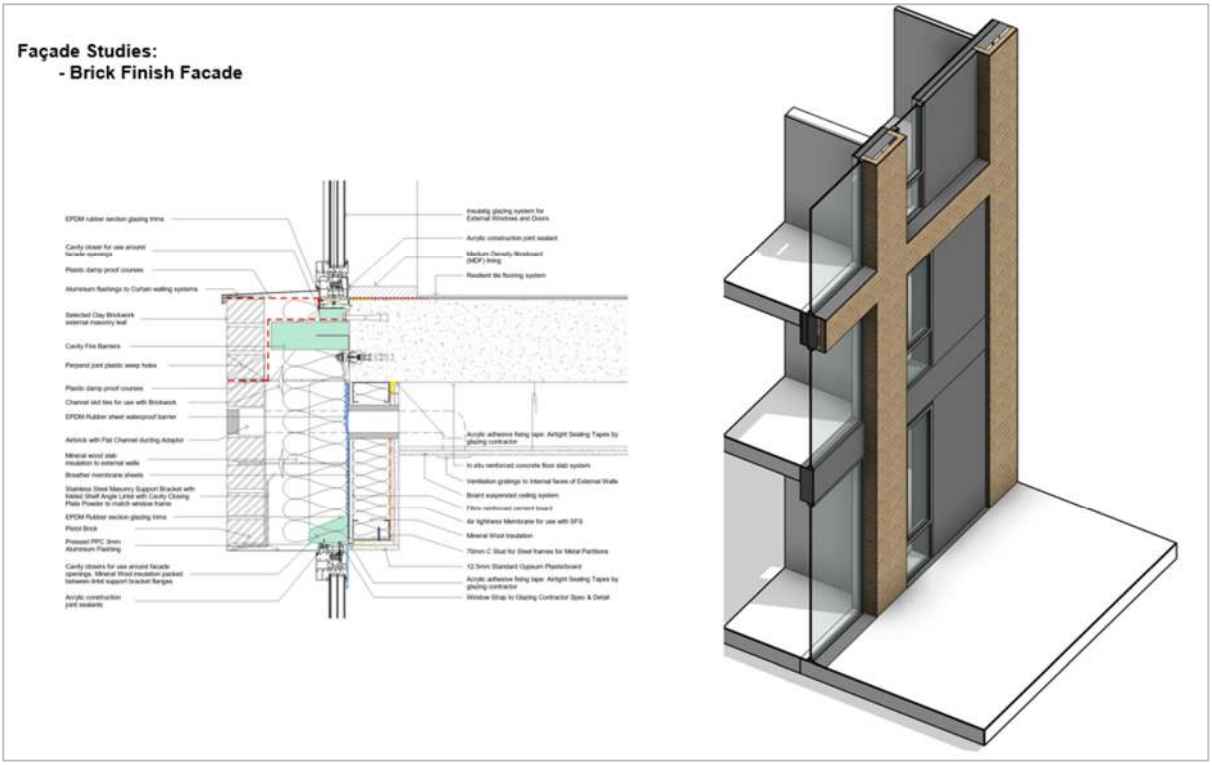
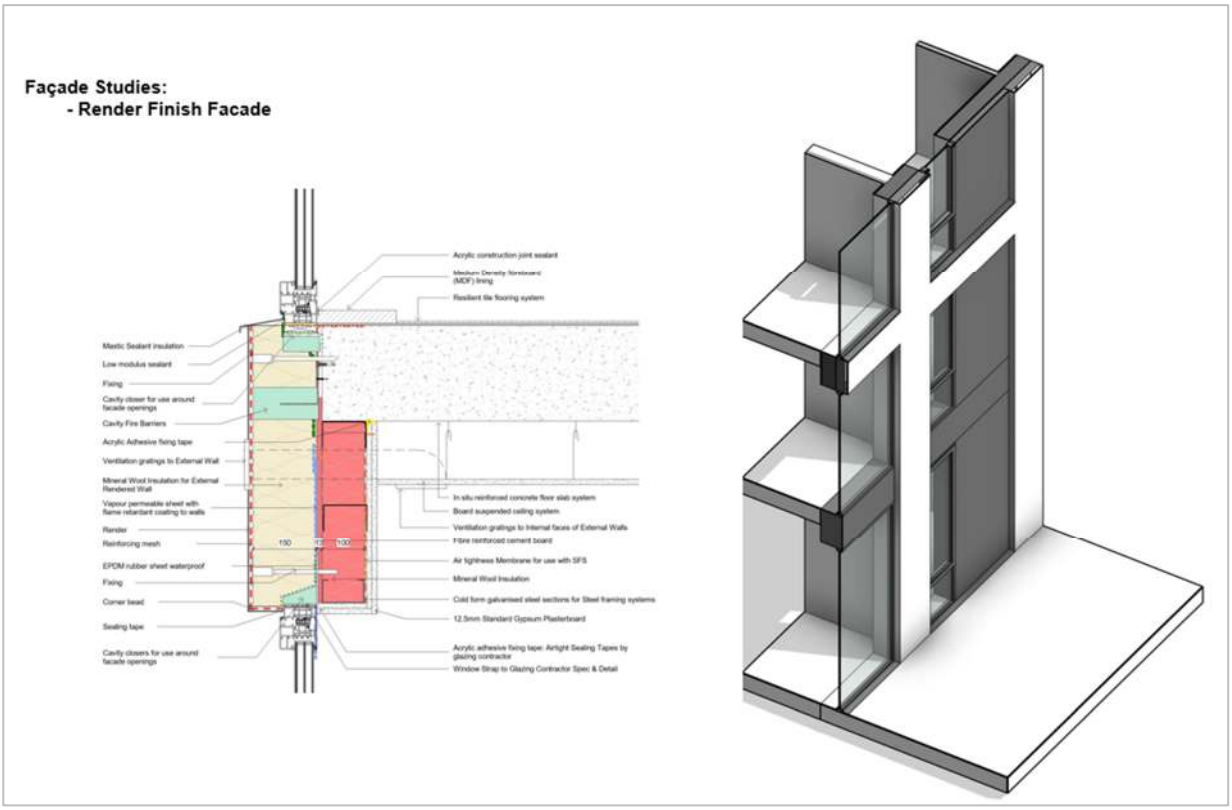


Figure 4.5.4 Façade Studies Render Finish (Discounted)



4.6 Alternative Mitigation Measures

The mitigation measures outlined in Chapters 5 to 15 of this EIAR, where appropriate, have been developed by competent experts relevant to the aspect of the environment under consideration and represent best practice with a view to avoiding or otherwise minimising potential impacts on the environment.

The mitigation measures proposed by the competent experts are deemed appropriate for the Proposed Residential Development. Therefore, no alternative mitigation measures have been described in this chapter.

4.7 "Do Nothing" Alternative

There are a number of reasons as to why the non-development of the subject project would represent an unsustainable use of land and infrastructure resources. This zoned and serviced site is located within a designated development and regeneration zone, in close proximity to a public transportation hub. The site is partially developed, and the proposed residential development will utilise much of the existing below ground structures at the site. In the absence of development, the existing development at the site would remain underutilised.

The existing landscaping scheme at the site is temporary and was put in place solely under Reg. Ref. 2724/13 to reduce the visual impacts of the previously unfinished development at the site. Condition 2 of Reg. Ref. 2724/13 limits the duration of the permission to 8 years (2021) after which this use will cease, unless the subject of another planning permission. In this way, the 'do nothing' scenario would contravene planning permission Reg. Ref. 2724/13 and would require that the site is reverted to its previously unfinished condition. This would have significant negative impacts on the amenity value and appearance of the subject site.

A 'do-nothing' scenario is considered an inappropriate and unsustainable approach that would result in the inefficient use of a strategically located and serviced landbank of zoned residential lands. A 'do nothing' scenario would also frustrate the delivery of the strategic planning objectives for the area and the region. In this way, the 'do-nothing' scenario is not considered appropriate for the subject site.

4.9 Conclusion

This chapter has sought to assess the reasonable alternatives in the construction, layout and design of this project, in accordance with both the European Commission and EPA Guidelines.

The proposed development provides for new residential development on a partially developed urban site, within an area designated for development and regeneration under the Dublin City Development Plan 2016-2022. It is therefore considered that the 'do nothing' scenario should not be pursed in the interest of sustainable development and efficient land use.

During the design process, the layout and design of the proposed development evolved in response to

historical, architectural, and visual requirements and several iterations of the site layout and alternative designs were considered. Any difficulties from an architectural, landscape or environmental viewpoint were assessed and, where necessary, the design was amended to address the issues encountered. number of consultations with DCC resulted in a lot of design iterations and changes to the original concept. Furthermore, the final scheme has been directly influenced by the technical and specific issues raised in the Board's Opinion (see Appendix 4A).

5 POPULATION AND HUMAN HEALTH

5.1 Introduction

This chapter examines the potential population and human health effects and mitigation measures of the proposed Strategic Housing Development (SHD) residential development at Heuston South Quarter (HSQ), Kilmainham, Dublin ("the Proposed Development"). The purpose of this assessment is to identify and assess: (a) the potential population, human health and wellbeing effects of the Proposed Development and (b) the measures incorporated into the project design in order to avoid, reduce, mitigate or remove potentially negative impacts associated with the Proposed Development.

5.1.1 Policy Context

The Dublin City Development Plan 2016-2022 (DCDP) is the current statutory development plan for the area. A key aspect of the DCDP Core strategy is that future development is prioritised within the intercity, key district centres and Strategic Development and Regeneration Areas (SDRA's).

The site where the Proposed Development is to be constructed forms part of the designated *SDRA 7 – Heuston and Environs (Section 15.1.1.10, DCDP)*, within a zoning delineation of *Z5* where it is the objective *'To consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity'*. Furthermore, it is stated that the primary purpose of this zone *'is to sustain life within the centre of the city through intensive mixed-use development…' (Section 14.8.5, DCDP)*. As documented in the DCDP, the Heuston Framework Plan of 2003 set out a framework for the development of the area surrounding Heuston Station, with a vision *'to create a coherent and vibrant quarter of the city that captures the public imagination with high quality services, development, design and public spaces that consolidate and improve the existing strengths of the area'*.

In line with local policy guidelines, the Proposed Development will deliver a high-density scheme of modern and adaptable new residential units, commercial facilities, and public space, within an existing mixed-use development, in close proximity to existing public transport, amenities, attractions, and local service provision. Accordingly, the assessment of the impact of the Proposed Development on population and human health takes the vision and objectives of local policy into consideration.

5.2 Characteristics of the Proposed Development Affecting Population and Human Health

The Proposed residential Development forms part of a larger development site within HSQ. It is envisaged that a planning application for a mixed-use commercial development[1] will be lodged that may include a hotel and office block to establish the uses, extent, layout, form, height and massing of development that may be appropriate on the site having regard to its physical and statutory land use planning context..

The Proposed Development consists of 399 no. Build to Rent apartments on a site of circa 1.08 ha. The

[1] The proposed Commercial Site development has not been sufficiently progressed at the time of the preparation of this EIAR to make any reasonable assumptions regarding construction details and the phasing of that development. It is noted that an EIAR will accompany any future development on the HSQ Commercial Site, and an assessment process has commenced for the purpose of the consideration of alternatives on that site.

Proposed development will consist of 46 no. studio apartments, 250 no. 1-bedroom apartments, 90 no. 2-bedroom/4 person apartments, and 13 no. 2-bedroom/3 person apartments arranged over 5 blocks of varying height of 3-, to 18-storeys over a basement (vehicle and bicycle) parking level. The Proposed Development includes a retail unit of 120 sqm at ground floor/podium level in Block B, as well as numerous residential amenities such as a shared co-working area / lounge (178 sq.m) and gym (102 sq.m) at lower ground floor level, lounges on either side of a residential foyer at ground floor / podium level within Block A (196 sq.m), and a TV Room / lounge (57 sq.m) at ground floor / podium level within Block C.

The site on which the Proposed Development is to be constructed is designated as a Strategic Development and Regeneration Area (SDRA) in the Dublin City Development Plan, 2016-2022 (DCDP), and is zoned as 'Z5' with the objective to 'consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity'. The site is also located in a designated 'Conservation Area', which dictates that the Proposed Development should not harm the features and visual characteristics of the area, but rather replace, improve, re-instate or develop contemporary architecture and buildings that are in harmony with such other features in the surrounding area, and positively contribute to the improvement of open spaces and the wider public realm.

A full development description is included in Chapter 3 'Description of Development' of this EIAR.

5.3 Assessment Methodology

This EIAR document has been prepared in accordance with the European Union EIA Directive 85/337/EC (as amended by 97/11/EC, 2003/4/EC, 2011/92/EU), Directive 2014/52/EU the requirements of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296/2018), and in accordance with the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (published in August 2018) and the 2017 Draft EIA Guidelines published by the EPA.

The 2014 Directive's title change to assess the impact on 'Population and Human Health' and the 2017 Draft EIA Guidelines published by the EPA have been adhered to, including the requirement that 'the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc'.

The assessment of potential impacts of the Proposed Development on the Population and Human Health of residents in the Study Area are based on a desktop assessment of local population information sourced from the Central Statistics Office (CSO) Census data captured in the previous Censuses of 2011 and 2016. Data sets analysed from the census data in this assessment include:

- Population Data
- Household Data
- Economic Activity and Employment Data
- General Human Health Data

Population data reflects on the growth, age and gender distribution, and nationalities of people in the Study Area. Household data reflects on the household composition and predominant family cycles of

households in the Study Area. The economic and employment context draws on principle economic status data of persons in the Study Area aged 15 years and older. Census data was also used to reflect on the (self-evaluated) general health status of residents in the Study Area.

The data used analyses the socio-economic and demographic attributes of the Study Area as recorded by the Census at Electoral Division (ED[2]) level. Data from the 2011 and 2016 Censuses were used to identify and highlight change in the social fabric of the Study Area over time. All data was sourced directly from the CSO and then modelled and reproduced according to the requirements for the analysis of population and human health characteristics in the Study Area.

To provide further context to the social and demographic assessment, a similar data analysis exercise, but at broader scale, was performed on Dublin Region and the State.

Furthermore, an assessment of the current provision of social infrastructure was conducted through desktop spatial analysis, while planning permission data informed the evaluation of the impacts of other current and consented development and land use activity in the Study Area in relation to the Proposed Development. This chapter has been prepared having regard to the following guidelines:

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, Draft August 2017);
- Advice Notes for Preparing Environmental Impact Statements (EPA, draft September 2017);
- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002); and
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2002).
- Dublin City Development Plan (2016-2022)

5.3.1 The Study Area

A Study Area has been created for this assessment as depicted below in Figure 5.3.1.1. To analyse the effects of the Proposed Development on Population and Human Health within the area surrounding the site, the Study Area was delineated as 98 Small Areas (SA) in proximity to where the site is located. This selection of the Study Area provides a good representation of the socio-economic and demographic characteristics of the immediate populated area potentially impacted by the Proposed Development. The Study Area therefore captures an area of Kilmainham, The Liberties (Dublin 8), and Stoneybatter (Dublin 7) neighbourhoods on the western side of central Dublin approximately 1km from the Proposed Development.

[2] EDs are the smallest legally defined administrative areas in the State for which Small Area Population Statistics (SAPS) are published from the Census

Figure 5.3.1.1 Study Area for the Population and Human Health Assessment

The Proposed Development site is situated approximately 2.5km from the Dublin City Centre, and forms part of the larger Heuston South Quarter (HSQ) development. The HSQ is located on the corner of St John's Road West (Chapelizod Bypass) and Military Road, with vehicular and pedestrian access from both roads. The HSQ is south of the Heuston Train and Bus Station, with the Irish Museum of Modern Art and Royal Hospital Kilmainham Gardens and public park on the western boundary. The surrounding area is characterised by a mix of high density residential and high street retail, with other notable activities in the area including the St Patrick's University Hospital, St James' Hospital, Guinness Brewery (incl. Guinness Storehouse and Open Gate Brewery), Roe & Co. Whiskey Distillery, Pearse Lyons Whiskey Distillery, Kilmainham Gaol, Croppies Acre Memorial Park, and the Irish War Memorial Park and Gardens.

5.3.2 Data Sources

- This assessment draws primarily on the following range of publically available information sources and data bases:Primary data sources (e.g. Small Area Population Statistics (SAPS) data from Census 2011 and 2016 produced by the Central Statistics Office);
- Maps of the surrounding area
- Relevant social infrastructure characteristics considered during the Environmental Impact Assessment (EIA) (including education, medical, recreational, and transport facilities);
- A review of secondary sources including research by the CSO and the Department of Education

and Skills;

- Dublin Region and State level data for comparative analysis
- Túsla Register of Early Years Services, supplemented by telephone and online surveys
- Department of Education and Skills Data

In the case of publicly available data, the most recent and up-to-date data source has been used. Data of this nature represents a snapshot in time and cannot capture more recent population and human health changes (including the impact of Coronavirus/COVID-19), but nevertheless represents the most robust basis for assessment.

This assessment is also informed directly by information included in this planning application and EIAR. This assessment will consider the interaction of population and human health impacts and other environmental impacts identified through topic assessments in the wider EIAR, including air, dust and climate, and noise and vibration assessments.

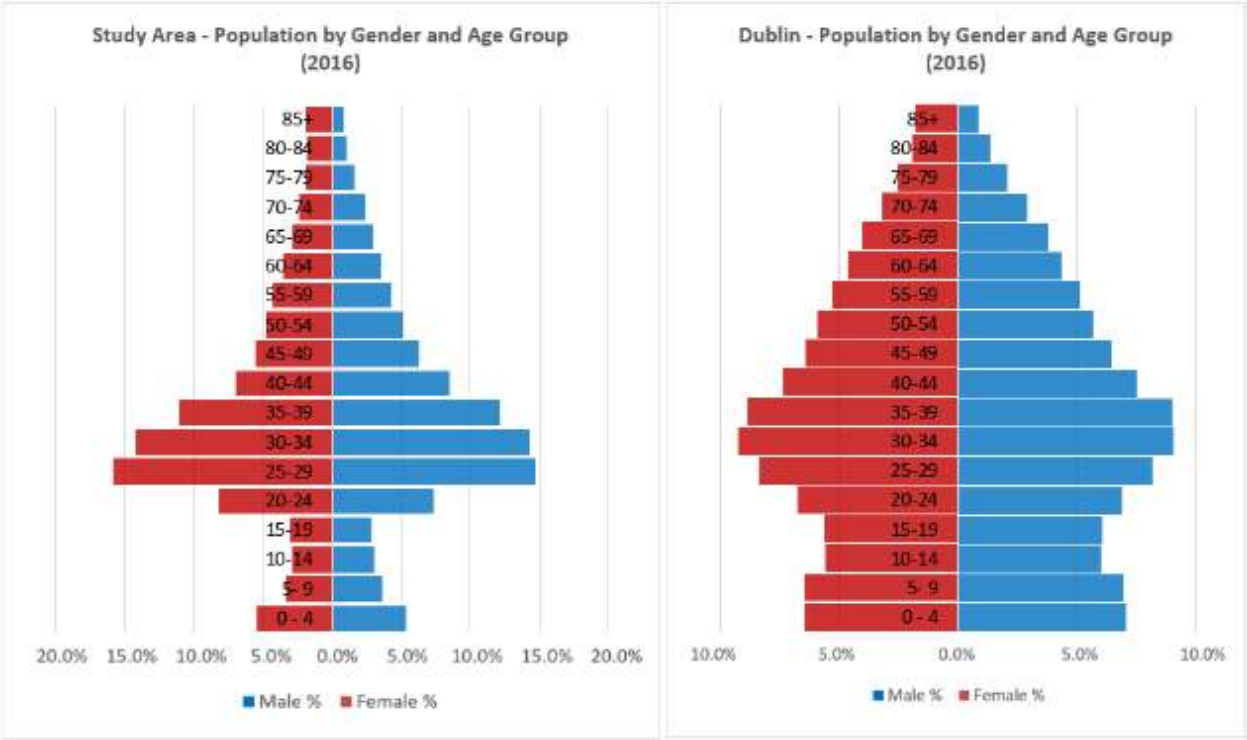
5.4 Receiving Environment

This section provides a description of the analysis performed on the assessment themes to develop an understanding of the current state of the environment where the Proposed Development will be located. This analysis informs the professional conclusions reached as to the nature, duration, and significance of potential impacts.

5.4.1 Population Characteristics

Data analysis on the Study Area and Dublin Region show differing trends in the distribution of the population in various age cohorts, with the Study Area having a noticeably larger portion of its population in the 25-29 years age cohort, and a smaller portion between the ages of 45 to 59, compared to Dublin Region figures.

Figure 5.4.1.1 Study Area and Dublin Region Population Pyramids



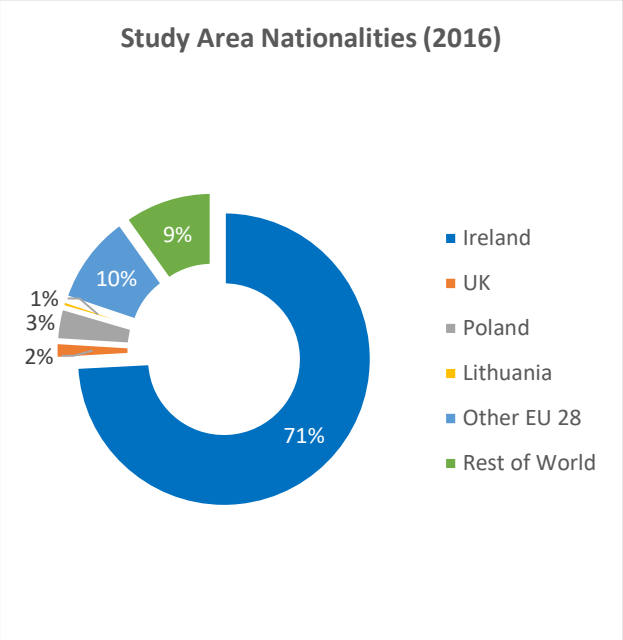
The CSO Census results (Census 2016) indicate that there were 21,948 residents in the Study Area, which increased by 1% from 21,772 as recorded in the 2011 Census. Although the largest portion of the population of the Study Area is between the ages of 25 and 34, there was a 11.5% decrease in the 20-29 years age group, and considerable growth in the older age groups (between 40 and 79 years). As seen in Table 5.4.1.1, the Study Area recorded significant growth of 12% in the 35-64 age group (amounting to 879 people). Although the percentage growth in the 65+ age group is high at 8%, the numerical value of the increase is only 154 people in the intercensal period.

Table 5.4.1.1 Study Area, Dublin Region, and State Population by Age Group (Summary)

Age	Study Area				Dublin Region	State
	2011 No.	2016 No.	% Change	% 2016	% 2016	% 2016
0-4	1,195	1,175	-2%	5%	7%	7%
5-18	1,813	1,901	5%	9%	17%	18%
19-34	9,264	8,339	-10%	38%	26%	21%
35-64	7,476	8,355	12%	38%	38%	40%
65+	2,024	2,178	8%	10%	12%	13%
Total	21,772	21,948	1%		1,347,359	4,761,865

While the Dublin Region and Study Area have a majority in Irish nationals (83% and 71% respectively), there is a notable presence of other nationalities, as shown in Figure 5.4.1.2.

Figure 5.4.1.2 Study Area Nationalities



At Study Area level in 2016, 'Other EU' nationals and people from the 'Rest of the World made up 19% of the total population (majority share of 'Other EU' nationals). In addition to the previously mentioned nationalities, 2016 data suggest a 3% portion of nationals from Poland, with the sum of all recorded foreign nationals contributing 25% (5,263) to overall population in the Study Area. The number of foreign nationals in the Study Area, however, decreased from 2011 to 2016 by 6%, with the largest decreases in foreign nationals from Poland (-29%) and the 'Rest of the World' (-19%). Foreign nationals in the Dublin Region make up 15% of the population, compared to 11% foreign nationals in the State.

5.4.2 Household Characteristics

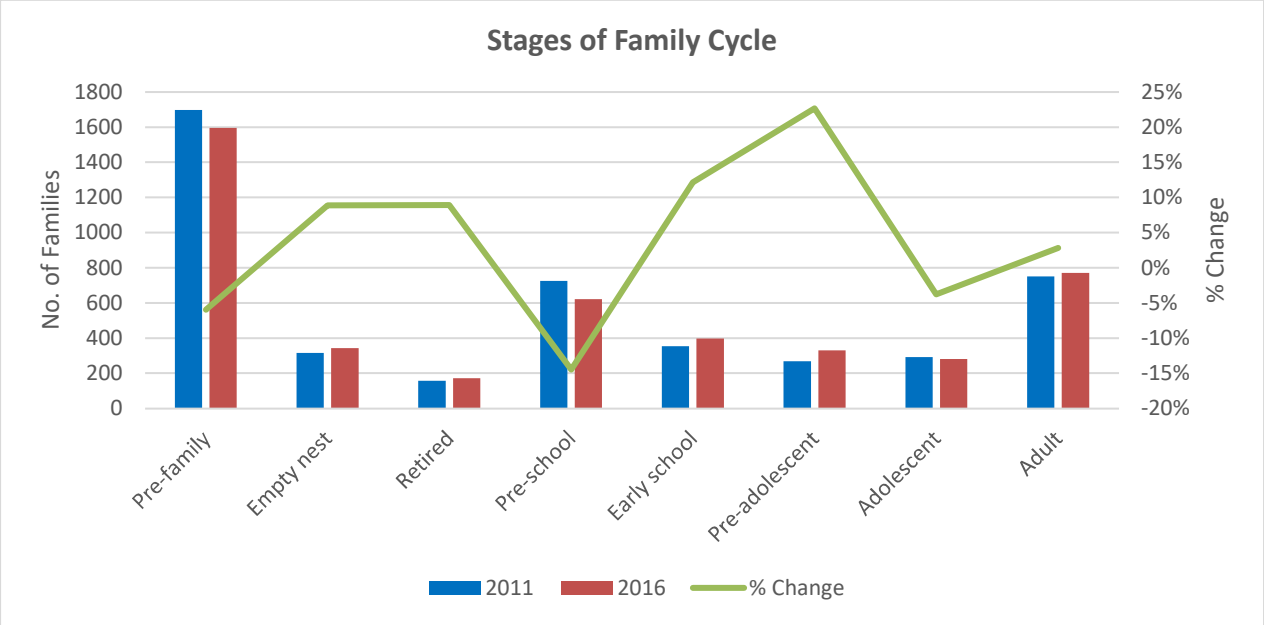
Trends in household data from the intercensal period for the Study Area are summarised in the table below.

Table 5.4.2.1 Study Area Household Composition

	Study Area				Dublin	State
Composition of Households	**2011**	**2016**	**Change**	**2016%**	**2016%**	**2016%**
Single person	3293	2877	-13%	32%	23%	23%
Married couple	850	839	-1%	9%	13%	15%
Cohabiting couple	1063	984	-7%	11%	5%	4%
Married couple and children	1022	1010	-1%	11%	27%	31%
Cohabiting couple and children	169	256	51%	3%	4%	4%
Father and children	97	73	-25%	1%	1%	1%
Mother and children	777	736	-5%	8%	9%	9%
Couple and others	210	255	21.4%	3%	2%	1%
Couple children and others	97	107	10%	1%	2.0%	2.0%
Father children and others	15	14	-7%	0.2%	0%	0%
Mother children and others	89	104	17%	1%	1%	1%
Two or more family units	84	66	-21%	1%	2%	1%
Non-family households and relations	383	359	-6%	4%	3%	2%
Two or more non-related persons	1205	1433	19%	16%	7%	4%
Total	**9354**	**9113**	**-3%**	**0%**		

A distinct difference in household composition is noted between Dublin Region (and the State) and the Study Area household profiles where the majority of households at Dublin Region and State levels are composed of 'married couple and children' (Dublin Region 27%; State 31%), as opposed to the Study Area's majority of 'single person' (32%) households. Other notable household composition in the Study Area is 'two or more non-related persons' at 16% (increase of 19% from 2011), and 'cohabiting couple', at 11% of the total households despite the decline of 7% in 'cohabiting couples'. Distribution is relatively evenly split across other compositions. The composition with the largest change from 2011-2016 was 'single person' (-416; -13%). The State and Dublin Region, in comparison, have a higher percentage of 'married couple' households and a higher rate of households with children. As identified in the population and households' statistics, the Study Area characteristics highlight a majority of young adult population, with a tendency to live in single person or co-living households. A shift in demographics is however noticed with an increase in the number of older adult population is however (40-65+ years). This trend is also seen in the change in family cycles, with an increase in early school, pre-adolescent, and empty nest families in the intercensal period, and a subsequent 5% increase in average household size from 2.11 (2011) to 2.22 (2016).

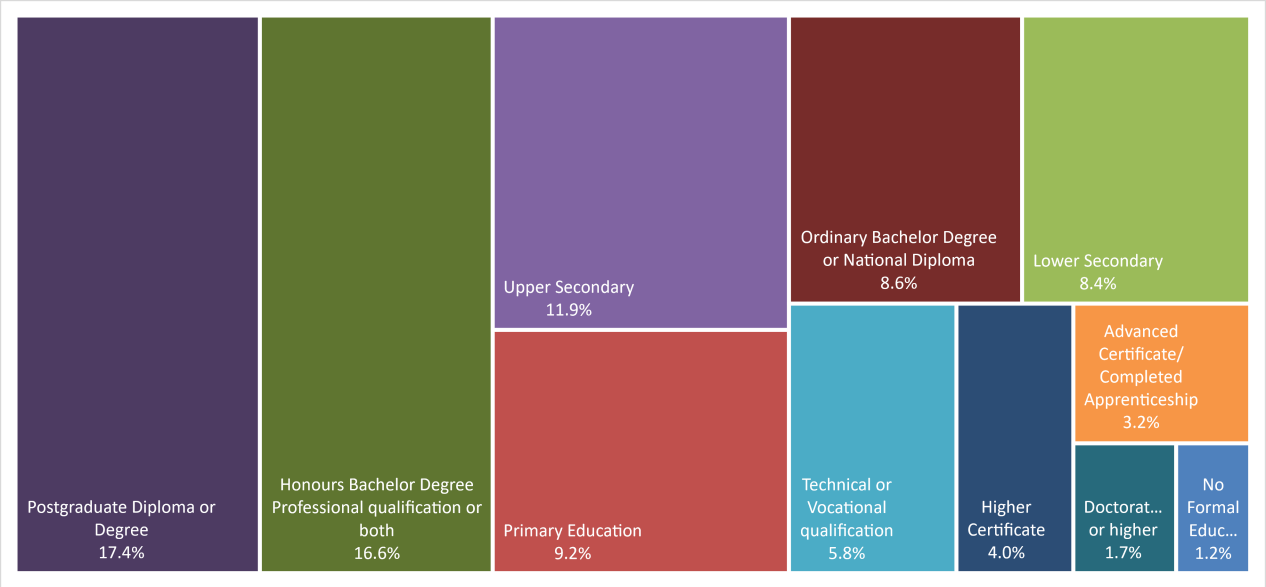
Figure 5.4.2.1 Study Area Family Cycle Stages



5.4.3 Education

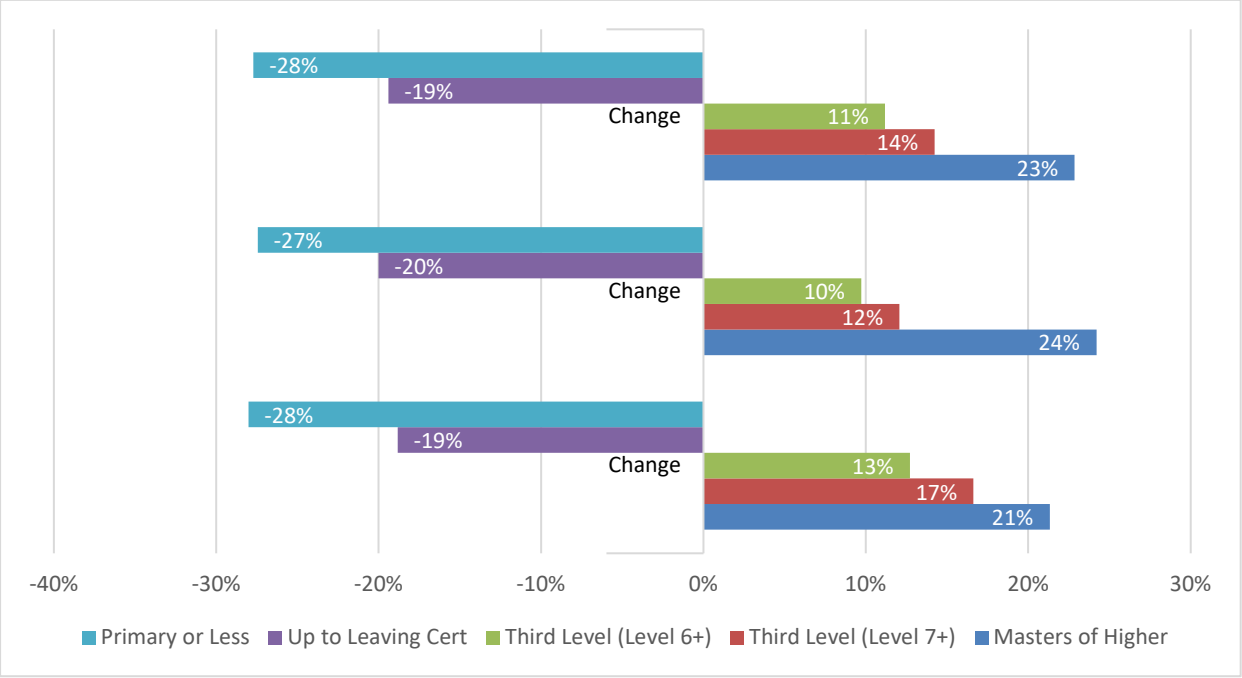
Among residents of the study area aged 15 and over, 48% of residents hold some form of Third Level qualification (Level 6 or above), slightly higher than the national average of 42%.

Figure 5.4.3.1 Study Area Educational Attainment



As seen in the following figure, the general level of education (of people aged 15 and older) in the study area has increased, with a decline in people having less than primary or up to leaving certificate qualifications, and an increase in the number of people with third level or higher qualifications. Particularly, the number of females with masters or higher degrees increased significantly (24%), while 17% more males attained a third level (level 7+) qualification.

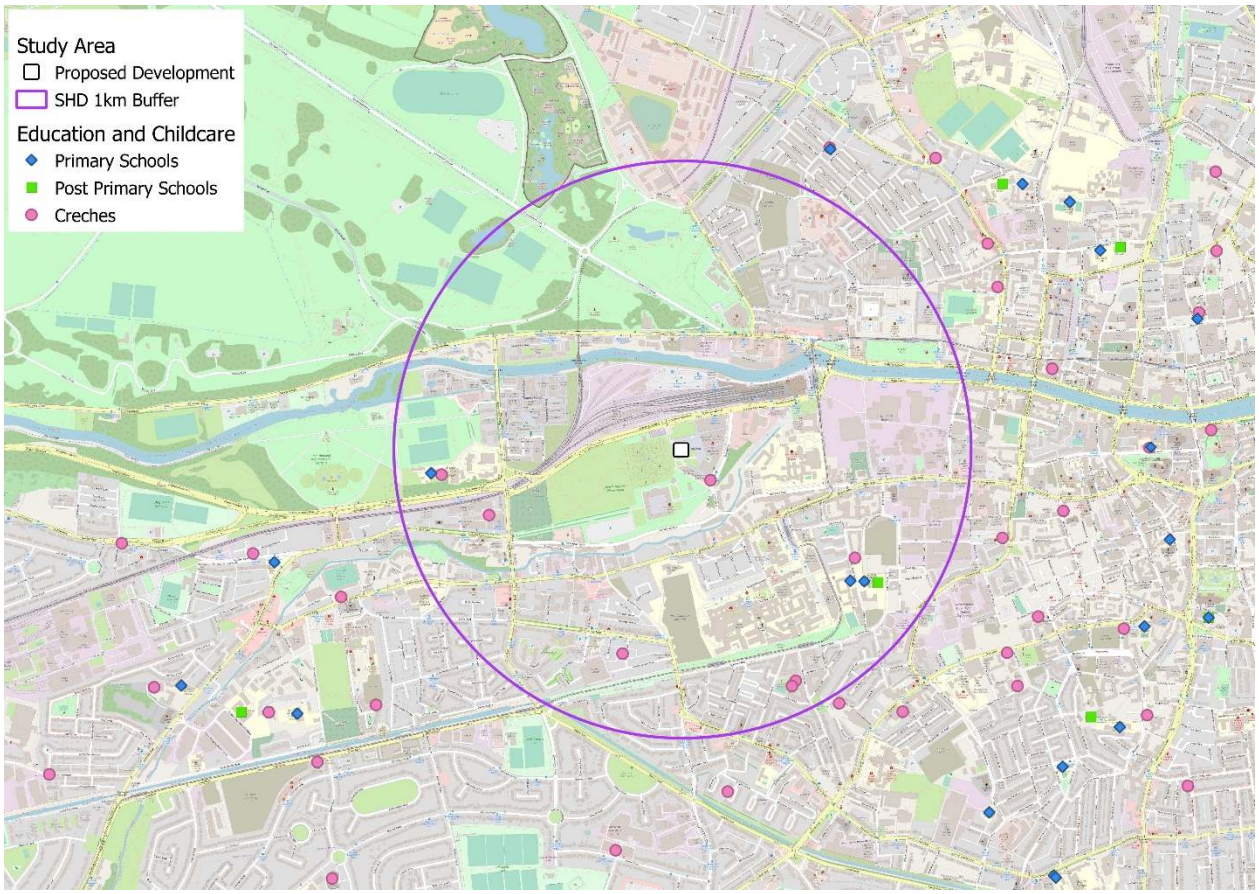
Figure 5.4.3.2 Change in highest level of education of people in the Study Area



5.4.3.1 Education Facilities in the Study Area

There are three primary schools located within the Study Area of the Proposed Development, with a secondary school in the south eastern quarter of the Study Area. There are seven childcare facilities within the Study Area. Figure 5.4.3.1.1 shows that most education facilities are in the southern part of the Study Area and beyond. Table 5.4.3.1.1 lists the schools (primary and post primary) in the area, and the number of pupils over the last three academic years as recorded by the Department of Education and Skills[3].

Figure 5.4.3.1.1 Education Facilities in the Study Area



[3] Number of pupils as recorded by Department of Education and Skills (DES). Available at: https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/

Table 5.4.3.1.1 Primary and Post Primary Education Facilities in the Study Area

Official Name (Primary Schools)	Type	DES Enrolment Figure by Academic Year			Change in Enrolment Figure
		2017/18	2018/19	2019/20[4]	
Gaelscoil Inse Chor	Primary	234	238	241	+7
St. James Primary School	Primary	255	245	251	-4
Canal Way Educate Together National School	Primary	240	281	317	+77
All Primary Schools		729	764	809	+80
Official Name (post Primary Schools)	Type	DES Enrolment Figure by Academic Year			Change in Enrolment Figure
		2017/18	2018/19	2019/20	
C.B.S James Street	Secondary	117	145	152	+35
All Secondary Schools		117	145	152	+35

The Table 5.4.3.1.1 provides a breakdown of the schools in the Study Area of the Proposed Development.

The table shows that the enrolment of primary schools in the area has changed disparately, with a net increase in enrolment of 80 pupils over the past three academic years, despite the net decrease in enrolment for St James's Primary School. Similar change is noted in the enrolment figures of the secondary school in the Study Area, whose enrolment increased throughout the three academic years to provide an additional 35 secondary school places by 2019/20.

The seven childcare facilities within the study area provide both all-day and sessional childcare. Capacity figures for these childcare facilities have been sourced using Túsla registration reports and a survey conducted through telephone and online correspondence (capacity assessment not inclusive of facilities outside the study area). However, where only Túsla reports were available the figures represent the maximum capacity of children allowed at each facility and does not represent the current enrolment figures. The telephone and online survey represent figures as confirmed by facilities in the month July 2021. The information captured is shown in the following table.

4 Figures correct as of 30 September 2019. Available at: https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/

Table 5.4.3.1.2 Childcare Facilities within the Study Area

Official Name	Service Type	Survey and Túsla Records[5]		
		Capacity	Enrolment	Age Profile
Children's Centre Rialto	**N/A**	N/A*	N/A*	N/A*
Wee Tots Creche	**Full day, sessional**	44	26	0-6 years
Naionra Bogha Baisti	**Sessional**	22**	N/A*	3-6 years
Safari Childcare (Kilmainham)	**Full day, part time, sessional**	32	32	2-6 years
Safari Childcare (HSQ)	**Full day, part time, sessional**	120	120	1-6 years
Fatima Groups United Children's Day Care Centre	**Full day, part time**	50	78 (50 in morning session, 28 in afternoon session	1-5 years
Mayfield Montessori	**Sessional**	22	20	2-6 years
All Childcare Facilities		c. 290	c. 276	

* Official figures not available
** Túsla Records

5.4.4 General Human Health

The Census records the self-evaluated general health status of respondents (as opposed to the health status confirmed by medical practitioners). In terms of general health and wellbeing, disparate changes were recorded throughout the spectrum as seen in Table 5.4.4.1.

[5] Source: Telephone and online survey, as well as Túsla Register of Early Years Services by County. Available at: https://www.tusla.ie/services/preschool-services/list-of-pre-school-services-by-county/

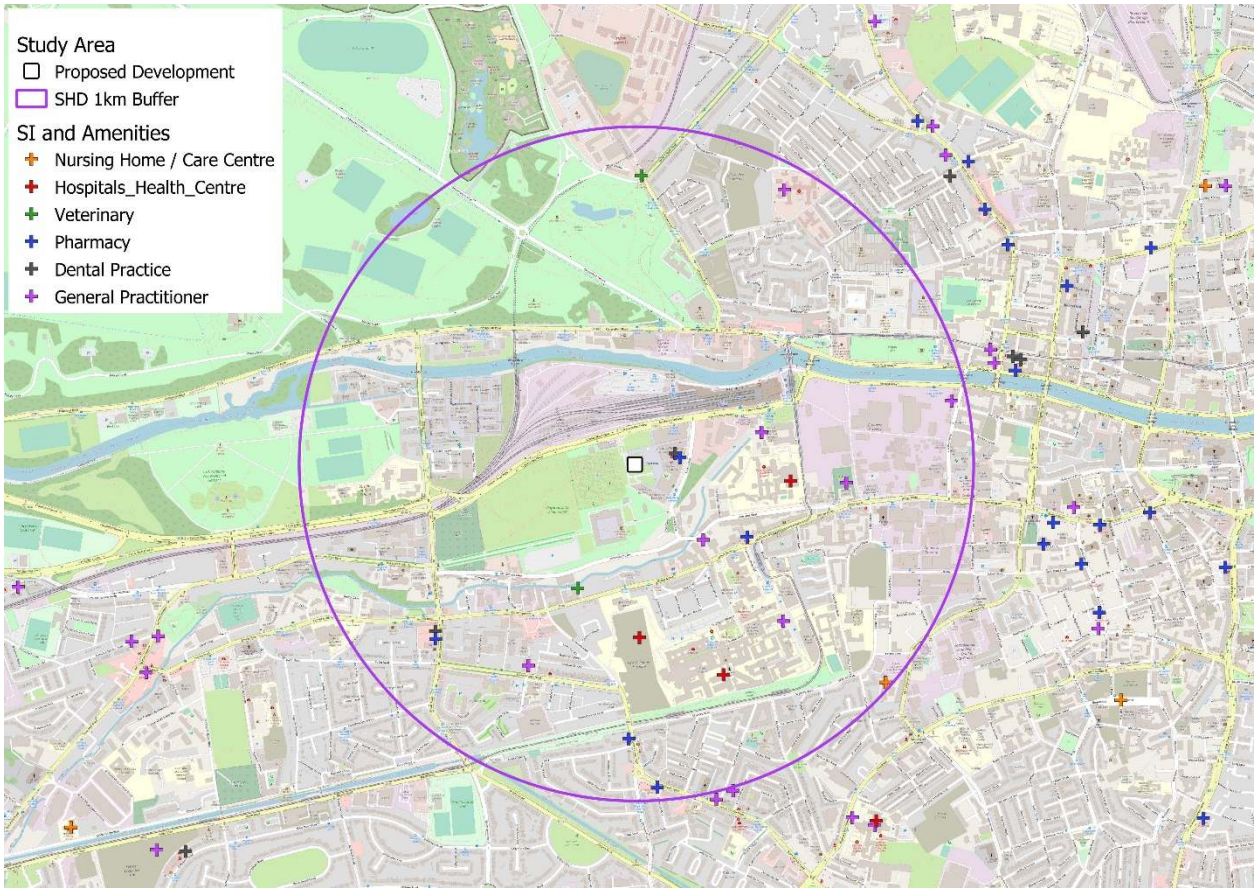
Table 5.4.4.1 Study Area Population by General Health and Gender

	Male			Female			Total			
General Health	**2011**	**2016**	**% Change**	**2011**	**2016**	**% Change**	**2011**	**2016**	**% Change**	**2016%**
Very good	5,845	5,889	1%	5,926	5,774	-3%	11,771	11,663	-1%	53.1%
Good	3,133	3,035	-3%	3,028	2,968	-2%	6,161	6,003	-3%	27.4%
Fair	1,072	964	-10%	1,016	940	-7%	2,088	1,904	-9%	8.7%
Bad	239	268	12%	247	224	-9%	486	492	1%	2.2%
Very bad	83	46	-45%	87	62	-29%	170	108	-36%	0.5%
Not stated	580	959	65%	516	819	59%	1,096	1,778	62%	8.1%
Total	10,952	11,161	2%	10,820	10,787	0%	21,772	21,948	1%	

From the table it is noted that varied percentage changes in health status were recorded throughout the Study Area. Disparate changes included a 9% decrease in females with 'bad' health compared to a 12% increase in males in 'bad' health. Despite the 53% of the Study Area population being in 'very good' health, a general decline in health is noted as the number of people in 'very good', 'good', and 'fair' health declined in the intercensal period.

A social infrastructure analysis conducted in the study area and surrounding area identified healthcare facilities, as shown in Figure 5.4.4.1. These healthcare facilities include hospitals and health centres (3), General Practitioners (GP) (6), pharmacies (5), dental practices (2), nursing home and care centre (1), and veterinary clinics (2). As seen in on the map, healthcare facilities are generally centred toward the more central parts of Dublin City Centre.

Figure 5.4.4.1 Healthcare Facilities in and near the Study Area



5.4.5 Economic Activity and Employment

The principal economic status as captured by the CSO, provides a breakdown of the number of people aged 15 years and older in the labour force that are economically active and inactive, unemployed, or those looking for their first job. Persons or groups over 15 years of age not participating in the labour force are typically students, home makers, retirees, and persons unable to work due to illness or disability and they are considered to not be economically active.

The following table provides an overview of the labour force in the Study Area.

Table 5.4.5.1 Population Aged 15 years and Over by Principal Economic Status

	Study Area				Dublin Region	State
Principal Economic Status	**2011**	**2016**	**Change**	**2016%**	**2016%**	**2016%**
At work	10,660	11,931	11.92%	62%	57%	53%
Looking for first regular job	204	238	16.67%	1%	1%	1%

Principal Economic Status	Study Area				Dublin Region	State
	2011	2016	Change	2016%	2016%	2016%
Unemployed having lost or given up previous job	2,355	1,587	-32.61%	8%	7%	7%
Student	2,195	1,714	-21.91%	9%	12%	11%
Looking after home/family	941	781	-17.00%	4%	7%	8%
Retired	1,827	2,025	10.84%	10%	13%	15%
Unable to work due to permanent sickness or disability	1,062	913	-14.03%	5%	4%	4%
Other	65	178	173.85%	0.9%	0.4%	0.4%
Total	**19,309**	**19,367**				

There has been a steady decline of 32.6% in unemployment. Employment in the Study Area increased by 11.9% from 2011 to 2016, which equates to 62% of the 15 years and older population that are at work. The decrease in the number of students coincided with the decrease in the population aged 10-19 (-1%) and 20-29 (-11.5%). The decrease in people 'looking after family/home' and 'unable to work due to permanent sickness and disability' and subsequent increases in employment resulted in a 4% increase in the economically active labour force. By comparison, employment rates in Dublin Region and the State are below the Study Area at 57% and 53% of the working age population, respectively.

5.4.6 Social Infrastructure and Amenities

Social Infrastructure (SI) is defined by the European Association of Long-Term Investors[6] as a subcategory of infrastructure that are seen as physical assets in the social sector that provide personal (individual/household) benefits and community benefits to increase social cohesion. The figures below provide an overview of the social infrastructure available in proximity to the Proposed Development.

6 Fransen, L., del Bufalo, G., Reviglio, E. (2018). Boosting Investment in Social Infrastructure in Europe, Report of the High-Level Task Force on Investing in Social Infrastructure in Europe 2018. [PDF File]. Retrieved from: https://ec.europa.eu/info/sites/info/files/economy-finance/dp074_en.pdf

Figure 5.4.6.1 Social Infrastructure and Amenities (Map 1)

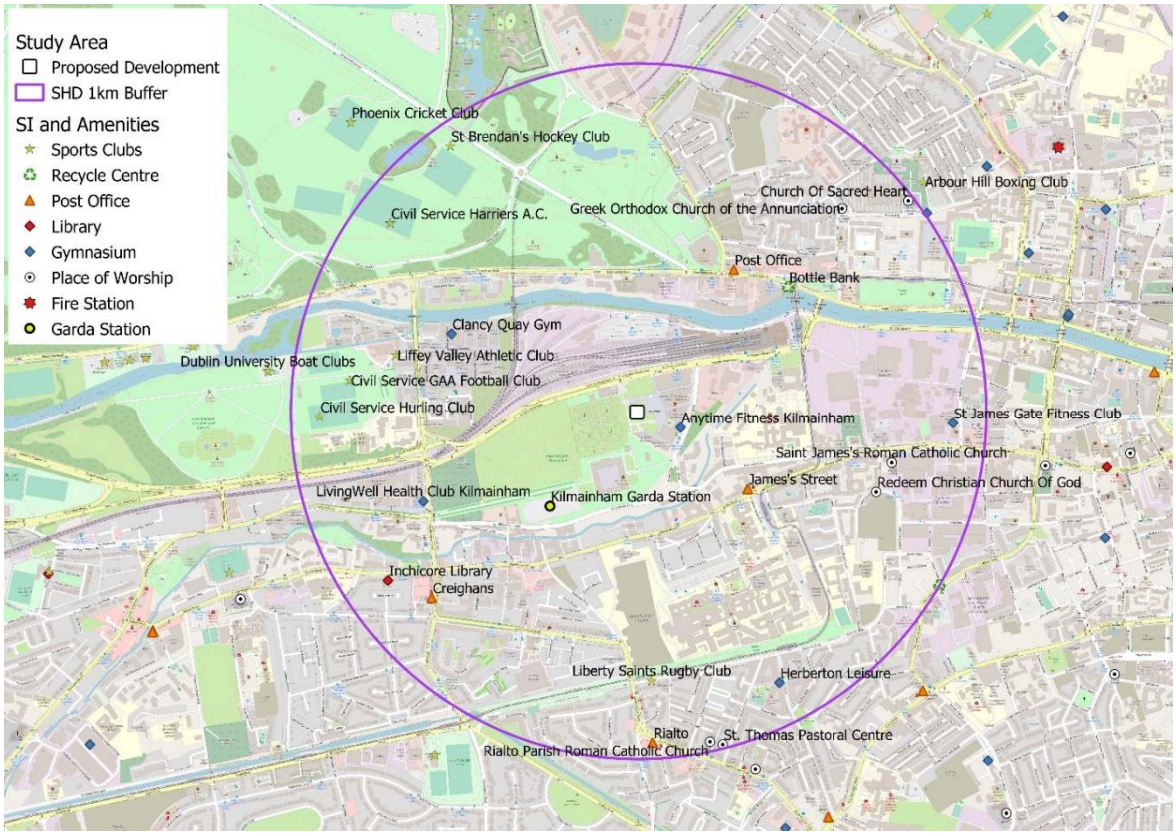
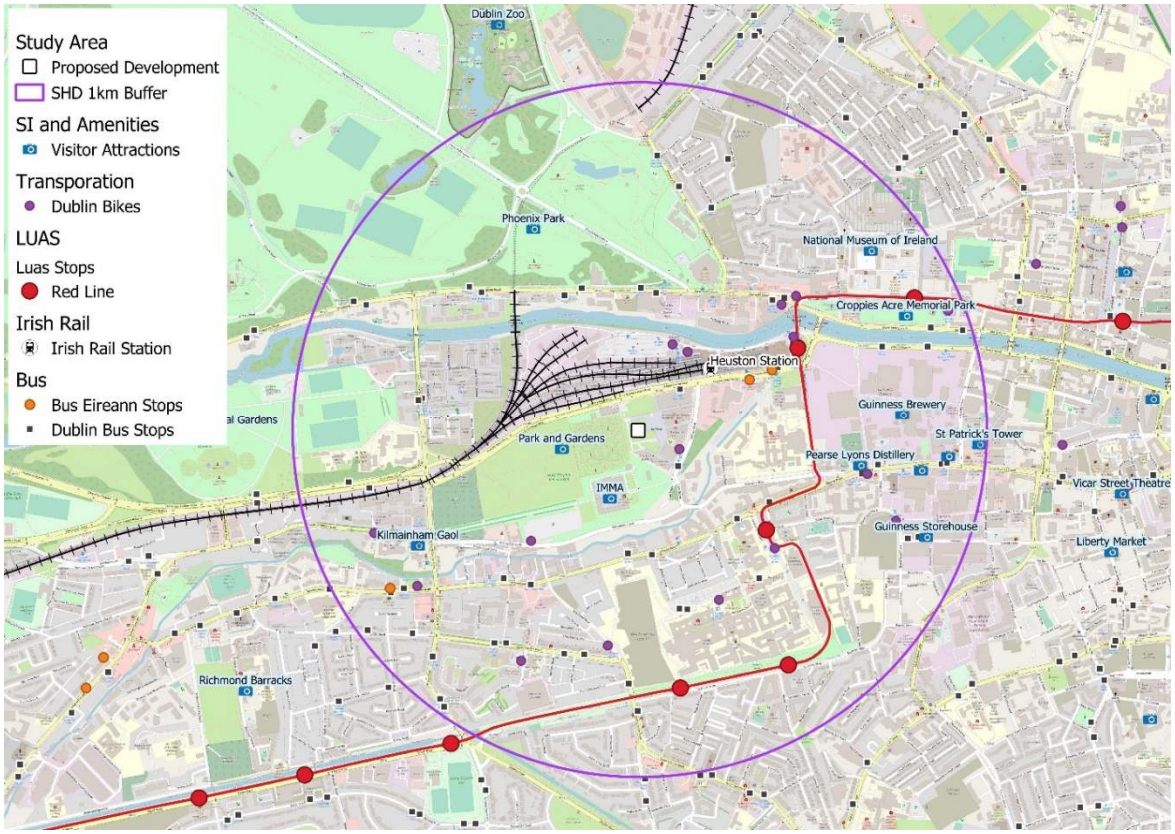


Figure 5.4.6.2 Social Infrastructure and Visitor Attractions (Map 2)



As seen in Figures 5.4.6.1 and 5.4.6.2, a variety of different SI and amenity facilities are in close proximity to the Proposed Development. The number of SI facilities within one kilometre from the site are listed in the table 5.4.6.1 below.

Table 5.4.6.1 Social Infrastructure and Amenities Within 1km from Proposed Development

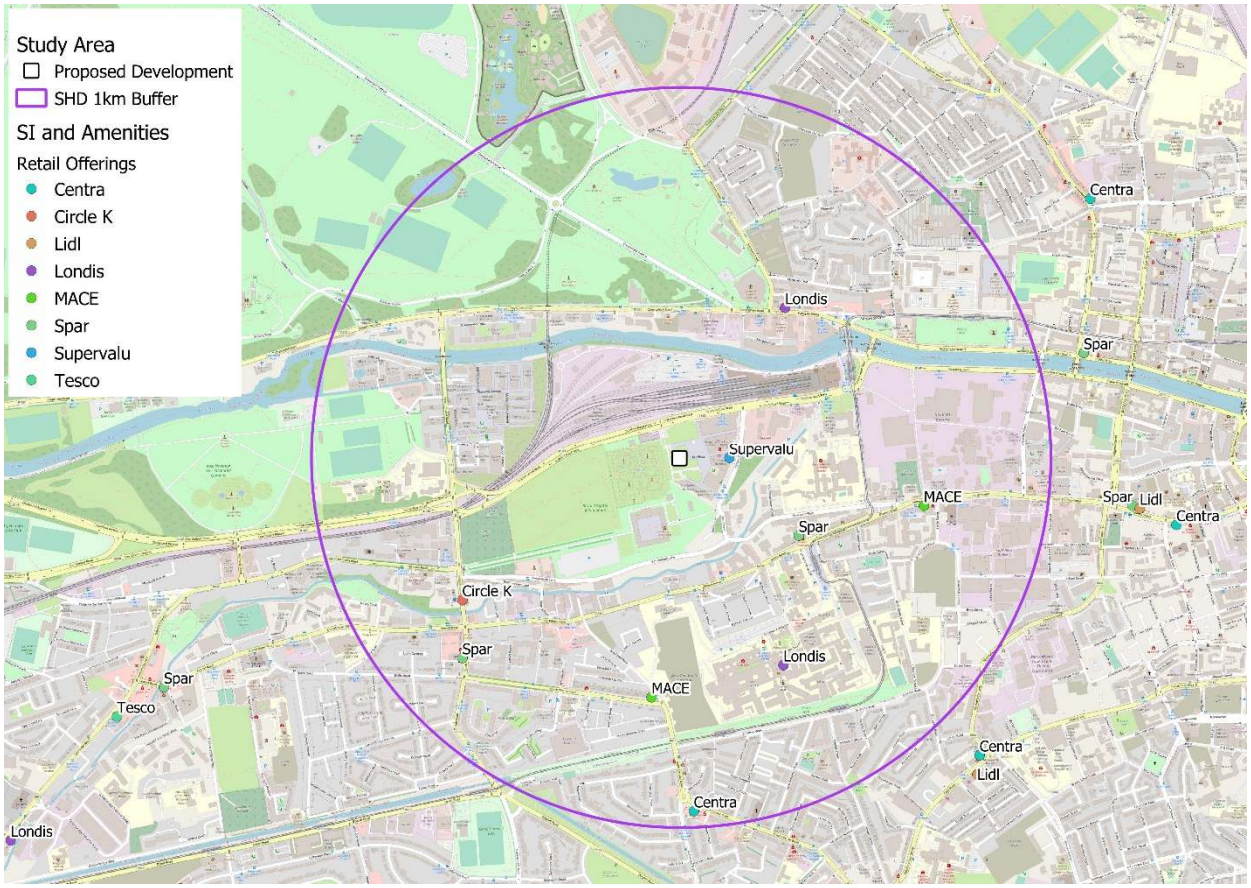
Amenity	Quantity	Amenity	Quantity
Creche	7	**Post Office**	4
Primary School	3	**Library**	1
Secondary School	1	**Bring Bank (Recycling Centre)**	1
Pharmacy	5	**Gymnasium**	6
Hospital and Health Centre	3	**Sport Club**	6
Dental Practice	2	**Points of Interest**	12
GP	8	**Dublin Bikes**	16
Nursing Home	1	**Dublin Bus Stop**	58
Fire Station	0	**Bus Eireann Stop**	3
Garda Station	1	**LUAS Stop (Red Line)**	5
Place of Worship	6	**Irish Rail Stop**	1

Social infrastructure near the site caters for different age groups and family cycles resident to this area. There are seven (7) creches available to provide childcare for parents with small children, while three primary schools are located in close proximity. Only one secondary school is located within the 1km buffer zone, while an additional 21 primary schools and 8 secondary schools located within 2km of the Proposed Development. A variety of healthcare facilities are accessible in the 1km buffer zone, in addition to 6 sports clubs and gyms.

The Proposed Development has a high degree of access to public transport through a variety of public transport modes. Access to the modes include 58 Dublin Bus stops, predominantly along major arterial routes (such as James Street, Thomas Street, Victoria Quay, and St. John's Road West) and other connector roads. There are also two Bus Eireann stops within the 1km buffer zone from the Proposed Development. Rail transport access includes five LUAS Red Line stops (predominantly east-west line towards the city centre (east) and Tallaght (west)) and the Irish Rail Dublin Heuston Train Station providing services to destinations such as Dundalk, Galway, Limerick, Tralee, Cork, and Waterford. Non-motorised public transport is provided through 16 Dublin Bikes (bicycle sharing) stands that provide transport to various locations in the city.

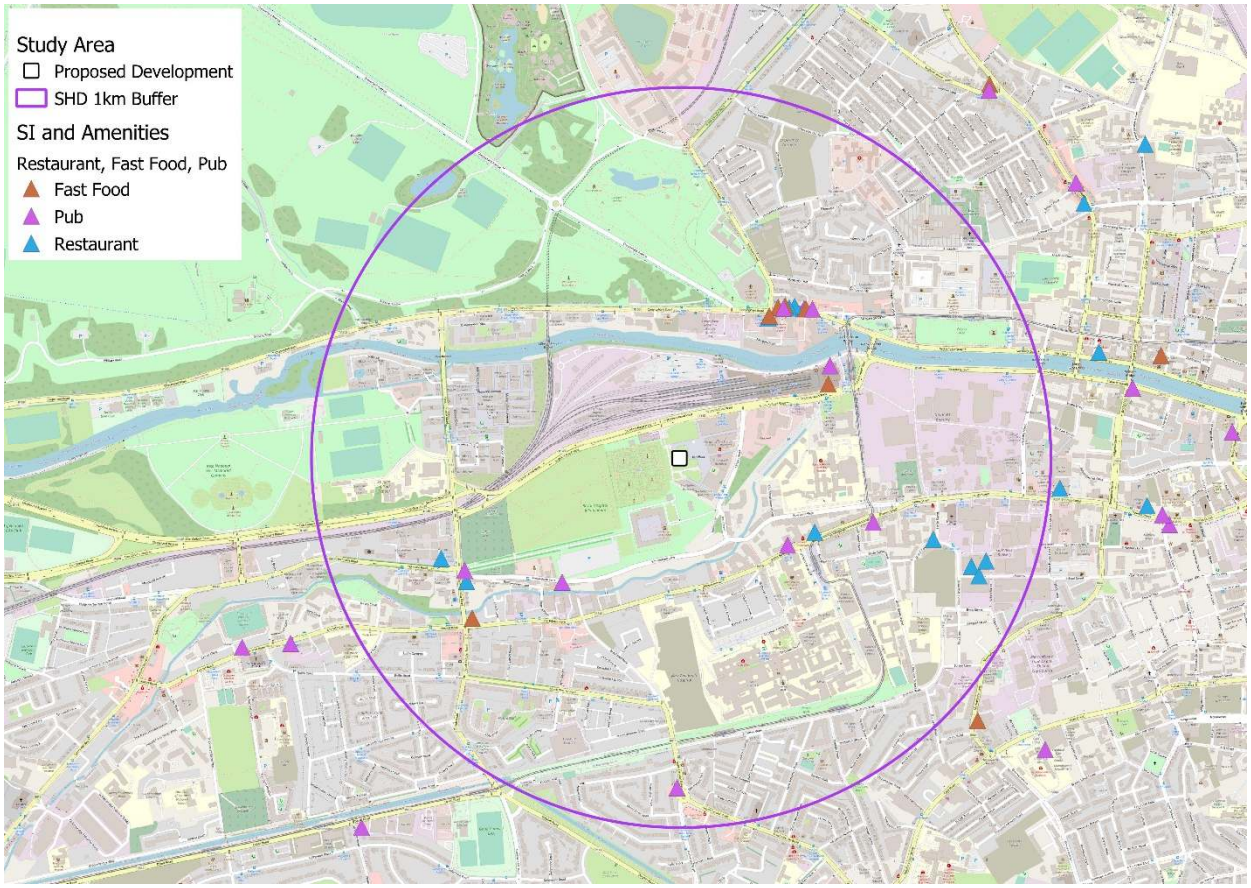
A variety of retail offerings of different size and diversity are available in the Study Area. As seen in Figure 5.4.6.3, there are multiple food/grocery retail offerings close to the Proposed Development, with a Supervalu on site and multiple other stores in close proximity along Thomas Street.

Figure 5.4.6.3 Retail Offerings in proximity to the Proposed Development (Map 1)



There are various restaurant and fast-food options within easy walking distance to the Proposed Development, as indicated in Figure 5.4.6.4

Figure 5.4.6.4 Retail Offerings in proximity to the Proposed Development (Map 2)



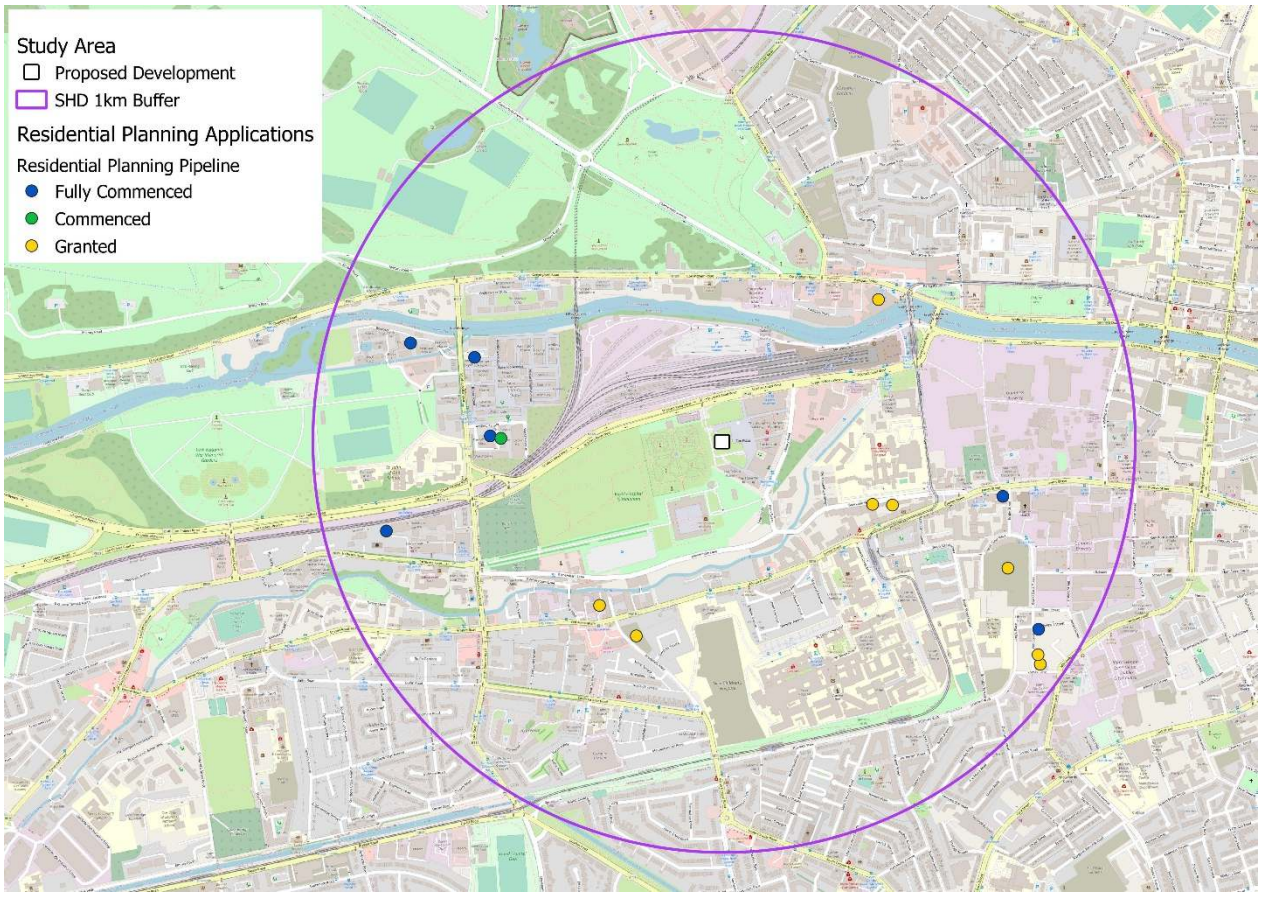
The increase in population brought on by the SHD development will positively impact retail sales in the Study Area, while also adding to the increase in spending power for healthcare and education facilities in proximity to the site. Residents will also benefit from the established retail and amenity offerings within the Heuston South Quarter development, such as the Supervalu, gym, Dublin Bikes, and Insomnia coffee shop, which are approx. 100m from the Proposed Development.

5.5 Recent Development and Planning Applications

A record of planning applications[7] from 2015 to 2020 indicate that 8 residential planning applications within 1km of the Proposed Development were granted (for 1,171 units), with 7 developments having been built, totalling to 127 new units. Construction has started on 246 units. The location of the fully commenced, commenced, and granted applications are indicated in Figure 5.5.1 below.

[7] All active planning applications for developments with 10 units or more, as reviewed by Dublin City Council and An Bord Pleanála, including Strategic Housing Developments

Figure 5.5.1 Residential Development Planning Applications in Proximity to the Proposed Development



The residential development pipeline in the Study Area shows a growing number of residential developments over the last five years in the western parts of Dublin city, indicating high demand for residential development and the suitability of the area for higher density developments. The Proposed Development is therefore well aligned with current development trends and will contribute to the existing and forthcoming housing supply in the area.

Table 5.5.1 Residential Planning Permissions Within 1km from Proposed Development

Ref	Address	Type	Description[8]	Status	Units
2850/17	Clancy Quay, South Circular Road, Islandbridge, Dublin 8	Major Residential (more than 150 residential units)	The proposed development is a mixed use residential (246no. units in total) and retail (c.598 sqm gfa) development comprising, 5no. apartment buildings (c. 21,575 sqm gfa) ranging from 6 to 9 storeys, accommodating 241no. apartment units (75no. 1-bed units, 134no. 2-bed units, 32no. 3-bed units) and 1no. ground floor retail unit (c. 598 sqm) in proposed apartment Block 1 abutting South Circular Road. 5no. 2-storey, 3-bed mews units (c. 608 sqm gfa). Balconies and or terraces on all proposed buildings. 163no. new undercroft car parking spaces. 56no. new surface car parking spaces. 27no. replacement car parking places previously permitted under planning reference 2593/14 as part of Clancy Quay phase 2. 244 no. bicycle spaces. Bin storage, horizontally fixed solar panels at roof level of all blocks, plant, ESB sub-station, hard and soft landscaping, lighting and boundary treatment works.	Commenced	246
				Total Commenced Units:	246
2354/16	48-50, James's Street, Dublin 8	Minor Residential (10+, less than 25 residential units)	RETENTION: Permission for development, retention and refurbishment of an existing five storey apartment block and change of use of ground floor unit. The development will comprise: - the refurbishment of the ground and upper floor apartments as previously granted (DCC Reg.Ref.:0329/00), - the reconfiguration of the constructed 15 no. apartments (10 no. 1 bed & 5 no. 2 bed) to form 12 no. apartments (10 no. 2 bed & 2 no. 1 bed)	Fully Commenced	12
2732/16	765 D(1) 765 D (2) And 765 E Bellevue Motors,	Medium Residential (between 25 and	PROTECTED STRUCTURE: The development will consist of the provision of 40 No. residential units in 4 Blocks, together with car	Fully Commenced	34

[8] Summarised description from sourced from Planning Application

Ref	Address	Type	Description[8]	Status	Units
	South Circular Road, Dublin 8	150 residential units)	parking landscaping and associated works		
3632/16	Former "Officers' Quarters and Mess Establishment" Building C1(Protected Structure), at Clancy Quay, (Formerly Clancy Barracks), South Circular Road, Islandbridge, Dublin 8	Minor Residential (10+, less than 25 residential units)	PROTECTED STRUCTURE: The development will consist of: - Change of use from Officers' Quarters and Mess Establishment to a multi-unit residential building (c.1,701 sq.m gross floor area), comprising 13 no. residential units (6 no. 1-bed apartments, 2 no. 2-bed apartments, 3 no. 3-bed apartments and 2 no. 2-bed duplex units) from lower ground to first floor levels within the existing building.	Fully Commenced	13
3484/18	765D / 765E South Circular Road, Dublin 8	Minor Residential (10+, less than 25 residential units)	PROTECTED STRUCTURE; Alterations to previously approved development under An Bord Pleanála decision reference PL.29S.246908. Particulars proposed consist of: (i) Provision of a 5 storey apartment block (block A) with overall apartment mix revised from 6 no. 1-bed and 14 no. 2 bed apartments (as previously granted) to 20 no. 2-bed apartments with associated alterations to floor plans and elevations, provision of a roof-top garden area and associated site works. (ii) Omission of previously approved basement car park (previously proposed under Block A of An Bord Pleanála's decision reference PL29S.246908) and reconfiguration of the site layout to provide for 10 no. surface level car parking spaces and all associated alterations to site layout. (iii) Revised site layout to consist of omission of Block C (as previously proposed) in accordance with condition no. 2 of An Bord Pleanála decision reference PL29S.246908 (IV) Provision of a total of 20 no. car parking spaces and 72 no. bicycle spaces within the overall site area in conjunction with associated hard and soft landscaping works. (v) New connections to all existing services with all associated and ancillary site works.	Fully Commenced	20

Ref	Address	Type	Description[8]	Status	Units
4660/18	The Black And Amber Inn, 778, South Circular Road and Hospital Lane, Islandbridge, Dublin 8	Minor Residential (10+, less than 25 residential units)	The proposed development will consist of the demolition of The Black And Amber Inn (1-2 storey building, c.602m2 GFA)and basement vault (c.201m2 GFA) and construction of a 6 storey over ground mixed-use building (c.1,247m2GFA) to accommodate at 1st to 5th floor levels, 20 no. studio apartments each with a private balcony; at ground floor level, a commercial unit(c. 88m2 GFA) fronting onto South Circular Road.	Fully Commenced	20
2618/19	17, 18, & 19, Newport Street, at Corner Of Newport Street and Pim Street, Dublin 8	Minor Residential (10+, less than 25 residential units)	Permission at the site at 17, 18, & 19 Newport Street, at the corner of Newport Street and Pim Street, Dublin 8, for amendment to previously approved development (ref. 2744/14) which consisted of the demolition of existing house and commercial sheds and construction of a mixed-use building ranging from 4 to 5 stories with: 12x2 bedroom apartments with 16 private balconies and 1 shared roof garden; 1 cafe / commercial / retail unit at ground floor level; ground level car park with 7 parking spaces accessed from Pim St.; Ancillary site-works including bicycle parking, bin storage, pedestrian entrances on Newport St. and service connections. The amendments to this scheme include: (a) Provision of additional full floor comprising 3 x 2 bedroom apartments, (b) the omission of brickwork finish to the internal courtyard, (c) the omission of narrow bedroom balconies facing into courtyard and (d) all associated site, drainage and ancillary works associated with the development. The amended building ranges from 5 to 6 stories.	Fully Commenced	12
2738/19	Site to the rear and side of The Laurels, 54, Inchicore Road, Kilmainham, Dublin 8	Minor Residential (10+, less than 25 residential units)	The proposed development includes the demolition of two existing outbuildings and the construction of a four-storey residential building to the rear of the site and one three storey, three-bedroom house fronting onto Inchicore Road. The four-storey residential building will accommodate 16 no. apartments, comprising 8 no. two bedroom units, 6 no. one bedroom units and 2 no. studio units. Balconies are provided for the residential	Fully Commenced	16

Ref	Address	Type	Description[8]	Status	Units
			apartments on the south elevation. The development includes bicycle parking, car parking (10 no. spaces), landscaping, boundary treatments, services, vehicular and pedestrian access from Inchicore Road, private and communal open spaces and all associated works.		
				Total Fully Commenced Units:	127
4179/15	Former Fodhla Printing Co Printing, the Printworks, Brookfield Roadm Kilmainham, Dublin	Minor Residential (10+, less than 25 residential units)	Residential Development in Co. Dublin. The proposed development comprises a part 2, part 4 and part 6-storey building over lower ground floor level to provide 14 no. residential dwellings (comprising 12 x 3 bedroom, double stacked duplex residential units and 2 x 3 bedroom houses (with integrated car parking provision)) and c. 1,971 sq.m (GFA) of office accommodation.	Granted	13
3188/17	23-25, Old Kilmainham Road, Dublin 8	Minor Residential (10+, less than 25 residential units)	Demolition of existing buildings on site construction of a 26 no. unit apartment development in two blocks over basement car park, with 26 no. car parking spaces and 26 no. bicycle parking spaces, as follows : Block A facing onto Old Kilmainham being5 storeys with the uppermost storey set back, with projecting and recessed balconies, containing 17 no. Apartments - 3 no. x 1 bed units, 12 no. x 2 bed units, and 2 no. x 3 bed units; Block B situated across an internal landscaped courtyard and overlooking the river Camac, being 4 storeys with the uppermost storey set back , with recessed balconies, containing 9 no. apartments - 1 no. x 1 bed unit, 5 no. x 2 bed units and 3 no. x 3 bed units.	Granted	24
3449/18	The Culvert Apartments, 7/7A, Pim Street, Dublin 8	Medium Residential (between 25 and 150 residential units)	RETENTION: Permission for development at the Culvert Apartments, 7/7A Pim Street (corner with Forbes Lane), Dublin 8. The development was constructed under Planning Register Reference 2048/04 but not built in accordance with same. The development, builton site, comprises a 3-6 storey mixed use development including 27 no. residential units (4 no. duplex units	Granted	27

Ref	Address	Type	Description[8]	Status	Units
			and 23 no. apartments in a mix of 7 no. 1 bed units, 18 no. 2 bed units and 2 no. 3 bed units), a 2 storey commercial office (c. 66.8 sqm) at ground and first floor level facing onto Pim Street, 8 no. car parking spaces, 8 no. bicycle parking spaces, all apartments/duplexes have associated balconies. Permanent retention permission is sought for the existing built form and development.		
3602/18	30(Rear) & 31-34, Bow Lane West, Dublin 8	Minor Residential (10+, less than 25 residential units)	L&S Developments seek planning permission for modifications to previously approved mixed use retail and apartment development (Ref. 5278/08/x1 and 2640/18) comprising (i) alterations to the 4th floor apartment layouts and the addition of a 5th floor to provide 4 duplex apartments comprising 2 two bedroom apartments and 2 three bedroom apartments entered at 4th floor level in lieu of the two approved 4th floor apartments comprising 1 two bedroom apartment and 1 three bedroom apartment: total number of apartments provided to be 13 apartments.	Granted	13
2290/19	7, Pim Street, Dublin 8	Medium Residential (between 25 and 150 residential units)	Construction of 29 no. residential units in the form of 1 no. 2 to 6 storey apartment building. The development shall provide for 11 no. studio apartments, 12 no. 1 bed apartments and 6 no. 2 bed apartments, all with associated private balcony/terrace/roof garden areas. Pedestrian access only is proposed and is provided from Pim Street. The proposed development shall also provide for 29 no. sheltered bicycle parking spaces, 15 visitor bicycle parking spaces and bin storage at surface level; a 181 sqm landscaped communal open space area at ground level; all boundary treatment and landscaping works and all associated site development works.	Granted	29
3209/19	Grand Canal Harbour, Grand Canal Place, Dublin 8	Major Residential (more than 150 residential units)	The proposed development will supersede the previously permitted development, Reg. Ref. 3855/09, which provided for the demolition of existing structures on site (total GFA of 9,330sqm); retention,	Granted	550

Ref	Address	Type	Description[8]	Status	Units
			renovation, refurbishment and extension of the protected structure (RPS No. 3275) as part of a mixed use development in six blocks, over basement. Similarly, the proposed development will consist of a mixed-use development in five blocks, over basement. Block 3/4 shall divide into two blocks at upper levels. The residential component shall be 'Build to Rent' scheme of 550 no. residential units with associated resident support facilities and resident services and amenities.		
2155/20	25-27, Bow Lane West, Dublin 8	Medium Residential (between 25 and 150 residential units)	The development will consist of the demolition of the existing two-storey warehouse/commercial building and the construction of an eight-storey apartment building comprising 34 no. apartment units (12 no. studio units, 14 no. 1-bed units and 8 no.2-bed units) with associated balconies/terraces, etc. This application also includes the provision of a commercial unit at ground floor (42 sq.m) and the provision of 4 no. communal open space areas at ground floor, first floor and seventh floor, together with ancillary areas for bicycle parking, refuse storage, apartment storage rooms, associated plant room, associated landscaping and all ancillary site development works.	Granted	34
306569	42A Parkgate Street, Dublin 8.	Major Residential (more than 150 residential units)	481 no. Build to Rent apartments and associated site works. 42A Parkgate Street, Dublin 8.	Granted	481
				Total Granted Units:	1,171

5.6 Identification of Likely Significant Impacts

This section provides a description of the specific, direct, and indirect impacts that the Proposed Development may have during both the construction and operational phases of the Proposed Development. Mitigation measures required to alleviate any such effects are listed in Chapter 17 of this EIAR. Potential impacts are assessed under the following headings: Economic Activity and Employment; Childcare/Creche facilities; Primary and Post Primary Schools; Landscape and Visual Impact; Water; Noise; Air Quality and Climate.

For a more detailed assessment of potential impacts associated with other environmental factors, please refer to the specific chapters of the EIAR.

The analysis comprises a study of the key assessment themes as well as consideration of the construction phase, with a conclusion reached in relation to the Proposed Development on the baseline characteristics as described above. The characteristics of this impact assessment are defined below, as per the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2017):

Table 5.6.1 Information to be Contained in Environmental Impact Assessment Reports (EPA 2017)

Type	Description
Probability of Effects	Likely Effects: The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented. Unlikely Effects: The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Quality of Effects	Positive Effects: A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities). Neutral Effects: No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error. Negative/adverse Effects: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Significance of Effects	Imperceptible: An effect capable of measurement but without significant consequences. Not significant: An effect which causes noticeable changes in the character of the environment but without significant consequences. Slight Effects: An effect which causes noticeable changes in the character of

Type	Description
	the environment without affecting its sensitivities. Moderate Effects: An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. Significant Effects: An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. Very Significant: An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment. Profound Effects: An effect which obliterates sensitive characteristics
Duration and Frequency of Effects	Momentary Effects: Effects lasting from seconds to minutes Brief Effects: Effects lasting less than a day Temporary Effects: Effects lasting less than a year Short-term Effects: Effects lasting one to seven years. Medium-term Effects: Effects lasting seven to fifteen years. Long-term Effects: Effects lasting fifteen to sixty years. Permanent Effects: Effects lasting over sixty years Reversible Effects: Effects that can be undone, for example through remediation or restoration Frequency of Effects: Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Extent and Context of Effects	Extent: Describe the size of the area, the number of sites, and the proportion of a population affected by an effect. Context: Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Type	Description
Types of Effects	Indirect Effects (a.k.a. Secondary Effects): Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway. Cumulative Effects: The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects. 'Do-Nothing Effects': The environment as it would be in the future should the subject project not be carried out. 'Worst case' Effects: The effects arising from a project in the case where mitigation measures substantially fail. Indeterminable Effects: When the full consequences of a change in the environment cannot be described. Irreversible Effects: When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost. Residual Effects: The degree of environmental change that will occur after the proposed mitigation measures have taken effect. Synergistic Effects: Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

5.6.1 Impact on Population and Human Health

5.6.1.1 Construction Phase

The construction phase of the Proposed Development may give rise to short term impacts to the locality such as, construction traffic and surface contaminants, dust, exhaust emissions, noise, and littering. All detail of the expected impact of the construction phase will be assessed in the relevant topic assessments in the applicable chapters of this EIAR, including Chapter 9 'Air, Dust & Climatic Factors' and Chapter 10 'Noise & Vibration', from which the subsequent impact on human health has been considered.

Type	Probability	Quality	Significance	Duration
Residual	Likely	Negative	Slight	Short Term

Extent	Users of the existing residential, commercial and retail facilities at HSQ will be predominantly be affected.

Context	The effects of the construction phase will be short term and only for the duration of the construction period.

5.6.1.2 Operational Phase

The operational stage of the development is unlikely to cause any adverse impacts on the existing and future residents of the locality in terms of human health. The design of the development has been formulated to provide for a safe environment for the future residents and visitors alike. The paths, roadways and public realm have been designed in accordance with the best practice and applicable guidelines. All open areas have been designed to be inviting, safe and conveniently located.

Type	Probability	Quality	Significance	Duration
Cumulative	Likely	Neutral	Not Significant	Permanent

Extent	Once operational, the facilities provided by the existing and Proposed Developments (on subject site and, in future, adjoining site) will have no significant negative effect on residents or visitors to the HSQ
Context	Long term (positive) effects are likely to include an increase in residents and visitors to HSQ and its immediate surrounding area.

5.6.2 Impact on Economic Activity and Employment

5.6.2.1 Construction Phase

The construction of the Proposed Development is likely to have a positive effect on economic activity and employment. The development in the short term will provide for increased construction related employment. During the construction phase, businesses directly involved in the sector and those indirectly involved in the supply chain would generate economic benefits that would provide for a positive net impact on the economy. The construction phase will also provide for indirect positive impacts through spending in local businesses around the site, such as retail services, together with wider benefits in the construction sector, building materials supply services and professional and technical professions. These beneficial impacts on economic activity will be largely temporary but will contribute to the overall future viability of the construction sector and related services and professions over the phased construction period.

Type	Probability	Quality	Significance	Duration
Cumulative	Likely	Positive	Moderate	Temporary

Extent	Increase in economic activity and employment through construction phase, with increased spending in stores in the immediate area.
Context	This effect will be temporary and will not change the economic activity or employment characteristics at the Proposed Development in the long term.

5.6.2.2 Operational Phase

The operational phase of the Proposed Development will result in the provision of 399 no. residential units (comprising 46 no. studios; 250 no. 1-bedroom; and 103 no. 2-bedroom apartments), a retail unit and public open space. This will provide accommodation for approximately 886 persons, based upon an estimated occupancy rate of 2.22 persons per unit (CSO Average Household Size, 2016). Considering the number of people in employment in the area (62%) it can be expected that c. 549 of the population generated will be working. This increase in occupancy in the area will enhance local spending power and will assist with the delivery of a critical mass of population which will support a wide range of additional local employment generating opportunities. Therefore, in the long term the Proposed Development is likely to provide additional spend in the local shops and restaurants, providing a positive impact. The increased number of residents in the area will also create additional demand for ancillary services such as barbers/salons, dry cleaners, etc., that would strengthen the retail mix.

Type	Probability	Quality	Significance	Duration
Indirect	Likely	Positive	Moderate	Permanent

Extent	Likely positive effect on economic activity and employment at HSQ and surrounding services and facilities (retail, recreational and leisure, pubs and restaurants, education, etc.) due to increase in residents and visitors and expected subsequent increase in local expenditure.
Context	Likely positive permanent effects that would generate more economic activity at HSQ and the surrounding area.

5.6.3 Impact on Childcare/Creche Facilities

5.6.3.1 Construction Phase

During the construction phase, the childcare and creche facilities within close vicinity of the subject site might be temporarily impacted by construction noise, traffic, and emissions. All detail of the expected impact of the construction phase on childcare facilities will be assessed in the relevant topic assessments in the applicable chapters of this EIAR, from which the subsequent impact on human health has been considered.

Type	Probability	Quality	Significance	Duration
Residual	Likely	Negative	Not Significant	Short Term

Extent	Impact to childcare facilities will be limited to the area of the HSQ
Context	As construction is temporary, these effects will not impact childcare facilities in the long term.

5.6.3.2 Operational Phase

Section 4.7 of the 'Sustainable Urban Housing: Design Standards for New Apartments' (2018) guidelines state that in relation to childcare facilities:

> *"… the threshold for provision of any such facilities in apartment schemes should be established having regard to the scale and unit mix of the Proposed Development and the existing geographical distribution of childcare facilities and the emerging demographic profile of the area.* ***One-bedroom or studio type units should not generally be considered to contribute to a requirement for any childcare provision and subject to location, this may also apply in part or whole, to units with two or more bedrooms."***

Accordingly, discounting the studio and one-bedroom units in accordance with the Apartment Guidelines, childcare space is required for 103 dwellings. Applying the Childcare Facilities Guideline standard of 20 places per 75 no. dwellings, the total requirement arising from the scheme is 27 places.

However, not all children in the 0-4 age cohort will require private childcare. The 2016 Quarterly National Household Survey (QHNS) (prepared by the CSO) indicates that in the Dublin region an average of 25% of pre-school age children attend private childcare. The figures for the State and the Dublin Region are set out in Table 5.6.3.2.1

Table 5.6.3.2.1 Type of Childcare utilised for pre-school children, Quarterly Household Survey Q3 of 2016.

Type of Childcare	Dublin	State
Parent/Partner	62%	62%
Unpaid relative or friend	16%	17%
Paid relative or friend	3%	3%
Childminder/Au-Pair/Nanny	8%	13%
Childcare Facility	25%	19%
Other	1%	1%

Applying the childcare facility figure for Dublin based respondents of 25% to the total number of pre-school children anticipated to reside in the Proposed Development (according to the Childcare Guidelines calculation set out above of 27 children), the actual demand for places is estimated as 7 children.

It is however acknowledged that the 25% QNHS estimate for the Dublin Region is an average and one would expect the percentage to be greater in areas where there are higher instances of both parents working, and therefore requiring private childcare. Therefore, to stress test this estimate, it is assumed that 40% of children aged 0-4 years in the development may require private childcare. On this basis, c. 11 pre-school childcare places would be required.

In any event, regardless of the variables used, it is expected that the demand for private childcare arising out of the development can be met by the various childcare facilities that are present within the Study Area and 1km - 2km from the Proposed Development.

Type	Probability	Quality	Significance	Duration
Cumulative	Likely	Positive	Not significant	Medium-term

Extent	Likely impact on childcare provision will extend outside of the HSQ, and into the surrounding area approximately 1km to 2km from the Proposed Development.
Context	In the medium to long term, the increased demand for childcare provision generated by the Proposed Development will have a positive effect on existing childcare facilities in the surrounding area. This effect will however be gradual as the Proposed Development progresses to full residential capacity.

5.6.4 Impact on Primary and Post Primary Schools

5.6.4.1 Construction Phase

During the construction phase, the impact on primary and post primary school facilities is expected to be imperceptible, with only 3 primary schools and 1 secondary school located within 1km of the Proposed Development. All detail of the expected impact of the construction phase on education facilities will be assessed in the relevant topic assessments in the applicable chapters of this EIAR, from which the subsequent impact on human health has been considered.

Type	Probability	Quality	Significance	Duration
Residual	Unlikely	Neutral	Imperceptible	Temporary

Extent	Unlikely impact on primary or post primary schools through the construction phase, as impact will be limited to the area of the HSQ
Context	With no primary or post-primary schools in the immediate area of the Proposed Development, no long term effects are expected on primary or post primary schools.

5.6.4.2 Operational Phase

The 2016 Census data for the study area gives the share of population in the Primary School and Post Primary School years as per Table 5.6.4.2.1 below. This percentage share was used to estimate the number of primary and post-primary school children the Proposed Development would generate.

Table 5.6.4.3.1 Projected Population for the Development at Full Occupancy (not including studio and 1-bed unit population equivalent)

	Study Area Population in 2016	Estimated school going population for the Proposed Development
Primary School (5-12)	5.2%	12
Post Primary School (13-18)	3.4%	8

Based on an average household size of 2.22, the estimated population of the development will be no. 886. To estimate the primary and post primary school child yield generated from the development, the population generated by studio and 1-bedroom apartment units have been discounted given their improbability of generating a child yield and in accordance with the Apartment Guidelines previously noted. Therefore, 103 no. units at an average of 2.22 persons per household will yield an estimated

population of 229 persons.

Based on the 2016 Census figures for the area, the population estimate for the 5-12 age cohort (primary school) (5.2%) is estimated to be 12 children. The population estimate for the 13-18 age cohort (Post primary school) (3.4%) is estimated to be 8. However, the Proposed Development will not generate this level of demand instantly given that the development will be constructed in a phased manner. It is expected that the primary and post primary school facilities in proximity of the Proposed Development will sufficiently absorb the school going population generated by the development.

Type	Probability	Quality	Significance	Duration
Cumulative	Likely	Positive	Slight	Short Term

Extent	Likely impact on primary and post primary education facilities will extend outside of the HSQ, and into the surrounding area approximately 1km to 2km from the Proposed Development.
Context	In the medium to long term, the increased demand for primary and post primary education generated by the Proposed Development will have a positive effect on existing education facilities in the surrounding area. This effect will however be gradual as the Proposed Development progresses to full residential capacity.

5.6.5 Impact on Amenities and Open Space

5.6.5.1 Construction Phase

Construction of the Proposed Development will take place on the undeveloped area of the HSQ which had been landscaped to provide a temporary improvement of aesthetics of the site pending further development of the site. Permission for these temporary works is due to expire in 2021. As such, the Proposed Development will not negatively impact amenities of open space on the development site. The Proposed Development will, however, add new areas to the existing network of pedestrianised public open space and landscaped areas. Chapter 15 'Landscape & Visual Impact Assessment' assesses the impact on landscape character, which is expected to be temporary during the construction phases of development. These impacts will be short term until such a time as construction is finished and the proposed high-quality landscaping matures. In any event the impacts are not considered to be significant on population and human health.

Type	Probability	Quality	Significance	Duration
Residual	Unlikely	Negative	Not significant	Temporary

Extent	Although it is unlikely that amenities and open space will be impacted, any perceived impact due to construction activities will be limited to the area of the HSQ
Context	As the site on which the Proposed Development is to be built is currently undeveloped and only temporarily improved, the context of the effect on amenities and open space will be more perceptible once construction has come to an end.

5.6.5.2 Operational Phase

The amenity and open space impacts likely to arise from the Proposed Development will be positive over the long term as it will improve the existing character and aesthetics of the site. The design of the Proposed Development's residential and public spaces improves the site and as such the impact is considered to be positive. The planned soft landscaping will mature over the long term and together with rooftop terraces and lower level communal courtyards will create public spaces that are conducive to enjoyable public interaction. Please refer to Chapter 11 'Landscape and Visual' of this EIAR for a more detailed assessment.

Type	Probability	Quality	Significance	Duration
Cumulative	Likely	Positive	Significant	Long-term

Extent	Likely significant positive effect on the area of HSQ.
Context	Once operational, the Proposed Development will provide additional and improved amenity and public open space to residents and visitors of HSQ alike. The facilities proposed will be an improvement on the existing undeveloped area, and therefore improve the public space facilities provision for the long term.

5.6.6 Impact on Water

The impact on water during the construction and operational phases of the Proposed Development, with applicable mitigation measures, are assessed and outlined in Chapter 8 'Water: Hydrogeology & Hydrology' and Chapter 12 'Material Asset: Water Supply; Drainage & Utilities' of the EIAR. These mitigation measures will serve to minimise potential adverse impacts of the construction phase to the water environment, thereby avoiding any associated risk to human health from water contamination.

5.6.7 Impact on Local Attractions and Tourism Activities

5.6.7.1 Construction Phase

It is expected that the construction of the Proposed Development could potentially have a moderate negative impact on the local/tourist attractions closest to the development site, with potential

environmental impacts from construction activity. The attractions likely to be impacted directly include the Royal Hospital Kilmainham, the IMMA, and the Gardens at the Royal Hospital, which are immediately adjacent to the development. The implementation of mitigating measures detailed in Chapters 9 and 10 of this EIAR will limit these disturbances.

Type	Probability	Quality	Significance	Duration
Indeterminable	Likely	Negative	Moderate	Temporary

Extent	Likely impact on the site adjacent (west) to the Proposed Development construction site.
Context	Although the adjacent site to the Proposed Development is not permanently occupied (no residential occupancy), construction activities at the Proposed Development will have a likely effect on the perceived comfort of visitors to the IMMA grounds due to possible noise, dust and other construction emissions. This will however be temporary until construction is complete.

5.6.7.2 Operational Phase

The local/tourist attraction impacts likely to arise from the Proposed Development will be positive and permanent over the long term. The attractions in proximity to the Proposed Development will enjoy increased exposure through the higher volume of resident and visitor numbers to the area. The increased spending power will likely spill over into the local tourism and related supplementary services (transport, food and beverage services, tour operators, etc.), with the potential to create a range of additional employment opportunities.

Type	Probability	Quality	Significance	Duration
Indirect	Likely	Positive	Significant	Long-term

Extent	Likely significant positive effect on the area of HSQ, and other attractions within proximity to HSQ.
Context	Once operational, the Proposed Development (and future proposed mixed-use development) will generate increased resident and visitor numbers to the area surrounding HSQ. This will likely increase the exposure to numerous visitor attractions in the area, and subsequently provide economic benefit for these facilities.

5.7 Cumulative Impacts

The following section provides an overview of the cumulative impacts of the proposed development on the topics assessed in Section 5.6:

- Population and Human Health
  - It is expected that the construction phase of the Proposed Development will have a slight impact on the existing surrounding population and visitors, as construction activities will inevitably lead to the generation of dust, emissions, and noise pollution. These effects will however be short term, as noise and emissions pollution will be managed according to the construction plan and proposed working hours, to ensure the effects are limited. In the operational phase the impact of noise and emissions pollution is expected to be not significant, as the Proposed Development will intentionally limit the provision of car parking spaces and promote the use of bicycle and other public transport modes in its immediate vicinity. The residential portion of the proposed development will strengthen the residential setting of HSQ and promote the sense of community and residential atmosphere in the area.
- Economic Activity and Employment
  - The construction and operational phase of the Proposed Development will lead to short- and long-term economic benefits to the area. The construction phase has the potential to generate direct and indirect economic activity and employment in the construction and related professional services. Although a portion of these might be temporary, the resultant increase in local population brought on by the Proposed Development, and subsequent increase in spending power, will see a more permanent positive impact in businesses surrounding the Development. The proposed retail facility portion of the Proposed Development will add to existing commercial and retail offerings at HSQ, while the proposed future mixed-use development will add even further to the multiple residential, commercial and retail facilities offered at HSQ. These present potential employment opportunities and resultant economic benefit for residents and visitors of HSQ.
- Education Facilities
  - As presented in Figure 5.4.3.1.1, there is one childcare facility in close proximity (Safari Childcare in the existing portion of HSQ) that would potentially be impacted by the construction phase of the Proposed Development. However, given the nature of the business (temporary occupation of staff and pupils predominantly during daytime hours) and its location within HSQ (slightly removed from the construction site to the southern corner of HSQ). It is therefore believed that the negative impact from the construction phase on childcare facilities would not be significant. In the operational phase, the increase in population generated by the Proposed Development over the medium to long term will have a positive impact on childcare facilities in and surrounding the Study Area through the economic benefit of potential additional enrolment.
  - With no primary or secondary school in immediate vicinity of the Proposed Development, it is believed that the construction phase is unlikely to have any negative impact on the health of school staff or pupils. Once operational, the increase in population generated by the Proposed

Development will potentially have a slight positive effect on schools in the area through enrolment.

- Amenities and Open Space

  - During the construction phase of the Proposed Development the noise, dust and emissions pollution resulting from construction activities will potentially have a slight negative impact on the use of amenities and open space. This will however be temporary and is considered to be not significant to population and human health. The additional amenities and open space brought on by the Proposed Development will greatly benefit residents and visitors to the HSQ in the operational phase, having a significant and positive impact on population and human health. The proposed future mixed-use development on the adjoining site would also benefit from the proposed landscaping and place making at the Proposed Development, as visitors and workers would be able to make use of the additional public space developed.

- Local Attractions and Tourism Activities

  - The construction phase of the Proposed Development is expected to only have a moderate negative impact on surrounding attractions due to inevitable noise and emission disturbances. This will however be temporary in nature, and once operational, the surrounding attractions should benefit from the increase in population generated by the Proposed Development. In addition to the expected increase in resident population, the proposed future mixed-use development will attract additional visitors and employed persons to the area, to further increase the potential use of local attractions and tourism activities in the area once the developments are operational.

- Residential and Commercial Development in Surrounding Area

  - As stated in Section 5.5, several planning applications have been lodged for further residential development within 1km from the Proposed Development. Those applications granted and commenced are not in immediate proximity to the Proposed Development and is unlikely to have any negative effect in the operational phase of the Proposed Development. With reference to further developments listed in Appendix 1B, the majority of which is residential and mixed-use, no negative impacts are expected. Over the long term these developments should add to the socio-economic diversity and prosperity of the area, providing more residential and commercial services, as well as a mass of population that will make use of the existing and additional supplementary services and social infrastructure.

5.8 Do Nothing Scenario

This section considers the potential impacts should the Proposed Development not take place. In a 'Do Nothing' scenario, the subject site would remain as is with temporary landscaping (due to expire) and potentially be left vacant thereafter. The environmental receptors discussed throughout this EIAR would likely remain unchanged while the potential for any likely significant adverse environmental impacts arising from the Proposed Development would not arise.

Consequently, in a 'Do Nothing' scenario the potential for any significant positive impacts from the construction and operation of the Proposed Development would also not arise.

Moreover, a 'do nothing' scenario would involve the subject site, which is a Strategic Development and Regeneration Area (SDRA 7 – Heuston Station and Environs Area), remaining in its current underdeveloped state. If this site were to remain underdevelopment it would not fulfil local, regional and national planning policy objectives.

5.9 Mitigation Measures

5.9.1 Construction Phase

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics examined and the inter-relationships between each topic. Through the provision of these remedial and mitigation measures, any negative impacts on population and human health during the construction phase shall be appropriately mitigated. Readers are directed to Chapter 17 of this EIAR for a summary of mitigation measures proposed from this EIAR.

5.9.2 Operational Phase

The Proposed Development has been designed to avoid negative impacts on population and human health through the design and provision of physical and social infrastructure as described in Chapter 3 'Description of Development' of this EIAR. Mitigation measures are proposed throughout the various chapters of this EIAR to avoid any adverse impacts from the proposed scheme and accordingly no further mitigation measures are considered necessary. Readers are directed to Chapter 17 of this EIAR for a summary of mitigation measures proposed from this EIAR.

5.10 Residual Impacts

5.10.1 Construction Phase

Any adverse likely and significant environmental impacts will be avoided by the implementation of the remedial and mitigation measures proposed throughout this EIAR. Positive impacts are likely to arise due to an increase in employment and economic activity associated with the construction of the Proposed Development. The overall predicted likely and significant impact of the construction phase will be short-term, temporary and neutral.

5.10.2 Operational Phase

The Proposed Development will contribute to further growth and expansion of the neighbourhood contributing to the existing and future populations. The predicted impacts of the Operational Phase are considered to be long term and positive to population and human health.

5.11 Potential Cumulative Impacts: Future Development of Adjoining Site

The potential cumulative impacts are assessed for the combined development site for the SHD and the mixed-use commercial developments.

Overall, the cumulative impacts of the Proposed Development on the population and human health are envisaged to be positive. The new population will contribute to the economic viability of the area, increasing local spending power, and the development of a range of new services, facilities, and open spaces will add to the viability and vibrancy of the area. The existing services and facilities will tap into the expanding population and invest more. Local businesses, transport, schools, etc. will benefit from the increase in resident population, while the increase in visitor population (through hotel and office occupancy) will deliver a further economic injection into the area.

The mix of residential, commercial and hotel development on site will add to the already established facilities in the HSQ and create further gravity to the HSQ as local 'hub' for service delivery, supported by landscaping and place making within the Quarter. The SHD will provide much needed residential capacity, in a location that provides easy access to multiple public transport links, retail, social infrastructure and amenity offerings to residents and visitors alike. The future development of the office building and hotel building on lands to the north of the subject site will provide employment, temporary accommodation and socialising space in the area that will support the existing and future populations.

5.12 Interactions Arising

There are numerous inter-related environmental topics described in detail throughout this EIAR which are of relevance to population and human health. The main high-level interactions between Population and Human Health and other environmental factors include Air, Dust, and Climatic Factors (Chapter 9), Noise and Vibration (Chapter 10), Traffic and Transport (Chapter 11), Material Assets: Water Supply, Drainage and Utilities (Chapter 12), Landscape and Visual Impact Assessment (Chapter 15). Please refer to the specific chapters of this EIAR where detailed assessments relating to these environmental topics are provided.

5.13 Monitoring

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in the chapters of this EIAR which address other environmental matters such as water, air quality and climatic factors, landscape and visual impact and noise sufficiently address monitoring requirements.

There are no reinstatement works proposed specifically with respect to population and human health.

5.14 References

List of sources drawn upon in preparing this chapter:

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, Draft August 2017);
- Advice Notes for Preparing Environmental Impact Statements, Draft September 2017;
- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2002);
- Central Statistics Office Census Data - www.cso.ie
- Tusla Data - https://www.tusla.ie
- Department of Education and Skills - https://www.education.ie/en/
- An Bord Pleanála - http://www.pleanala.ie/

6. BIODIVERSITY

6.1 Introduction

This Chapter has been prepared to assess potential impacts that may arise from the proposed development on biodiversity within the receiving environment.

This Chapter has been prepared by Dr Brian Madden (BA. Mod. Hons., Ph.D., MCIEEM) of Biosphere Environmental Services. It is based on a site visit, review of various technical reports which accompany the planning application, and a comprehensive literature review.

The present ecological assessment has been undertaken with due consideration to the following legislation:

- The Wildlife Act 1976 (as amended)
- The Habitats Directive 92/43/EEC (as amended);
- The Birds Directive 2009/147/EC (as amended);
- European Communities (Birds and Natural Habitats) Regulations 2011 S.I. 477 of 2011 (as amended).
- The EIA Directive 2011/92/EU as amended by Directive 2014/52/EU;
- European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011 [S.I. No. 456/2011];
- European Union (Environmental Impact Assessment and Habitats) Regulations 2011 [S.I. No. 473/2011];
- European Union (Environmental Impact Assessment and Habitats) Regulations 2012 [S.I. No. 246/2012];
- European Union (EU) (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2015. [S.I. No. 320/2015];
- Flora (Protection) Order, 2015 S.I. 356;

In considering the ecological impacts of the proposed development, regard was made to the following guidance and information documents:

- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes.
- Smith et al. (2011). Best Practice Guidance for Habitat Survey and Mapping in Ireland.

- EPA Draft Guidelines on the Information to be contained in Environmental Impact Assessment reports (August 2017).

6.2 Characteristics of the Proposed Development

The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over double basement level / podium level. The application site extends to 1.08 ha or 10,825 square metres (sqm).

- Block A is a rectangular shaped block that occupies the north-eastern corner of the application site. This block rises in height to 18-storeys above podium level and includes a lower ground floor level to provide a total of 154 no. apartments (comprising 12 no. studios; 108 no. 1 beds and 34 no. 2 beds). Block A has a Gross Floor Area (GFA) of 11,814 sqm.

- Block B is a rectangular shaped block that occupies the south-eastern corner of the application site. This block is part 8- and part 12-storeys in height above podium level and includes a lower ground floor level to provide a total of 81 no. apartments (comprising 9 no. studios; 60 no. 1 beds and 12 no. 2 beds). Block B has a Gross Floor Area (GFA) of 5,446 sqm, which includes a retail unit at the northern end of the block at podium level of approximately 120 sqm (GFA).

- Block C is situated between Block B to the east and Block D to the west. Block C varies in height up to a maximum of 12-storeys above podium level and includes a lower ground floor level to provide a total of 86 no. apartments (comprising 19 no. studios; 45 no. 1 beds and 22 no. 2 beds). Block C has a Gross Floor Area (GFA) of 6,024 sqm,

- Block D is a 5-storey over basement level rectangular block that occupies the south-western corner of the application site. It accommodates a total of 35 no. apartments (comprising 1 no. studio; 16 no. 1 beds; 6 no. 2 bed /3 person and 12 no. 2 beds). This block has a Gross Floor Area (GFA) of 2,786 sqm.

- Block E is a part 3-, part 5-storey over basement level rectangular block that occupies the north-western corner of the application site to the west of Block A. It accommodates a total of 43 no. apartments (comprising 5 no. studios; 21 no. 1 beds; 7 no. 2 bed / 3 person and 10 no. 2 bed / 4 person units). This block has a Gross Floor Area (GFA) of 3,321 sqm.

Site clearance and localised demolitions to remove part of the podium and Basement Level -1 reinforced concrete slabs at the interface of the proposed Blocks A and B, together with the incorporation of part of the existing double basement level structure extending to approximately 7,613 sqm over two levels (excluding an area of 3,318 sqm that will be backfilled at Basement Level -1) within the proposed development.

It is proposed to provide a Retail unit of 120 sqm at podium level in Block B. The Retail space has a small garden to the east with an area dedicated for outdoor seating (150 sqm).

Indoor communal facilities with a total area of 533 sqm are proposed as follows; a shared co-working area / lounge (178 sqm) and gym (102 sqm) at lower ground floor level, and lounges on either side of a residential foyer at ground floor / podium level within Block A (196 sqm), and a TV Room / lounge (57

sqm) at ground floor / podium level within Block C.

Communal Outdoor Amenity space is provided for residents in the form of rooftop terraces (totalling 1,179sqm), and lower-level communal courtyards between blocks (totalling 960sqm). Hard and soft landscaping works are proposed at podium level which includes the extension and completion of the public plaza to the east of Block A; the provision of footpaths; a MUGA (Multi Use Games Area) and informal play areas for children (totalling 1,670sqm).

A double basement is provided that will be integrated within the existing basement levels serving the wider HSQ development and will be accessed from the existing vehicular ramped accesses/egresses onto/off St. John's Road West and Military Road to the north and east, respectively. Basement level -1 provides: a refuse store; 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces); 4 no. motorcycle parking spaces; and, secure bicycle parking / storage in the form of 251 no. double stacked cycle parking spaces providing capacity for 502 no. secure bicycle storage spaces for residents. An additional 49 no. Sheffield type bicycle stands are provided at basement level -1 to provide 98 no. visitor cycle spaces (inclusive of 8 no. designated cargo bike spaces, that will also be available for the shared use with residents of the scheme) and a further 55 no. Sheffield type bicycle stands are provided at podium level to provide 110 no. cycle parking spaces (108 no. visitor cycle parking spaces (inclusive of 6 no. designated cargo bike spaces) and 2 no. cycle parking spaces in connection with the retail unit). All bicycle parking at basement level is accessed via a dedicated cycle lift from podium to basement level -1 that is situated to the south of Block B.

Works proposed along the St John's Road West frontage include the omission of the existing left-turn filter lane to the vehicular ramped access to the HSQ development and re-configuration of the pedestrian crossings at the existing junction together with the re-configuration of the existing pedestrian crossing over the westbound lanes of St. John's Road West leading to an existing pedestrian refuge island. Re-alignment of the existing footpath along the site frontage onto St John's Road West to tie into the reconfigured junction arrangement and provision of a link to a new lift to provide wheelchair access from St John's Road West to the HSQ podium.

A double ESB substation/switch room at ground / podium level within Block A, and a single substation/switch room at ground / podium level within Block B together with associated site development works, which includes the infilling of an existing vehicular access ramp at the southern end of the site between basement levels -1 and -2.

6.3 Assessment Methodology

6.3.1 Desk study

In addition to standard ecological reference material (as listed in reference and bibliography section 6.11) other key resources included:

- The Ordnance Survey website for recent and historic mapping (scales of 1:10,560 & 1:2,500) and various aerial images since the year 1995 (www.osi.ie/mapviewer).

- BING aerial imagery for high quality aerial photographs (www.bing.com/maps)
- Data on protected species and sites of conservation importance held online by National Parks and Wildlife Service (www.npws.ie.) and National Biodiversity Data Centre: (www.biodiversityireland.org) (both accessed 25th August 2020)
- Irish Wetlands Birds Survey (I-WeBS) – database of sites in Ireland that support wintering wetland birds (www.birdwatchireland.ie)

6.3.2 Site survey

A site survey was carried out on 3rd September 2020. This comprised a walk-over survey of the site area and immediate surroundings. Survey was over a period of 3 hours commencing at 10.30 am. Weather was fine at the time.

6.3.2.1 Habitats and flora

Habitat classification is according to Fossitt (2000). Consideration was also given to the possible presence of habitats listed in Annex I of the EU Habitats Directive.

Particular emphasis was given to the possible occurrence of rare or legally protected plant species (as listed in Flora Protection Order 1999) or Red-listed plant species (Curtis & McGough 1985, Wyse Jackson *et al.* 2016).

6.3.2.2 Fauna

Observations were made for fauna species present or likely to occur on site. Emphasis was placed on mammals and birds, and especially for species listed in the respective Red lists, namely Gilbert et al. (2021) and Marnell et al. (2009).

For mammals, search was focused on signs of their presence, such as tracks, feeding marks and droppings, as well as direct observations. For bats, the main focus was on evaluation of the suitability of habitats to support roosting bats.

Bird species were recorded by sight and sound. However, as the survey was confined to one date, the likely presence in other seasons of bird species of conservation importance was assessed based on habitats present (e.g. winter wetland species such as swans and waders would require wetland habitats, such as estuary, lake etc., breeding woodland species would require woodland habitats, breeding upland species such as hen harrier and red grouse would require bog and heath habitats).

6.3.3 Ecological evaluation

The criteria used to assess the ecological value of features follows the NRA *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009). Whilst the NRA guidelines were devised specifically for road schemes, they can be applied to general site evaluations. The NRA system uses the following five-point scale:

- International Importance

- National Importance
- County Importance
- Local Importance (higher value)
- Local Importance (lower value)

6.3.4 Limitations / Data deficiencies

The habitat and flora assessment was carried out within the recommended period for botanical survey.

The optimum period for survey of ground mammals is late winter to early spring when vegetation cover is at a minimum. However, at this site, there is no natural or semi-natural vegetation cover to obscure signs of mammal species so survey in September is adequate.

As the bat survey was limited to visual inspection of habitats for potential roosts, full assessment (if such was deemed necessary) would require evening/night survey to detect roost sites and thorough daytime examination of any suitable buildings on site.

Survey for birds in early September includes resident species and summer migrants which may have bred locally. The likely presence of birds in other seasons can be assessed by the diversity of habitats present.

Overall, and taking the character of the site (i.e. built environment) into account, it is considered that there are no significant limitations to the present assessment of the ecological importance of the site.

6.4 Receiving Environment

6.4.1 Location and physical characters

The application site forms part of a larger development site known as Heuston South Quarter (HSQ). The overall HSQ site is bounded principally by St. John's Road West to the north, Military Road to the east, and by the formal gardens of the Royal Hospital Kilmainham (RHK) to the west and south. The HSQ lands are in close proximity to Heuston Rail Station and the LUAS Red Line service.

The application site has a total area of approximately 1 ha. It is currently open space and has been landscaped as an interim measure to improve the aesthetics of the site pending its complete development (see Plate 6.4.1.1). The application site adjoins to the north a previously excavated and partly built concrete structure, which is part of the overall HSQ site. Existing residential and commercial developments occur immediately to the east and south (also part of overall HSQ site).

There are no streams, open drains or natural habitats on site. Natural drainage of the site is towards the River Liffey, which is approximately 250 m to the north (with St John's Road and the Heuston Station facility occupying the intervening area).

Figure 6.4.1.1 Overview of site showing amenity grassland, planted trees and roads. Looking eastwards, Sept. 2020.

Figure 6.4.1.2 Much of the boundaries of the site have been planted with willows. Sept. 2020.

Figure 6.4.1.3 View of boundary wall along western perimeter of site. A row of oaks has been planted here. September 2020.

6.4.2 Habitats and flora

As noted, the site has been landscaped and also includes roads leading to an existing underground car park.

Amenity grassland (GA2), which is well maintained, is a principal habitat. There are planted ornamental specimen trees (WD5) throughout the grassland. Willows (Salix spp.) have been planted along the boundaries of the site to provide screening (presently c.4-5 m in height) (see Figure 6.4.1.2). There is a line of six planted oaks along the western boundary.

The boundary with the adjoining Royal Hospital gardens is formed by a large retaining wall which has a covering in parts of Virginia creeper (see Plate 6.4.1.3).

The existing roads through the site leading to car parking within the HSQ complex facility are classified as Buildings and artificial surfaces BL3.

There are no records of rare or scarce flora species associated with the site and the existing habitats would not be expected to support any such species. There were no observations made of rare or scarce plant species during the site survey.

6.4.3 Fauna

6.4.3.1 Mammals

The site survey did not record any terrestrial mammal species on site. It is noted that the site does not have habitats to support large mammals such as badger *Meles meles*.

Red fox *Vulpes vulpes* may at times pass through the site as it is a widespread species in Dublin city. Brown rat *Rattus norvegicus* was recorded in the adjoining HSQ site to the north and would be expected on site, while other small mammals such as pygmy shrew *Sorex minutus,* house mouse *Mus domesticus,* and possibly hedgehog *Erinaceus europeaus* may occur at times.

The site offers no potential for roosting bats as there are no mature trees or suitable buildings. The retaining boundary wall with the Royal Hospital gardens does not have suitable crevices for roosting as there is a smooth finish. Foraging bats could pass through the site (as bats are widespread in this part of Dublin city and would be expected in the Royal Hospital complex) though the absence of any mature trees or hedging offers low potential for foraging.

6.4.3.2 Birds

On the day of survey, the only bird species recorded actually using the site was pied wagtail *Motacilla alba* and wren *Troglodytes troglodytes*. Gulls, feral pigeons and jackdaws were recorded flying over the site.

Due to the absence of suitable habitats, no bird species of conservation importance would be expected within the site at any other times of year (see section 6.3.2.2) .

6.4.3.3 Amphibians and reptiles

The site does not have any habitat suitable for amphibian or reptile species.

6.4.4 Sites designated for conservation

The subject site is located approximately 8 km from the Dublin Bay system, with four European sites, as follows (see http://webgis.npws.ie/npwsviewer/):

- North Dublin Bay SAC (code 00206)
- South Dublin Bay SAC (code 00210)
- South Dublin Bay & River Tolka Estuary SPA (code 04024)
- North Bull Island SPA (code 04006)

It is located approximately 1 km north of the Royal Canal proposed Natural Heritage Area (code 002104) and approximately 3 km south of the Grand Canal proposed Natural Heritage Area (code 002013).

The Liffey Valley proposed Natural Heritage Area (code 00128) is located along the banks of the Liffey approximately 4.5 km west of the HSQ site.

6.4.5 Overview of conservation value of site

The subject site is a previously developed site which is presently a landscaped area with road access to an adjoining underground car park. The site does not support any natural or semi-natural habitats. Fauna species associated with the site are all species commonly found in urban environments. The site is not part of, and does not adjoin, any designated site for conservation.

The site is considered to have an ecological rating of Local Importance (lower value).

6.5 Identification of Likely Significant Impacts

6.5.1 Habitats

The proposed development will result in the loss of the existing habitats on site.

All of the habitats on site have been created in the last decade and have negligible ecological interest. The effect by the loss of the habitats as a result of development is considered to be not significant.

During the construction phase the effect of the impact of the proposed development in respect of existing habitats is considered to be not significant.

During the operational phase the effect of the impact of the proposed development in respect of existing habitats is considered to be not significant.

6.5.2 Birds

The proposed development will result in the loss of the existing habitats on site.

While a very limited number of bird species may nest in the site (see section 6.4.3.2), these are all common and widespread species and the effect by the loss of habitat for these species is considered to be not significant (subject to appropriate mitigation for nesting birds).

During the construction phase the effect of the impact of the proposed development in respect of existing birds is rated as not significant (subject to appropriate mitigation for nesting birds).

During the operational phase the effect of the impact of the proposed development in respect of existing birds is considered to be not significant.

6.5.3 Mammals, Amphibians and Reptiles

The proposed development will result in the loss of the existing habitats on site.

The site has very limited potential to support mammal species, including bats, and has no suitable habitats for amphibians or reptiles.

The effect of the impact of the proposed development in respect of existing mammal species is considred to be not significant.

6.5.4 Protected Sites

6.5.4.1 European sites

Assessment of the hydrological environment allows Source-Pathway-Receptor linkages to be identified. If no S-P-R linkages are identified, then there is no risk to identified receptors.

Surface and storm water drainage from the area of the HSQ site is to the River Liffey. The River Liffey flows for approximately 8 km from the Heuston/Islandbridge sector to Dublin Harbour and ultimately Dublin Bay.

During the Construction Phase, potential sources for water pollution from the construction site to local drains and watercourses include:

- Suspended solids derived from soil excavation and movement within site.
- Run-off from wet cement surfaces which can result in alkaline water with high pH.
- Leakages and spillages of hydrocarbons.

During the Operation Phase, there will be general run-off to the local surface drainage system from roofs and hard surfaces, with potential for leakage of petrol/diesel fuel from vehicles.

For this project, a hydrological pathway from the proposed development site to the designated European sites associated with Dublin Bay has been identified (see Section 6.4.4). For a full assessment of the

potential effects on European sites, reference is made to the NIS which forms part of the application.

In the absence of mitigation, the input of potential pollutants to the North Dublin Bay SAC and the South Dublin Bay SAC, via the River Liffey, could have potential effects on the following qualifying interests of the SACs:

- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1310 Salicornia and other annuals colonising mud and sand
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)

It is considered unlikely that input of potential pollutants could have any effect on the other qualifying interests for these two SACs as all are above the level of high tide.

In the absence of mitigation, the input of potential pollutants to the North Bull Island SPA and the South Dublin Bay and the River Tolka Estuary SPA, via the River Liffey, could have potential effects on the following Special Conservation Interests of the two SPAs:

- A160 Curlew (Numenius arquata)
- A149 Dunlin (Calidris alpina)
- A157 Bar-tailed Godwit (Limosa lapponica)
- A162 Redshank (Tringa totanus)
- A179 Black-headed Gull (Chroicocephalus ridibundus)
- A144 Sanderling (Calidris alba)
- A156 Black-tailed Godwit (Limosa limosa)
- A143 Knot (Calidris canutus)
- A169 Turnstone (Arenaria interpres)
- A054 Pintail (Anas acuta)
- A046 Light-bellied Brent Goose (Branta bernicla hrota)
- A048 Shelduck (Tadorna tadorna)
- A052 Teal (Anas crecca)
- A141 Grey Plover (Pluvialis squatarola)
- A056 Shoveler (Anas clypeata)

- A130 Oystercatcher (Haematopus ostralegus)
- A140 Golden Plover (Pluvialis apricaria)

The qualifying interest, A999 Wetlands, could also be potentially affected. However, it is unlikely that the three tern species list as SCIs for the South Dublin Bay and River Tolka Estuary SPA would be affected as the terns feed mainly offshore.

It is concluded that in the absence of mitigation, there is potential for contaminated water emanating from the HSQ development site to enter the River Liffey system and ultimately the aquatic and intertidal environment of Dublin Bay, during the construction and (to a lesser extent) operational phases of the proposed development. The significance of any subsequent effect on the qualifying interests/special conservation interests of the Natura 2000 sites would vary depending on the type of pollutant, as well as the magnitude and duration of the event. As the conservation objectives of the four identified Natura 2000 sites could potentially be affected adversely, measures are required to avoid or reduce harmful effects of the proposed project (i.e. mitigation measures).

6.5.4.2 National sites

The subject site does not have any linkages with the three identified proposed Natural Heritage Areas (see Section 6.4.4) identified within the hinterland of the site and hence the proposed project could not have any impacts on these pNHAs.

During the construction phase the proposed development does not have potential to have impacts on any nationally important site.

During the operational phase the proposed development does not have potential to have impacts on any nationally important site.

6.5.5 Cumulative impacts

The principal potential in-combination effect to be considered is in the context of the overall HSQ development site of which approximately 60% has already been developed and is operational. As the proposed development is physically within the wider HSQ development footprint, which itself is within the built limits of Dublin City, a practical Zone of Influence for consideration of in-combination effects is the entire HSQ development site.

The planning history of this larger site dates back to September 2004 when the Parent Permission was granted (ABP Ref. PL29S.206528, SCC Ref. 2656/03) (details of each planning application within the HSQ development site have been compiled in Appendix 1B). The existing developed area is a mix of commercial, residential and retail uses. The proposed development provides a high degree of integration with the earlier completed built phases of the HSQ development to the east and south of the application site.

Also to be considered is the yet to be developed adjoining site which fronts St. John's Road West. This site, where development had commenced but was not completed within the life of the relevant permission, is to be the subject of a forthcoming planning application for a hotel and office block.

All existing and/or proposed developments within the HSQ development site have been or will be subject to rigorous assessment by the competent planning authorities for potential impacts on the environment and particularly for significant environmental impacts on European sites. As with the present residential application, the final HSQ application for the site that fronts St John's Road West will be screened for Appropriate Assessment.

Taking into account that all of the associated HSQ developments could only proceed on the basis that there would not be significant effects on any European site, it is concluded that in the context of the overall HSQ development, the present residential application will not contribute to an in-combination effect on any European site.

In a wider context, the HSQ site is located in a long-established area of Dublin City, with a range of industrial, commercial, cultural and residential developments and activities. Construction, re-development and maintenance projects are on-going, with all subject to planning approval. As it can be objectively demonstrated that the proposed project at the HSQ site will not have any significant effects, direct or indirect, on any designated European site, it can be demonstrated objectively that when other projects are considered along with the proposed HSQ development there will not be any in-combination effect on the European sites as discussed.

Overall, the cumulative impacts during the construction phase are considered to be not significant.

Overall, the cumulative impacts during the operational phase are considered to be not significant.

6.6 Do Nothing Scenario

In the case that the proposed development was not undertaken, and the site was to remain as a managed landscaped area, from an ecological perspective little change would be expected other than the planted trees growing and eventually maturing. Associated fauna species would remain more or less the same, with perhaps more birds nesting in the maturing trees than at present. After several decades (perhaps up to 5), the maturing trees might become suitable for roosting bats as wood starts to rot and crevices and holes appear in the trunk and main side branches.

6.7 Mitigation Measures

6.7.1 Measures for birds

6.7.1.1 Construction Phase

To mitigate against impacts on bird species, the following mitigation measure is required during the construction phase:

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife,

from 1 March to 31 August. The trees on site have some potential, albeit low, to support nesting birds such as wren and blackbird. Removal of trees will be done outside of the restricted period to comply with the Wildlife Acts.

6.7.1.2 Operational Phase

During the operational phase, no mitigation measures are required in respect of birds.

6.7.2 Measures for Protected Sites

A range of mitigation measures will be implemented during the construction and operation phases of the development to avoid or reduce potential harmful effects of the proposed development on local watercourses and ultimately the Dublin Bay system and the associated four European sites. These measures are summarised as follows:

6.7.2.1 Construction phase measures

All works carried out as part of construction will comply with all Statutory Legislation including the Local Government (Water Pollution) Acts, 1977 and 1990.

The Outline Construction Management Plan prepared by CS Consulting outlines the measures which will be in force for the duration of construction phase to ensure protection of surface waterbodies and the control of potential pollutants generated on site - it is noted that the Contractor must prepare a final Construction Management Plan and that the Plan will remain a live document and will be subject to updates as necessary for the duration of the project. A main purpose of the Plan is to ensure that storm water and wastewater runoff is managed and that there is no off-site environmental impact caused by overland storm water flows. A copy of this outline Construction Management Plan is in Appendix 6A of this report.

The following measures will be put in place by the Contractor during the construction phase to ensure protection of surface waterbodies.

Management of suspended solids in run-off

- Any temporary storage of spoil, hardcore, crushed concrete or similar material will be located as far as possible from any surface water drains and also stored in receptacles where possible. In order to minimise the risk of contamination, the stockpiled material will be removed off-site as soon as possible. Surface water drain gratings in areas near or close to where stockpiles are located will be covered by appropriate durable polyurethane covers or similar.

- There will be no direct pumping of silt-ladened water from the works to any watercourse or drain. All water from excavations must be treated by infiltration over lands or via settlement ponds, silt busters etc. It is imperative that all waters discharged from the site will have been treated beforehand to remove contaminants.

Concrete run-off

- No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Wash-outs will only occur in designated areas with an impervious surface. Wash-out units will be monitored on a continuous basis to prevent overflows.

Accidental spills and leaks

- No bulk chemicals will be stored within the active construction areas. Temporary oil and fuel storage tanks will be kept in the material storage area in suitable containers and will be appropriately bunded as required. Refuelling of vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated areas of the site, where possible, which will be kept away from surface water drains.

- Spill protection equipment such as absorbent mats, socks and sand will be available to be used in the event of an accidental release during refuelling. Training will be given to appropriate site workers in how to manage a spill event.

- The following measures will be taken at the construction site in order to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

  - Refuelling will be undertaken off site where possible;

  - Where mobile fuel bowsers are used the following measures will be taken:

- Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;

- The pump or valve will be fitted with a lock and will be secured when not in use;

- All bowsers to carry a spill kit and operatives must have spill response training; and

- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

Monitoring

- In addition to vigilance on a daily basis that all environmental planning conditions are being adhered to, weekly checks will be carried out on site by relevant personnel to ensure that the surface water drains are operating efficiently and that all dirty water is being treated appropriately prior to discharge from site.

- A regular written log of site inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not re-occur.

6.7.2.2 Operation phase measures

The following mitigation measures will be in place during the operational phase of the development to prevent impacts on protected sites.

Surface water

- Surface drainage arrangements for the operation of the development are outlined in the Engineering Services Report that was prepared by CS Consulting (October 2020). The report notes that there is an existing 375mm storm sewer to the north of the site along St. John's Road West. The proposed development will have a separate, attenuated storm water drainage system designed in accordance with the Greater Dublin Strategic Drainage Study and the Regional Code of Practice for Drainage Works. Stormwater collected within the proposed development shall be collected in pipes ranging in diameter from 225mm – 300mm and flow under gravity into a proposed storm water attenuation tank. It is proposed to pump the storm water from the attenuation tank to a standoff manhole located at the top of the existing basement carpark ramp adjacent to St. Johns Road. The proposed discharge rate will be 5.0l/sec. The proposed discharging of the storm water into the existing 375mm sewer at a controlled rate for all storm water events will aid in freeing up hydraulic capacity during high intensity storms.

- The proposed development has been designed in accordance with the principals of Sustainable Urban Drainage System (SuDS). The overall strategy aims to provide an effective system to mitigate the adverse effects of urban storm-water runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in storm-water, contributing to amenity, aesthetics and biodiversity enhancement and allow for the maximum collection of rainwater for re-use where possible. In addition, SuDS features aim to replicate the natural characteristics of rainfall runoff for any site by providing control of run-off at source and this has been achieved by the current proposals. SuDS features proposed include:

  - Water butts for local water rainwater reuse;

  - Use of green roof technology to cater for the initial interception storage (refer to architect's plans),

  - Low water usage appliances, to restrict potable water demand; and

  - Attenuation tank with flow control device, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change effects, to limit discharge from the site during extreme rainfall events.

- The proposed stormwater management plan requires that various stages of treatment are provided to surface water prior to its ultimate disposal.

Interception

- The proposed building will have a sedum roof to capture the first 5mm of rainfall. When greater volumes of rainwater are experienced, an overflow system takes this storm water to lower levels

and into the treatment stage. The landscaped areas also act to capture the first 5mm of rainfall with a positive outfall to a perimeter drain.

Treatment

- As noted above, rainfall greater than 5mm will pass through the interception stage and into the treatment stage. Treatment will consist of a perimeter drain to allow water to filtrate into the subsoil. Due to the physical constraints of the site and the low porosity of the clays in this part of Dublin, the treatment stage will be limited to a section of the site; the proximity of the site boundary is also a restriction. When a volume of storm water is experienced that is greater than the infiltration capacity of the liner drain, an overflow system will allow this exceedance of storm water to overflow into the positive outfall, which ultimately connects to a dedicated storm water sewer which discharges to the combined sewer.

Attenuation

- Rainwater exceedances which cannot be dealt with by the interception treatment stages positively drain by gravity into the development's attenuation tank. As noted above, this has been sized to cater for the predicted 1-in-100-year storm event, increased by 20% for the predicted effects of climate change. The storm water flows from the development are released via a flow control device limited to 5.01/sec, as per Dublin City Council requirements.

- The treated water will ultimately be discharged to the River Liffey via the public drainage system.

Foul water

- There is an existing 300mm dedicated foul public sewer along St John's Road to the north with an existing connection from the subject lands to this combined sewer. It is estimated that the proposed development will generate wastewater in the order of 98.12m^3 per day. All foul effluent shall be collected in pipes with a 225mm diameter and flow under gravity to an existing outfall manhole located at the top of the existing ramp adjacent to St. Johns Road West. This existing foul sewer drains to the east and ultimately outfalls into the Regional Wastewater Treatment Plant at Ringsend.

- It is noted that a Pre-Connection Enquiry has been submitted to Irish Water, based on the foul water flows for a 400 no. apartment scheme and a favourable response has been received (refer to Appendix B of the Engineering Services report which accompanies this planning application and is provided in Appendix 6B of this EIAR, for ease of reference)

6.7.3 Summary of Mitigation Measures

Table 6.7.3.1 Table of Mitigation Measures

Character of potential impact	
Construction Phase	
Disturbance of nesting birds	Remove trees outside of the restricted nesting season (March-August)
Protection of water quality	Implementation of Outline Construction Management Plan including the following provisions: • Management of suspended solids in run-off • Control of concrete run-off • Management of accidental spills and leaks
Operational Phase	
Protection of water quality	• Surface water drainage design in accordance with principles of SuDS is to be implemented as proposed.

6.8 Residual Impacts

With mitigation measures implemented as recommended, it is considered that the proposed project will not have any significant adverse residual impacts in terms of ecology and biodiversity.

6.9 Interactions Arising

Biodiversity interacts with several environmental factors including water & hydrology, soils & land, noise, air quality and climate chapters of the EIAR. Changes to these environmental factors could result in significant impacts on biodiversity such as the following:

6.9.1 Water and hydrogeology

Interactions between water and hydrogeology and biodiversity including habitats, flora and fauna, can occur through impacts to water quality either arising from an accidental pollution event or increased sedimentation during the construction stage or an accidental pollution event during the operational stage. This interaction has the potential to result in significant negative impacts on hydrologically connected habitats and sensitive fauna that rely on these habitats. However, following the implementation of mitigation measures outlined in Section 6.7.2, relating to the protection of surface and ground waters

during construction and operation, impacts to habitats, flora and fauna from water and hydrogeology interactions are not predicted to be significant.

6.9.2 Soils and land

Interactions between soils and land and biodiversity can occur through the spread of hazardous material/contaminated land which may occur during the construction stage. The spread of land contaminated with potentially hazardous material could result in degradation of habitats within the proposed development site and adjacent/downstream designated sites and their associated qualifying interests. However, following the implementation measures outlined within the preliminary Construction Environmental Management Plan, impacts to habitats, flora and fauna from soils and land interactions are not predicted to be significant. There are no interactions predicted for the operational phase of the development.

6.9.3 Noise

Interactions between noise and sensitive fauna, including birds, can occur and arise from increased noise levels during the construction and operational stages. This interaction has the potential to result in significant negative impacts. However, as the site does not support sensitive species of fauna, impacts to fauna from noise interactions are not predicted to be significant during the construction or operational phase.

6.9.4 Air quality

Interactions between air quality and flora and fauna in adjacent habitats and designated sites can occur during the construction stage due to dust emissions arising from construction works. This interaction has the potential to result in significant negative impacts on biodiversity. However, following the mitigation measures outlined in Chapter 9, impacts to flora and fauna from air quality interactions are not predicted to be significant during the construction or operational phase.

6.10 Major Accidents

It is considered that should a potential accident or disaster occur on site during the construction phase, the effects on biodiversity at the site would not be significant due to the low intrinsic ecological value of the site.

However, should a major spillage occur during construction or operational phases, full mitigation as discussed in this report would be required to prevent the entry of contaminants to the River Liffey and ultimately Dublin Bay and the associated European designated sites.

6.11 Monitoring

Mitigation as recommended will be monitored by the Environmental Officer working with the main Contractor. A written log of site inspections for environmental issues will be maintained during the entire

construction phase and will be available for inspection by relevant third parties.

6.12 References

Colhoun, K. & Cummins, S. (2013) Birds of conservation concern in Ireland 2014-2019. *Irish Birds* 9 (4): 523-544.

Curtis, T.G.F. & McGough, H.N. (1988) *The Irish Red Data Book. 1 Vascular Plants*. Stationary Office, Dublin.

Department of Housing, Heritage and Local Government (2021). Protected sites in County Dublin, listings and maps. www.npws.ie

European Commission (1996). *Interpretation Manual of European Union Habitats*. Version Eur 15. European Commission, DG XI.

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

Gilbert, G, Stanbury, A. & Lewis, L. (2021) Birds of Conservation Concern in Ireland 4: 2020-2026. *Irish Birds* 43: 1-22.

Hayden, T. & Harrington, R. (2000) *Exploring Irish Mammals*. Town House, Dublin.

Hutchinson, C.D. (1979) *Birds of Dublin and Wicklow*. Irish Wildbird Conservancy, Dublin.

Marnell, F., Kingston, N. & Looney, D. (2009) *Ireland Red List No. 3: Terrestrial Mammals*. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government. Dublin, Ireland.

Preston, C.D., Pearman, D.A. & Dinis, T.D. (2002) *New Atlas of the British and Irish Flora*. Oxford University Press.

Stace, C. (2010). *New Flora of the British Isles* (3rd edition). Cambridge University Press, Cambridge.

Whilde, A. (1993) *Irish Red Data Book 2: Vertebrates*. HMSO, Belfast.

Wyse Jackson, M., Fitzpatrick, U., Cole, E., Jebb, M., McFerran, D., Sheehy-Skeffington, & Wright, M. (2016). *Ireland Red List No. 10: Vascular Plants*. NPWS, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Dublin.

7. LAND, SOIL AND GEOLOGY

7.1 Introduction

This section of the EIAR has been prepared by Cronin and Sutton Consulting and describes the existing Land, Soil & Geology aspects on the proposed development site. An assessment is made of the likely impact arising during the demolition, construction and operational phases of the development on these elements, as well as the cumulative impacts arising.

This chapter was prepared by David Rehill of CS Consulting. David is a Chartered Engineering with Engineers Ireland and the Institute of Structural Engineers and has been practicing as a consulting engineer for over eighteen years. David holds an undergraduate degree in Civil Engineering, a postgraduate Diploma in Project Management, and a Masters in Business Administration.

This assessment is based on a desktop study of the site including publicly available information and recent specific intrusive site investigation and environmental site assessment works undertaken by Byrne Looby Partners dated February 2006 and by Minerex Environmental Ltd dated October 2017.

This chapter presents an assessment of the impacts of the Proposed Project on land, soils and hydrogeology (groundwater). It defines the study area, the methodology used for developing the baseline and impact assessment, provides a description of the baseline environment in relation to land, soils and groundwater and presents the findings of the impact assessment.

7.2 Characteristics of the Proposed Development

A full description of the development is provided in Chapter 3 of the EIAR.

The proposed development will involve the construction of five new residential blocks, and associated ancillary areas, within the un-development western portion of the HSQ development. The construction of the sub-structures at Block A and B will involve some localised demolitions of existing sub-structure elements.

The foundations to the eastern proposed blocks, (Blocks A, B and C), will consisted of bored concrete piles. The piles will extend into the black boulder clay beneath the current site formation level. The proposed western blocks (Blocks D and E) will be constructed from traditional reinforced concrete pad foundations, bearing on the black boulder clay. A reinforced concrete basement slab and retaining will be constructed, and this will complete the entire "basement box" to the HSQ development, which was not completed during the initial phases of the development (see later sections). This completed basement box will ensure a watertight structure against groundwater movements.

7.3 Assessment Methodology

This chapter has been set out with reference to the specific criteria set out in the Environmental Protection Agency guidelines:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002 & 2017 'Draft'),
- Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (EPA 2015),
- EIA Directive 2014/EU/52, Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003),
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (Dept Housing 2018).
- The Institute of Geologists of Ireland guidance document 'Guidelines for Preparation of Soils, Geology, Hydrogeology Chapters of Environmental Impact Statements' (IGI 2013).
- CIRIA C741: Environmental Good Practice on Site (2015, Fourth Edition) in relation to source of impact and mitigation.
- European Union Water Framework Directive (WFD) (2000/60/EC).
- European Communities (Water Policy) Regulations, 2003 (S.I. No 722 of 2003).
- European Communities Environmental Objectives (Surface Water) Regulations, 2009 ('S.I. No. 272 of 2009 as amended'), as amended in 2012 (by S.I. No. 327/2012), 2015 (by S.I. No. 386/2015) and 2019 (by S.I. No. 77/2019).
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010).
- European Communities Environmental Objectives (Groundwater) (Amendment) Regulations, 2016 (S.I. No. 366 of 2016).
- EC, Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (2017).
- EPA, Towards Setting Guideline Values for the Protection of Groundwater in Ireland (2003), containing Draft IGVs for the Protection of Groundwater.
- Groundwater Directives (80/68/EEC and 2006/118/EC).
- Dublin City Council Development Plan 2016 – 2022

Other reference documents used in the preparation of this assessment include the following:

- National Roads Authority (NRA) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Interpretative Geotechnical Report for Site Investigation at Westgate, February 2006, prepared by Byrne Looby Partners Ltd.

- Heuston South Quarter Subsoil, Groundwater and Air Quality Investigation, October 2017, prepared by Minerex Environmental Ltd.

The site, which is the subject of this application, is developed. An assessment of the soils and bedrock geology underlying the study area was undertaken in the form of a desktop study (May 2021) using information from The Geological Survey of Ireland (GSI) such as the Bedrock Geology Map of Dublin. The site was also visited on a number of occasions from May 2020 to May 2021. An assessment of the existing groundwater underlying the study area was undertaken in the form of a desktop study using information available from The Geological Survey of Ireland (GSI).

Specific geological information was obtained from a preliminary site investigation which was undertaken at the proposed development site by Byrne Looby Partners. The corresponding Site Investigation Report by Byrne Looby Partners dated February 2006 and by Minerex Environmental Ltd dated October 2017 are attached in Appendix 7A. It is our opinion that the site investigation reports developed to date provide sufficient information to assess the soil, geology and groundwater aspects of the site.

7.3.1 Impact Assessment Methodology

The proposed development is to be built off existing levels within the boundaries of an existing secant pile wall constructed circa. 2003. With reference to the Dublin City Council BIA Basement Development Policy Document please refer to the following sections with reference to other chapters of the EIAR in addressing the principal requirements of the BIA.

7.3.1.1 Desk Study & Site Investigation

An assessment of the soils and bedrock geology underlying the study area was undertaken in the form of a desktop study using information from The Geological Survey of Ireland (GSI) such as the Bedrock Geology Map of Dublin. An assessment of the existing groundwater underlying the study area was undertaken in the form of a desktop study using information available from The Geological Survey of Ireland (GSI).

Specific geological information was obtained from an intrusive site investigation carried out in 2006(Byrne Looby Partners) and in 2017 (Minerex Environmental Ltd), and these reports were assessed.

7.3.1.2 Ground Water

The development works in 2003 which are further detailed in Section 7.4.1 involved the installation of a perimeter secant pile wall around the entire site. The secant pile wall was embedded into the boulder clays. Following the installation of the cut-off wall, the site was excavated down to a formation level of approximately 0.5mOD throughout the entire site. This excavation to formation level was approximately 7.5m below ground level along the northern boundary, and approximately 15m below ground level at the southern boundary. Following the 2008 financial crisis the site was backfilled to a level 2.42mOD. The proposed development is to be built off the existing 2.42mOD site levels with localised reduced level digs for foundations.

The Hydrogeology section 7.4.2 describes the likely effects on the ground water for the proposed site. An assessment is made of the likely effects associated with the construction and operation of the proposed

development based on the history of the site and previous site investigations and soil sampling.

On the basis of the above it is concluded that the proposed structure is not expected to impact on the ground water flow during or after construction as the existing secant pile wall has been constructed since 2003 and the proposed development is to be constructed of the existing site levels and will not extend below the secant pile formation levels.

7.3.1.3 Ground Movements

The existing secant pile wall was constructed to a level below 0.5mOD to suit the requirements of the 2003 developments as detailed in section 7.4.1. Given that the proposed development is to be developed from the existing 2.42mOD site levels with localised dig of approx. 1m for foundations along the secant pile wall it is concluded that ground movements in the vicinity of the site will be negligible.

7.3.1.4 Temporary Works

There will be no need for additional temporary works during the development of basement level -1 outside of the normal concrete shutters to facilitate the pouring of RC perimeter walls, columns and podium slabs. The existing secant pile wall has been installed as a retaining wall since 2003 and it is intended to be used as such during construction. The proposed development is to be built off existing site levels and localised reduced level dig for foundations will have embankments battered back to ensure stability during construction.

7.3.1.5 Effects on Neighbouring Structures

The Telford Building neighbours the development along the South boundary, and Sancton Wood, AIB, and Brunel building on the East boundary. There is no building on the West boundary as this is bounded by the Royal Kilmainham Hospital Gardens with ground movement being discussed in section 7.3.1.3. The buildings on the East boundary built to a floor level of -0.55 mOD at the boundary and the Telford Building to the South is built to floor level of 1.05 mOD. The proposed development is designed to tie in with neighbouring buildings at their basement level -1 at 2.42 mOD.

It is concluded that given the levels of the existing neighbouring building and the levels of the proposed development the proposal will not affect the structural stability of any neighbouring properties.

In summary given that a secant pile wall has been constructed and remained in place on the site acting as a retaining wall to the Royal Kilmainham Gardens since 2003 and the proposed development is to be built from the existing site levels the risks relating to the proposed development are low with regard to impact on neighbouring structures, ground water and ground movements.

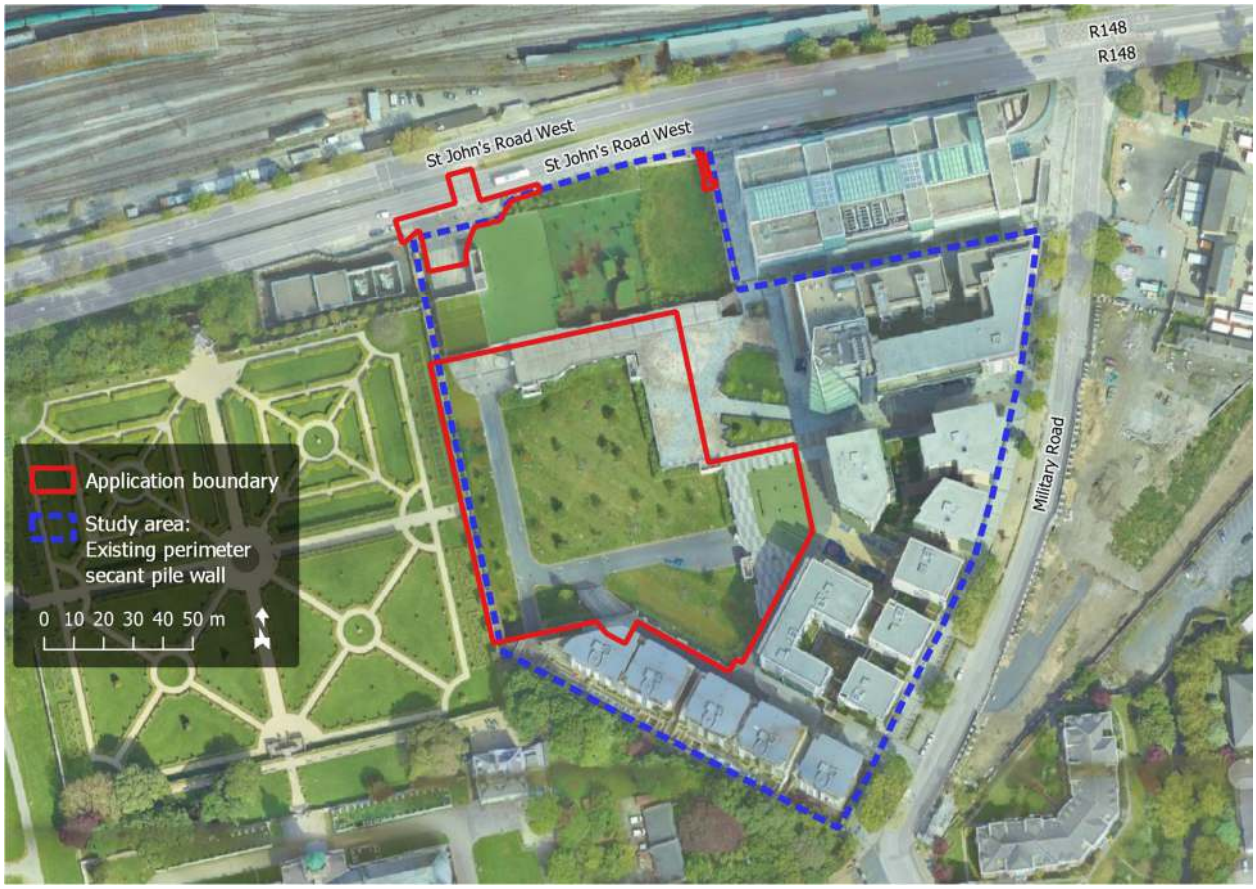
7.4 Receiving Environment.

The proposed development is located on St. John's Road at the Heuston South Quarter complex in Dublin 8. The site sits within the established communities of Kilmainham, between The Royal Hospital Kilmainham to the west and the Quays to the north. The site is located in the administrative jurisdiction of Dublin City

Council and has a total area of approximately 1ha. The site is bounded to the west by The Gardens at the Royal Hospital of Kilmainham, to the north by the St. John's Road, to the east by existing buildings from phase 1 of the larger HSQ development fronting, Military Road further to the east and to the south by office and residential buildings.

The subject site comprises part of the undeveloped area of the site that has been landscaped as an interim measure to improve the aesthetics of the site pending its complete redevelopment. There is already an established road, pedestrian and cycle network in the vicinity of the site so as to allow for a high level of permeability.

Figure 7.4.1 Heuston South Quarter site (source google maps)



7.4.1 Geology & Land Use

The geology of the subject site and the surrounding area is interpreted from information from the Geological Survey of Ireland (GSI) and the Site Investigation carried out. The site and surrounding area is underlain by 'Calp' Formation comprising of Dark Grey to Black Limestone & Shale. The natural deposits are overlain with various thicknesses of made ground consisting of various fil material. The bedrock is also known as 'Calp' Limestone which is a dark grey argillaceous limestone known as the Lucan formation encountered at depths of between 26.1-27.6m below ground level.

Prior to development of Heuston South Quarter from c2003, the site operated as a storage depot and yard for Eir (formerly Eircom), see Figure 7.4.1.2. The original site level prior to commencement of construction works varied from c7.1mOD along the northern boundary at St John's Road, to c14.2mOD at

the southern boundary. A number of single storey warehouse building were located along the northern and eastern boundaries.

Figure 7.4.1.1 Bedrock Geology (source gsi.ie)

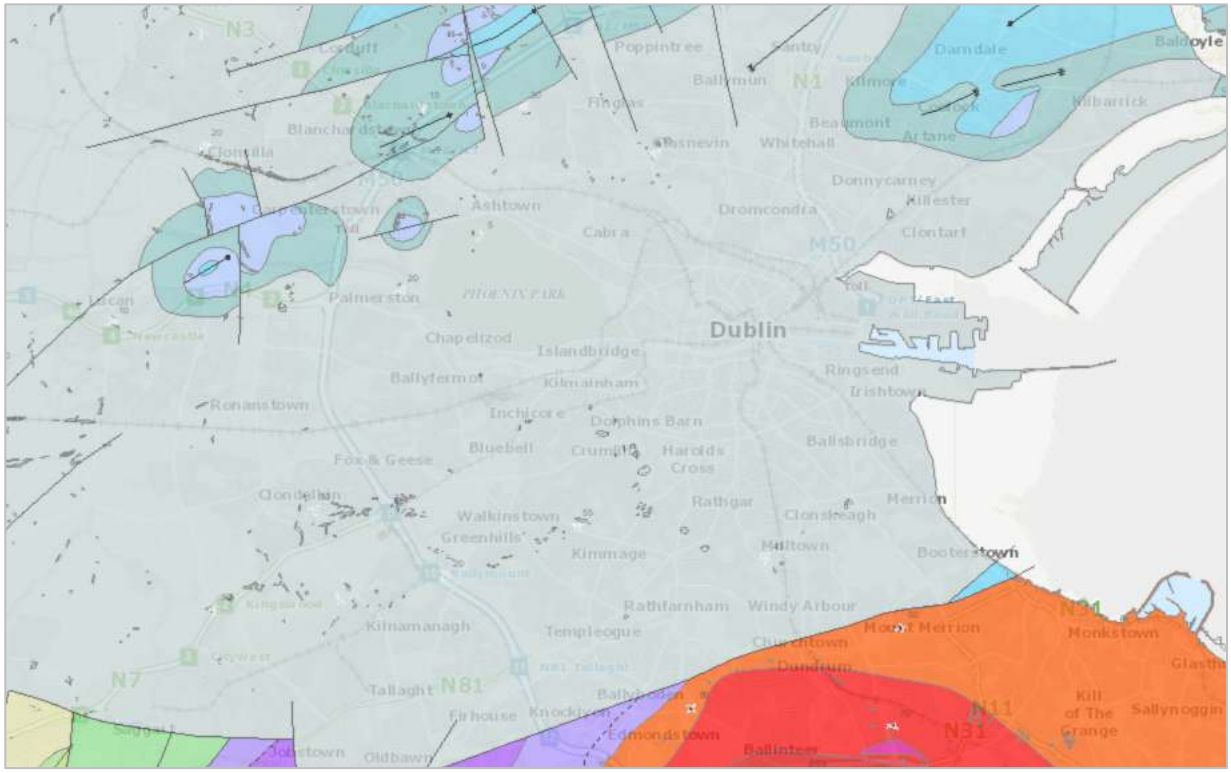


Figure 7.4.1.2 Aerial Image of site Pre-HSQ Development 2005 (source osi.ie) Indicative red line

The subsequent commencement of the development works in 2003 involved the installation of a perimeter secant pile wall around the entire site. The secant pile wall was embedded into the boulder clays. Following the installation of the cut-off wall, the site was excavated down to a formation level of approximately 0.5mOD throughout the entire site. This excavation to formation level was approximately 7.5m below ground level along the northern boundary, and approximately 15m below ground level at the southern boundary. The eastern portion of the development was constructed, with a double level basement and buildings ranging in height from seven to twelve stories.

The construction works ceased in 2008 as a result of the financial crisis. With the exception of the lower levels to the buildings along St Johns Road, no construction works had commenced to the section of the site relevant to this current planning application, and the site remained excavated to formation level, until site remediation works in 2012. The site remediation works involved landscaping treatment, which remains in place to the day. The landscaping works carried out involved the demolition of the existing tarmac roads and ramps on site, the construction of new roads and ramps and the importation of soil material to landscape the open space.

The site currently is laid out with soft and hard landscaping as shown in Figure 7.4.1.4

Figure 7.4.1.3 Aerial Image of HSQ site when works ceased c2011 (source osi.ie)

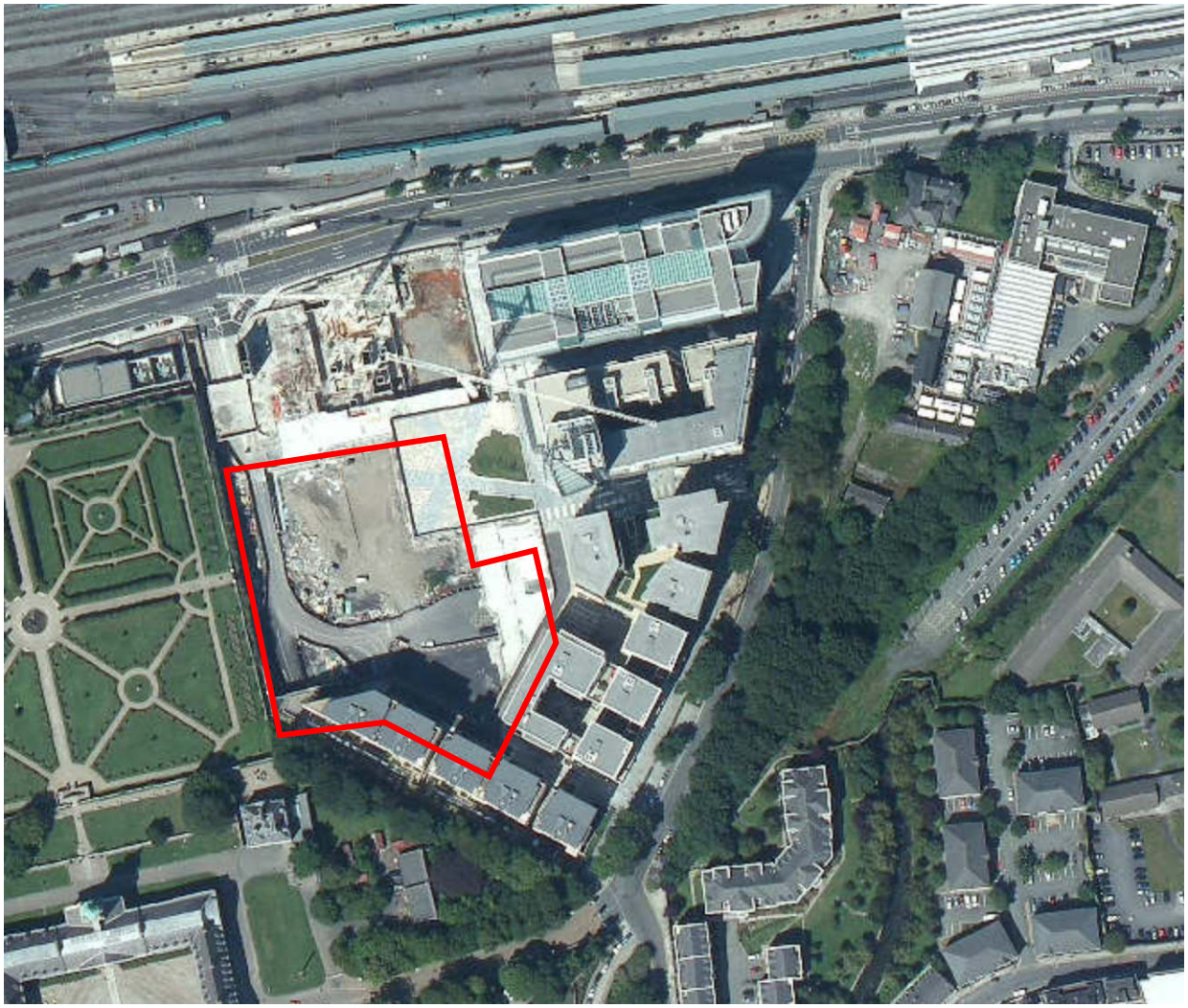
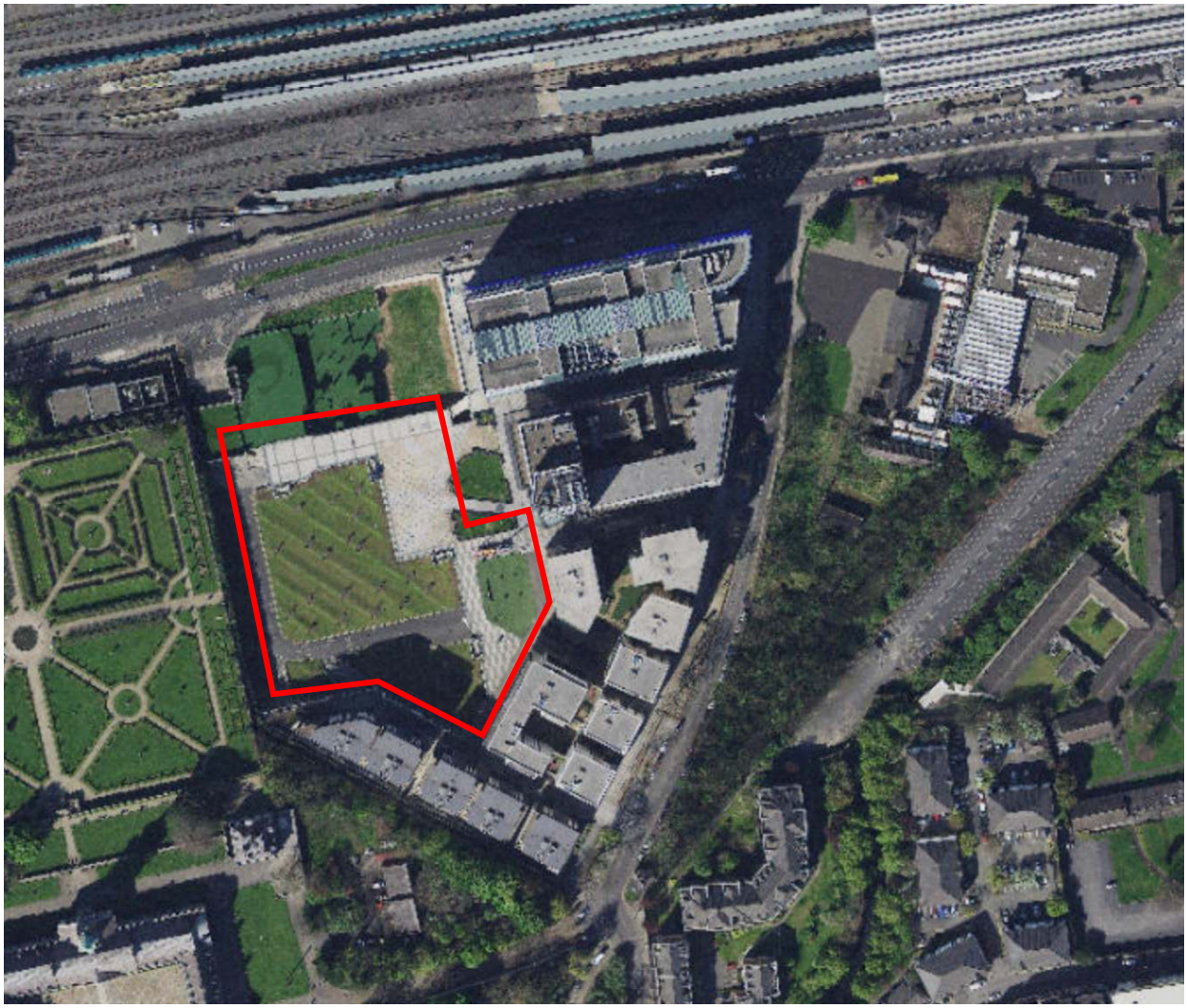


Figure 7.4.1.4 Aerial Image of site current HSQ Development 2017 (source osi.ie)



A summary of the ground conditions encountered in the 2006 Byrne Looby Partners Site Investigation is outlined in Table 7.4.1.1 below:

Table 7.4.1.1 Baseline Ground Conditions

Stratum	Typical Depth (m BGL)
Made Ground: Hardcore fill, clay with rubble fill, medium dense grey and brown clayey sandy angular to sub-angular fine to coarse gravel with occasional cobbles, crushed concrete with red brick fill and occasional pockets of soft dark brown clay.	0 to 2.7m
Very dense sand GRAVEL with cobbles and boulders. A large quantity of cobble size material and occasional boulders.	2.7m to 4.8m
The upper layers consist of stiff brown boulder CLAY, over very	0.8m to 26.1m

Stratum	Typical Depth (m BGL)
stiff to hard black boulder CLAY.	
Strong Dark Grey and black LIMESTONE bedrock	26.1m

7.4.2 Hydrogeology

The subject site is within the Dublin Urban Groundwater Body as designated in the ERBD Management Plan. The groundwater body chemical and quantitative status of both of these groundwater bodies has been designated as 'good'. The Geological Survey of Ireland, GSI, has developed a classification system for aquifers based on the value of the resource and their hydrogeological characteristics. The bedrock aquifer is classified as a Locally Important Aquifer (Li) Aquifer which is designated as a productive aquifer in local zones. The GSI, vulnerability rating for pollution from the ground surface is Low. The groundwater flows in a northerly direction towards the River Liffey.

As noted, a perimeter secant pile cut-off wall was constructed in 2003, prior to commencement of excavations. A detailed Environmental Assessment, involving sampling, was carried out by URS. The site was then excavated to formation level, which was generally within the virgin black boulder clay. All made ground was excavated and removed off site. Therefore, any contaminated material from historic site uses has been excavated off site.

7.4.3 Soil

As noted, the site was excavated to formation level within the virgin boulder clays in 2003. Part of the site was built-out, and the western part remained undeveloped between 2008 and 2012. Landscaping works were carried out in 2012, which involved importing some landscaping fill material.

An updated test regime, including sampling, was carried out by Minerex in 2017. This involved sampling at five locations, with the samples sent for Waste Acceptance Criteria classification. The report is included in Appendix 7A. The findings indicated minor localised areas with elevated levels of materials which would require mitigation prior to the development being used for housing upon completion. As such elevated materials will be removed off site in accordance with statutory requirements during the re-development of the subject lands.

7.4.4 Geological Heritage

The GSI data base does not indicate any features of Geological Heritage at the proposed site. The closest geological feature is noted on GSI at the Guinness Brewery at St James's Gate, approximately 500m to the east of the subject site. The GSI database notes: "*two boreholes dug within the brewery complex. For historical, technical and cultural importance, the wells within Dublin City are unusual*". The "Dublin City – County Geological Site Report – Guinness Wells – IGH 16 Hydrology" contained within "The Geological Heritage of Dublin City – An Audit of County Geological Sites in Dublin City" (2014) refers to a number of 19th century wells and boreholes which were constructed by Guinness to provide a sustainable water source. One well was constructed to a depth of c487m below ground level, but reported a relatively low yield. Only one well is still in use, the Cooperage Well to the north of the site, which currently produces a yield of 100 cubic metres per hour.

Figure 7.4.4.1 Geological Heritage Feature at St James's Gate (source gsi.ie)

7.4.5 Geo-Hazards

The GSI data base does not indicate any geo-hazards at the proposed site or in the local vicinity.

7.5 Potential Impacts

In this section the potential impacts arising from the proposed development on land, soil and geology are described.

7.5.1 Construction Phase

During the construction phase is it proposed to remove 800-1,000m^3 of demolished material from the site. It is proposed to excavate 2000 m^3 of material to allow the proposed development to be constructed.

The demolition and excavations will result in disturbing materials and the risk of migration of dust pollution. Typically, soil moisture is sufficient to prevent contaminants becoming airborne, however where soil becomes dry there is likely a temporary negative / adverse effect, with an overall Significant significance occurring. These potential negative effects will need to be controlled by the contractor, using a number of measures outlined in later sections, and this reduce the impact of the effects to moderate and brief.

As noted in preceding sections, a secant pile wall was constructed around the entire site as part of the initial construction works in 2003. The secant pile wall is embedded into the impervious boulder clays below the proposed formation level and creates a cut-off wall to prevent groundwater movements into and out of the site. Therefore, the risk of contamination of the groundwater as part of the construction

works is negligible. The significance of the effects would be imperceptible.

The perimeter secant pile cut-off wall was construction in 2003. The relatively long period of time since installation would have resulted in the groundwater level striking an equilibrium. In addition, the gravel lenses noted in the site investigation would facilitate the movement of groundwater around the secant pile wall structure. The significance of effects would be imperceptible. As with any construction works, there are risks of impacts arising from accidental spills or leaks, which can result in temporary / adverse effects. The contractor shall implement a number of measures, as outlined in later sections. Notwithstanding, the presence of a perimeter cut-off wall will prevent any risk of contamination of the adjoining soil and/or groundwater. The significance of effects would be imperceptible and short-term.

The need for dewatering of the site will require pumping of water from the site. The exposure the groundwater collection tanks could pose temporary / adverse effects as the ground and groundwater may contain contaminants. Therefore the material will need to be tested and monitored during construction, which will reduce the impact of the effects to not significant and temporary. This is to facilitate the completion of the basement and therefore is unavoidable. The licencing agreement with the Council, may call for, subject to analysis of the groundwater, the groundwater water to pass through filtration system to remove sediment from the water and an oil separator prior to discharge to a designated sewer and at a controlled rate.

Moderate negative impacts during the construction phase will be short term only in duration. Implementation of the mitigation measures will prevent any significant long-term adverse impact

7.5.2 Operational Phase

During the operational phase of the new development on the subject site the completion of the basement structure will prevent contact with the underlying subsoil. This will have permanent moderate positive effect on the subsoils beneath the site.

Run-off from hardstanding areas will pass through a closed drainage system, which will incorporate silt traps and oil/petrol interceptors, to reduce the possibility of potentially contaminated surface water from contaminating the soil and bedrock geology. This drainage system will then discharge into the Local Authority operated sewer system. This will have a permanent, moderate and positive effect on the public drainage network. It is not predicted that there will be any adverse effects on the soils and geology during the operational phase of the development.

The development will be supported by the underlying rock through either direct bearing or via the overburden. It is not envisaged that this will have any negative impact on the bedrock geology.

Overall, effects on land, soil and geology during the operational phase are considered to be permanent, positive and imperceptible.

7.6 Do Nothing Scenario

The "Do Nothing Impact" assesses the environmental impact of not redeveloping the proposed development site in respect of the existing impacts to land and soils, at the proposed site.

Under the "Do Nothing Scenario" there would be no change in the current land use of the site and therefore the soil and bedrock geology environments would remain in their current state. It is noted that as the main construction works in the subject site ceased in 2012, the 'basement box' has remained incomplete. The proposed works complete the reinforced concrete basement structure, and thereby provide a fully sealed basement structure against the risk of groundwater ingress and/or the risk of contamination of the groundwater from the development. This is a neutral impact.

7.7 Mitigation Measures

7.7.1 Construction Phase

The main impacts identified are associated with the Construction Phase of the proposed development. Following construction there will be no long-term significant impacts with respect to soils and geology of the site.

Mitigation measures relating to impacts outlined in the previous section are outlined below:

Table 7.7.1 Table of Mitigation Measures

Character of potential impact	
Construction Phase	
Contaminated Soil	The excavated material will be monitored and assessed to determine the most suitable disposal outlet. Material will be categorised according to the Landfill Directive and will be sent to appropriately licensed facilities for treatment/disposal. This will entail carrying out soil analysis to determine the appropriate waste facility for disposal. Where applicable, material on site will be segregated and divided into material re-use, material re-cycling and waste material streams in accordance with current guidelines and best practice.
Demolition Material	The material generated from the demolition shall be segregated and divided into material re-use, material re-cycling and waste material streams in accordance with current guidelines and best practice.
Dust	Dust suppression measures will be implemented to minimise dust generation during extended dry periods. Dust monitoring will be conducted through the excavation period. The provision of vehicle wheel wash facilities at site exits and implementation of a road sweeping programme will reduce effect on surrounding road network. Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust. In addition, water-based dust suppression systems (such as Dust Boss) shall also be used to greatly reduce

	the extent of dust and windborne particulates.
Groundwater Flow	The basement could act as a barrier to the groundwater flow and the potential for ground water levels to rise on the up-stream side of the site. It is noted that the perimeter secant pile cut-off wall was installed in 2003. This cut-off wall extended into the relatively impermeable clays. As a result, it is inferred that the ground water flow regime in the area has regularised in the intervening eighteen-year period. It is not possible to mitigate the risk, but the risk is seen as negligible.
Noise, Vibration,	During the demolition and excavating phase of the works monitoring will be ongoing for noise, vibration, gas & water levels as well as ground contamination as described in the section below on Monitoring. Noise monitoring shall be in accordance with Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 Noise and Vibration. Vibration monitoring shall comply with BS 5228-1:2009+A1:2014 & BS 5228-2:2009+A1:2014. Gas and water levels shall be monitored via installed Pierzometers on site.
Impact on Adjoining Buildings	The perimeter secant pile wall was installed in 2003 to facilitate excavation of the site and mitigate risks of movement or deflection of adjoining lands or buildings.
Disposal of Ground Water	The disposal of groundwater shall be in accordance with the licensed requirements of Dublin City Council and will be on a short-term basis. All conditions of this licencing agreement will be complied with.
Site Compound	The site compound will be temporary in nature and will be constructed on hardstanding, which will be removed upon completion of construction and disposed off to a licenced facility.

7.7.2 Operational Phase

No operational impacts have been identified in respect to the soils and geology aspects of the site.

7.8 Residual Impacts

7.8.1 Construction

The proposed development will result in excavated material being removed off site for disposal. The material may contain contaminants and therefore will need to be tested and exported to an approved licensed waste facility, as per the mitigation measures described above. The predicted impacts are noted as short term and moderate. Similarly, residual impacts arising from dewatering of the subject site, and

the disposal of groundwater under licence by Dublin City Council are classified as short-term and imperceptible.

The demolition material generated on site will be segregated and assessed to establish the viability of material to be reused or recycled, as per the mitigation measures outlined above. The material may contain contaminants and therefore will need to be tested and exported to an approved licensed waste facility. The predicted impacts are noted as short term and slight.

The nature of the construction works will inevitably mean that waste material generated on site will not be suitable for re-use or recycling, and therefore will be required to be removed from site and disposed of in accordance with current legislation. The waste material taken from site deemed to be inert or non-hazardous, will be committed to a regional landfill. The impacts are noted as temporary and not significant.

7.8.3 Operation

There is no predicted long-term impact on the soil, geology and hydrogeology environments associated with the operation phase of the proposed development. The impacts are noted as neutral and imperceptible.

7.8.4 Cumulative Impacts

The proposed development works can be assessed cumulatively with the proposed future development of the commercial site to the north. The study area for this assessment is identified in Figure 7.4.1 as the existing perimeter secant pile wall which was constructed around the entire site in 2003. This perimeter interlocking pile wall isolates both development sites in geotechnical terms from posing a risk of contamination to the external environment, causing adverse ground movements or damage to nearby structures. Similarly, the proposed construction work within the existing secant pile 'box' can proceed with neutral effect on existing or proposed development. The cumulative effects of the proposed development in conjunction with adjacent future planned development are therefore imperceptible.

A full schedule of existing and permitted developments in the vicinity of the subject development site is given in Appendix 1B to this EIAR, for the purposes of determining cumulative impacts of the proposed development in conjunction with other relevant developments. With regard to land, soil, and geology, none of these listed developments proposes significant earthworks sufficiently close to the subject development site to have a cumulative impact in conjunction with it.

7.9 Interactions Arising

The impacts described previously in this Chapter also relate to and interact with other chapters within the EIAR specifically, Population and Human Health, Water, Biodiversity, Noise and Vibration, Air Quality & Climate. These impacts are described in more detail in the various corresponding chapters however some general points are described below:

During the construction phase there is potential for dust from demolition work and excavations or stockpiles to impact on air quality/human beings. This can occur during demolitions and excavations

phases, when subsoils are being excavated, stockpiled and loaded into vehicles. The significance of effects would be deemed as moderate and short-term. Dust suppression measures will be implemented to minimise dust generation during extended dry periods such as water misting systems, wheel washes, tarpaulins to stockpiled materials etc. Dust monitoring will be conducted through the excavation period.

Noise and vibration will be generated through the Construction Phase particularly during the demolition, pilling and excavation works. Some level of noise and vibrations are unavoidable due to the nature of the works which require large machinery and the associated breaking, boring and excavation of concrete and subsoils as part of the construction works. The significance of effects would be deemed as moderate and short-term. A strict monitoring regime will be implemented, adopting an early warning traffic light system.

During the construction phase there is potential for interaction with Human Health. Construction workers will be exposed to any contaminants present in the underlying strata through direct contact and inhalation of dust and vapours. This would be during the bulk excavation stage, as excavated material is deposited into haulage trucks. The significance of effects would be deemed as imperceptible and short-term. All construction staff will wear suitable Personal Protective Equipment (PPE) during this phase of works. This interaction is considered to be negative and not significant.

The construction of the development will complete the "basement box" and prevent any future groundwater ingress, or the risk of contamination from the development affecting the groundwater. The drainage system associated with the proposed development is a fully 'closed' piped system which discharges to the appropriate foul or surface water public sewer along St John's Road; i.e. there is no surface water discharge to the groundwater.

No interactions are expected with Biodiversity. The site has undergone development since 2003 when the perimeter secant pile wall was first installed. There is some temporary landscaping provided to the centre of the subject site, but there is minimal biodiversity present in this area.

7.10 Monitoring

It is recommended that the following are monitored in relation to the land, soil and geology during the construction and operational stages:

- Testing and monitoring of soil and Made ground that will be excavated for any potentially contaminated material to ensure adequate classification and disposal.
- Monitoring of the retaining wall using for example, inclinometers and monitoring of water movements either seepages or through control points.
- Monitoring of neighbouring structures immediate to the development site for the effects of any vibration, movement and settlement arising from the excavation works based on condition surveys carried out by the Contractor prior to the works.
- Monitoring of interrelated impacts such as noise and vibration levels, groundwater levels, dust emissions etc. dealt with in the other chapters in this EIAR. The Contractor will be required to produce an Air Quality and Dust Management Plan including Best Practice Measures to control

dust and, in particular, measures to prevent dust nuisance.

- Testing and monitoring of water and gas during excavation works. It is not envisaged that any large scale groundwater pumping will be required during the construction works, but any run-off on excavated surface will be collected in settlement tanks and tested, before discharging under licence to the public sewer.

7.11 Reinstatement

Any temporary construction compounds will be removed from the site following the end of the construction phase. Reinstatement at completion of the works will involve removal of all materials that may have been deposited during construction works and restoring any areas within the public realm/pedestrian corridor with an appropriate and acceptable hard-wearing layer prior to landscaping works being undertaken.

7.12 Human Health

The predicted impacts on human health in relation to land, soils and geology have been considered with reference to the following:

- Land take; and
- Movement of soils during construction works.

7.12.1 Construction Phase

Development commenced at the site in 2003, with the construction of a perimeter secant pile wall. The excavation of the entire site followed soon afterwards, and construction of the existing buildings continued up to 2008/2009. A temporary landscape treatment was provided to the west of the site in 2012 under a temporary planning permission. The proposed development will remove the temporary landscaping, and complete the overall basement box and podium area.

There are no likely significant impacts to human health during the construction phase in terms of land, soils and geology due to the mitigation measures proposed. As such the predicted impact is considered to be short-term, imperceptible with a neutral impact on quality.

7.12.2 Operational Phase

The interim landscaping provided in 2012 as a temporary measure is a full storey below the publicly assessable podium level. The proposed development will complete the basement structure and provide a podium level which will be accessible to the public, across the full development.

There are no likely significant impacts to human health during the operational phase in terms of land, soils and geology due to the mitigation measures proposed. As such the impact is considered to be long term,

imperceptible with a neutral impact on quality.

7.13 Risk of Major Accidents and Disasters

As noted in earlier sections, the perimeter retaining wall elements and bulk excavations have already been completed at the subject site, In addition, supplementary lateral restraint anchors were installed at the secant pile wall along the western boundary to extend the design life of this element to 2042. The construction of the basement box as part of this development will provide permanent restraint. Therefore, the works do not pose risks of large scale civil works which could de-stabilise the surround ground or adjacent buildings. Similarly, whilst there will be localised excavations for foundations, there will be no large bulk excavation that would involve significant excavations or stockpiling.

In addition, the GSI online data base was consulted, which includes Landslide Susceptibility Mapping (See extract in Figure 7.13.1 below). The mapping provides information on areas which are predisposed to this type of Geohazard. The maps indicate data based on susceptibility banding or slope stability classification, areas ranging from a high susceptibility to landslide events to areas generally devoid of landslide events. As can be seen from Figure 7.13.1 below, the subject site has a Landslide Susceptibility Classification of "Low".

Figure 7.13.1 Landslide Susceptibility Map (source gsi.ie)

7.14 Difficulties Encountered in Compiling

The soil and geology profiles described are extracted from available site investigation information which uses testing and observation of a sample within boreholes and trial pits to give an overall representation of the site.

7.15 References

National Roads Authority (NRA) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

Interpretative Geotechnical Report for Site Investigation at Westgate, February 2006, prepared by Byrne Looby Partners Ltd.

Heuston South Quarter Subsoil, Groundwater and Air Quality Investigation, October 2017, prepared by Minerex Environmental Ltd.

Dublin City Council Geological Site Report – Guinness Wells IGH 16 Hydrogeology. (Date Unknown)

8. WATER

8.1 Introduction

This section of the EIAR has been prepared by Cronin and Sutton Consulting and describes the existing Surface water & flooding zoning aspects on the proposed development site, (note potable water and foul water are assessed in Chapter 12, Material Assets). An assessment is made of the likely impact arising during the construction and operational phases of the development on these elements.

This chapter was prepared by Robert Fitzmaurice of CS Consulting. Robert is a Chartered Engineer with Engineers Ireland and has been practicing as a consulting engineer for over twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering, an advanced Diploma in Planning & Environmental Law and has a master's degree in Industrial Engineering.

8.2 Characteristics of the Proposed Development

8.2.1 Development Description

The proposed strategic housing development at this site at Heuston South Quarter complex, Kilmainham, Dublin 8, will include 399 no. mixed residential units, retail, community facilities and public open space. All associated site development works and services provisions including parking, bin storage, substations, landscaping and all services required to facilitate the proposed development.

A full description is provided in Chapter 3 of the EIAR. The proposed development includes surface water, potable water and foul water infrastructure that is designed to minimise impacts on the surrounding environment. These have been described below.

Chapter specific particulars of the development include that the proposed scheme will be constructed on top of an existing basement constructed previously. The subject lands are located approximately 300m to the south of the River Liffey. The current basement podium has an elevation of 7.50mAOD.

8.2.1.1 Proposed Attenuation Arrangements

The first aspect is to reduce any post development run-off to pre-development discharge rates. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1 in 100 year storm event increased by 20% for predicted climate change factors.

To ensure an accurate calculation of the required attenuation for the site Met Éireann was contacted to provide the information noted below. As per standard industry practice the information is retrieved from Met Éireann's web site,(www.met.ie):

- The SAAR (Standard Annual Average Rainfall) for the area: 727mm/year.
- The sliding duration table for the site indicating the 1:100 year rainwater intensities to be used.

- Soil type value obtained from the Flood Studies Report, (for the subject lands this has been established as soil type 4.

These parameters allow the Q-Bar, greenfield runoff rate, to be calculated. The Q-Bar value for the site is 5.05 l/sec/Ha. As the storm water will connect into a public surface water sewer and the site area being roughly 1Ha, 2.0l/s/Ha is used as the restriction value. Therefore, the allowable discharge rate off site for any given storm even will be limited to 5.00l/sec.

The proposed development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1 in 100 year storm event increased by 20% for predicted climate change factors. The attenuation volume requirement of 760m3 for the 1 in 100 year storm event. See CS Consulting's Engineering Services Report.

8.2.1.2 Proposed Sustainable Urban Drainage System, SuDS

The second aspect is the policy of the Local Authority is to include Sustainable Urban Drainage Systems, SuDS, for all new applications. The aim is to provide an effective system to mitigate the adverse effects of storm water runoff on the environments, through enhanced quality systems and on local infrastructure to aid in preventing downstream flooding. The features proposed shall reduce run-off volumes, pollution concentrations and enhance groundwater recharge and biodiversity.

The proposed SuDS features shall consist of:

- Green-roof – this allows the roof areas of the proposed apartments to use a Sedum type covering to absorb the first 'flush' from rainfall events. Typically, 5-10mm of rain can be retained on the sedum surface. As more intense rain is experienced the green roof can overflow from the roof through down pipes and into the schemes main drainage runs.

- Water-'butts' – when the rain water from the green roofs and from the roofs of the housing units is drained to ground floor it will be directed into rainwater storage units, commonly referred to as water butts. The retained rainwater can then be stored and re-used for local landscaping and maintenance purposes. It would not be envisioned that the captured rainwater would be reused in the apartment units for public health reasons.

- Main Attenuation Tank – As noted above the for extreme storm events, will require a dedicated system to contain the storm water flows generated during a 1-in-100 year storm, increased by 20%. It is proposed to use a proprietary underground storage tank for this purpose. The tank will be placed under open spaces, not roads so the open space above can be enjoyed while not preventing the schemes ability to retain the storm water.

- Low Water Usage Appliances – It is also worth highlighting that low water usage appliances will also be utilised to aid in the reduction of water usage on the development.

The combination of the above noted elements will allow the proposed development to adhere to the principles of sustainable drainage practices while enhancing overall storm water quality. Interception Storage shall be provided via the use of the green roofs on the apartment buildings and by the use of local drainage into landscaped areas & tree pits where applicable. This will allow both interception & treatment volumes from the proposed development to be provided for.

8.2.1.3 Proposed Surface Water Infrastructure

The proposed development will require a sperate storm water system to be constructed in the new building to gather and drain storm water generated on site into the public sewer on St. James Road. The proposed storm water system has been designed in accordance with the requirements of Dublin City Council. All storm water generated on site will pass through a 'green roof' on the upper levels of the proposed structure before draining down into the basement area for storage in a proposed attenuation tank. The storm water will be pumped at a controlled rate into a dedicated storm water manhole on St. James Road. See CS Consulting's drawing HSQ-CSC-XX-XX-DR-C-0102 for details of the proposed storm water system, note that a large scale version of this drawing is included with the application.

8.2.2 Location

The proposed development is located on St. John's Road at the Heuston South Quarter complex in Dublin 8. The site sits within the established communities of Kilmainham and nestled between The Royal Hospital Kilmainham to the west and the Quays to the north. The site is located in the administrative jurisdiction of Dublin City Council and has a total area of approximately 1ha. The location of the proposed development site is shown in Figure 8.2.2.1.

The subject site comprises part of the undeveloped area that has been landscaped as an interim measure to improve the aesthetics of the site pending its complete redevelopment. There is already an established road, pedestrian and cycle network in the vicinity of the site so as to allow for a high level of permeability. The site is bounded to the west by The Gardens at the Royal Hospital of Kilmainham, to the north by the St. John's road, to the east by existing buildings from phase 1 of the larger HSQ development fronting, Military Road further to the east and to the south by office and residential buildings.

Access to the site is available from a number of points with the principal vehicular access points being from the existing HSQ / St. Johns Road west junction, north of the development site, and the existing HSQ / Military Road junction, east of the development site. The above access points are interconnected by the development's internal road network. This provides permeability and connectivity through the site for vehicular traffic, as well as for pedestrians and cyclists.

The indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 8.2.2.1.

Figure 8.2.2.1 Location of proposed development site (sources: EPA, OSM Contributors, Google)

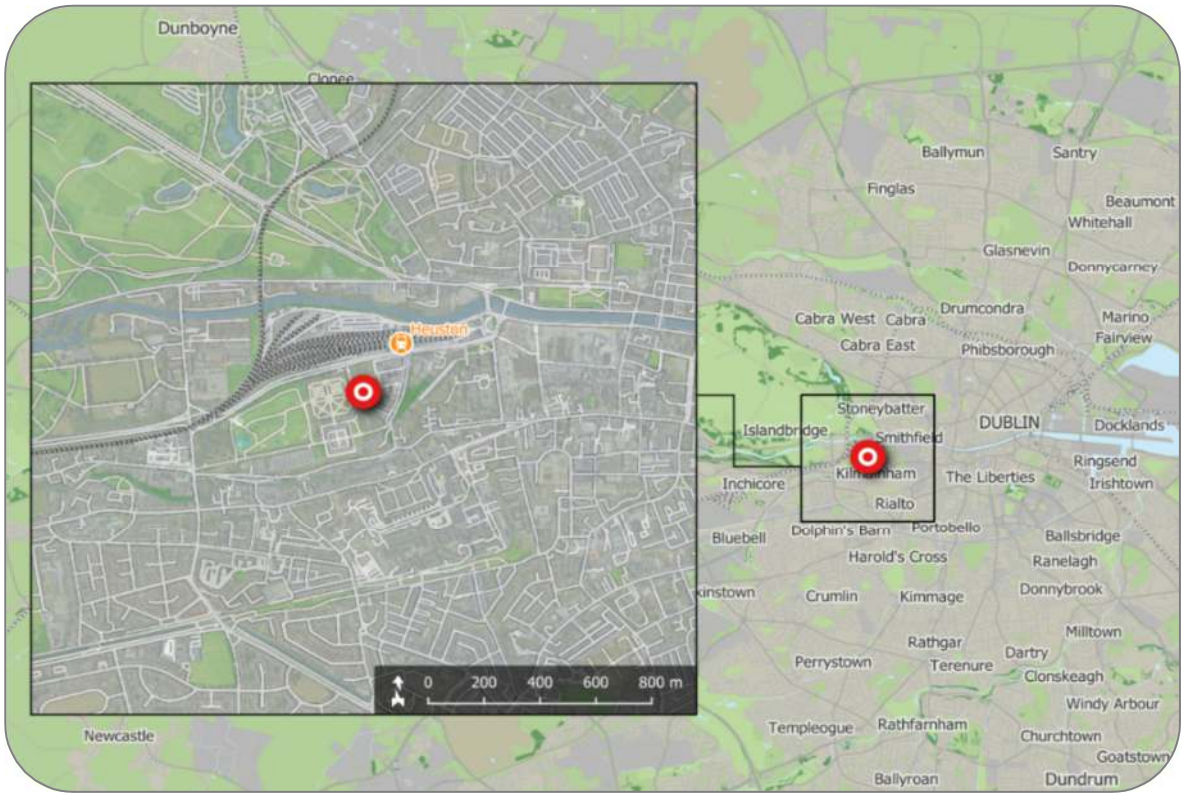


Figure 8.2.2.2 Site extents and surrounding transport infrastructure (sources: NTA, OSM Contributors, Google)

8.3 Assessment Methodology

This chapter has been set out with reference to the specific criteria set out in the Environmental Protection Agency guidelines, including the following:

- EPA (2017), Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR);
- Conservation and Amenity Advice service (CAAS) (2002), Guidelines on the Information to be contained in Environmental Impact statements.
- CAAS (2003), Advice Notes on Current Practice in the Preparation of Environmental Impact statements.
- EPA (2015), Advice Noted for Preparing Environmental Impact Statements Draft.
- Good Practice Guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, C532, 2001).
- The Greater Dublin Strategic Drainage Study, (GDSDS), 2005,
- Regional Drainage code of Practice, (DCC),
- CIRIA, C753 Sustainable urban Drainage Systems (SuDS) Manual,
- A Strategic Flood Risk Assessment prepared by CAAS for the Poolbeg West SDZ Planning Scheme,
- The National Planning Guidelines from the OPW & the Department of the Environment, heritage and Local government, November 2009, Titled *The Planning system and Flood Risk Management Guidelines for Planning Authorities*.

8.3.1 Desktop Study

A desktop study was carried out on the local and regional surface water and drainage network. Information was obtained from documents including the following sources:

- Eastern River Basin District (ERBD) Catchment Characterisation Report (ERBDA, 2005)
- ERBD River Basin Management Plan 2009-2015 (ERBDA, 2010a)
- ERBD Programme of Measures 2009-2015 (ERBDA, 2010b)
- ERBD River Basin Management Plan - Strategic Environmental Assessment (ERBDA, 2011)
- EPA online Water Quality Database and Envision Map Viewer (www.epa.ie)
- Dublin City Council Water and Drainage Department record drawings and discussions with Drainage Division Engineers;

- Flood Risk Assessment Report completed by Cronin and Sutton Consulting which accompanies this Planning Application.

- Dublin City Councils Development Plan, 2016 – 2022

- Dublin City Councils Strategic Flood Risk Assessment, Vol. 7 of the current Development Plan.

- Site Visits ; CS Consulting staff attended site in May 2020 & 2021.

8.3.2 Policies

At a national level the National Planning Framework (Project Ireland 2040) includes Objective 60, a National Policy to "Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance".

As the subject lands are within the jurisdiction of Dublin City Council, their current Development Plan, (2016 – 2022), also contains policy guidance to be adhered too.

Specific policies relating to surface water quality within the 2016 – 2022 plan include:

- GI20: To seek continued improvement in water quality, bathing facilities and other recreational opportunities in the coastal, estuarine and surface waters in the city, having regard to the sensitivities of Dublin Bay and to protect the ecology and wildlife of Dublin Bay.

- GI21: To support initiatives to reduce marine pollution in Dublin Bay in partnership with other organisations and to raise awareness by Bay users and the general public and also to have regard to the Marine Strategy Framework Directive (2008/56/EC).

- SI1: Policy to support Irish Water: provision of high quality drinking water and waste water treatment facilities.

- SI2: Policy to support Irish Water in upgrading of wastewater infrastructure and Greater Dublin Regional Wastewater Treatment Plant, and Marine Outfall and orbital sewer.

- SI3: Policy to ensure development is permitted in tandem with available water supply and wastewater treatment.

- SI14: To protect the Dublin City coastline from flooding as far as reasonably practicable, by implementing the recommendations of the Dublin Coastal Flood Protection Project and the Dublin Safer Project.

- SI15: To minimise the risk of pluvial (intense rainfall) flooding in the city as far as is reasonably practicable and not to allow any development which would increase this risk.

- SI16: To minimise the flood risk in Dublin city from all other sources of flooding, including fluvial, reservoirs and dams and the piped water system.

- SI17: To require an environmental assessment of all proposed flood protection or flood alleviation works.

- SI18: To require the use of Sustainable Urban Drainage Systems in all new developments, where appropriate, as set out in the Greater Dublin Regional Code of Practice for Drainage Works. The following measures will apply:
    - The infiltration into the ground through the development of porous pavement such as permeable paving, swales, detention basins.
    - The holding of water in storage areas through the construction of green roofs, rainwater harvesting, detention basins, ponds, wetlands.
    - The slow down of the movement of water.
- SI10: To have regard to the Guidelines for Planning Authorities on the Planning System and Flood Risk Management, and Technical Appendices, November 2009, published by the Department of the Environment, Community, and Local Government as may be revised/ updated when assessing planning applications and in the preparation of plans both statutory and non-statutory.

8.3.2 Legislative Background

The following legislation was referred to in compiling this chapter:

Water Framework Directive 2000/60/EC

The EU Water Framework Directive (WFD) 2000/60/EC came into force on 22nd December 2000, and enacted into Irish legislation through S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003. This legislation and regulation is a significant piece of legislation for water policy, as it provides a co-ordinated approach across Europe for all water policies, establishing a management structure for future water policy. A few key objectives of the Directive are to:

- Protect all waters, including rivers, lakes, groundwater, transitional and coastal waters.
- Achieve "good status" in all waters by 2015 or at the latest 2027, and maintaining "high status" where the status already exists.
- Have water management based on River Basin Districts (RBD).

The strategies and objectives of the Water Framework Directive in Ireland have been influenced by a range of National and European Union legislation and regulation including:

- Local Government (Water Pollution) Acts 1977 – 1990.

In turn the implementation of the Water Framework Directive and its associated policies has necessitated the introduction of new regulations in Ireland including, the European Communities Environmental Objectives (Surface Waters) Regulations 2009, which are discussed further in the following section.

European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No.272 of 2009)

These regulations have been devised as a more complete and stringent set of surface water quality regulations which covers the requirements of the Water Framework Directive and the Dangerous Substances Directive. These regulations came into effect on 30th July 2009 and have been adopted by the Government. These regulations supersede previous water quality regulations (both EU and national). This project is cognisant of previous regulations as they form the basis for a wide range of impact assessment and monitoring methodologies. It is envisaged that a detailed construction management plan which will include the management or disposal of surface water runoff will be prepared in advance of construction commencing on site. The construction & demolition management plan will be cognisant to take into account these new regulations and apply them throughout the construction phase.

European Communities Priority Substances Directive 2008

These regulations have been devised to assign a chemical status assessment for water bodies. Directive 2008/105/EC provides environmental quality standards in the field of water policy.

Local Government (Water Pollution) Acts 1977 – 1990:

The Act is the main legislation for the prevention and control of water pollution, including the general prohibition of polluting matter to waters. While this act has largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

Water Quality Standards for Phosphorus Regulations 1998 (S.I. No. 258 of 1998):

As part of the Water Pollution Acts, these regulations require water quality be maintained or improved, with reference to the biological quality river rating system (Q Rating) as assigned by the Environmental Protection Agency between 1995 to 1997. While this act has also largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

Pollution caused by certain dangerous substances discharged into the aquatic environment 2006 (Directive 2006/11/EC Of The European Parliament And Of The Council):

Directive gives an indication of parameters which have to have their concentration values limited to ensure improvement of the aquatic environment.

European Union – Drinking Water Regulations 2017 (S.I. No. 464/2017)

Regulations pertain to the overall water quality & constituents allowable in potable water.

European Union – Environmental Objectives (groundwater) 2016 (S.I. No. 366/2016)

Regulations pertain to the overall water quality & constituents allowable in potable water.

8.3.3 Assessment of Existing Water Quality

An assessment of the existing water quality was also carried out in the form of a desktop study examining water quality data from the EPA from surveys predominately conducted by the EPA and local authorities. Various quality classes are used to establish and monitor the condition of rivers and streams in Ireland. Quality classes relate to the potential beneficial use of a water body, and can be effected by the quality of water discharged to surface water during construction and operation of a development.

Background Information on the local drainage network and water supply was obtained from documents from local authorities.

8.3.4 Flood Risk Assessment

A Site Specific Flood Risk Assessment Report compiled by Cronin & Sutton Consulting was undertaken for the proposed development and is included as part of the planning application. This Flood Risk Assessment is provided in Appendix 8A of this report.

The potential sources of flooding considered were:

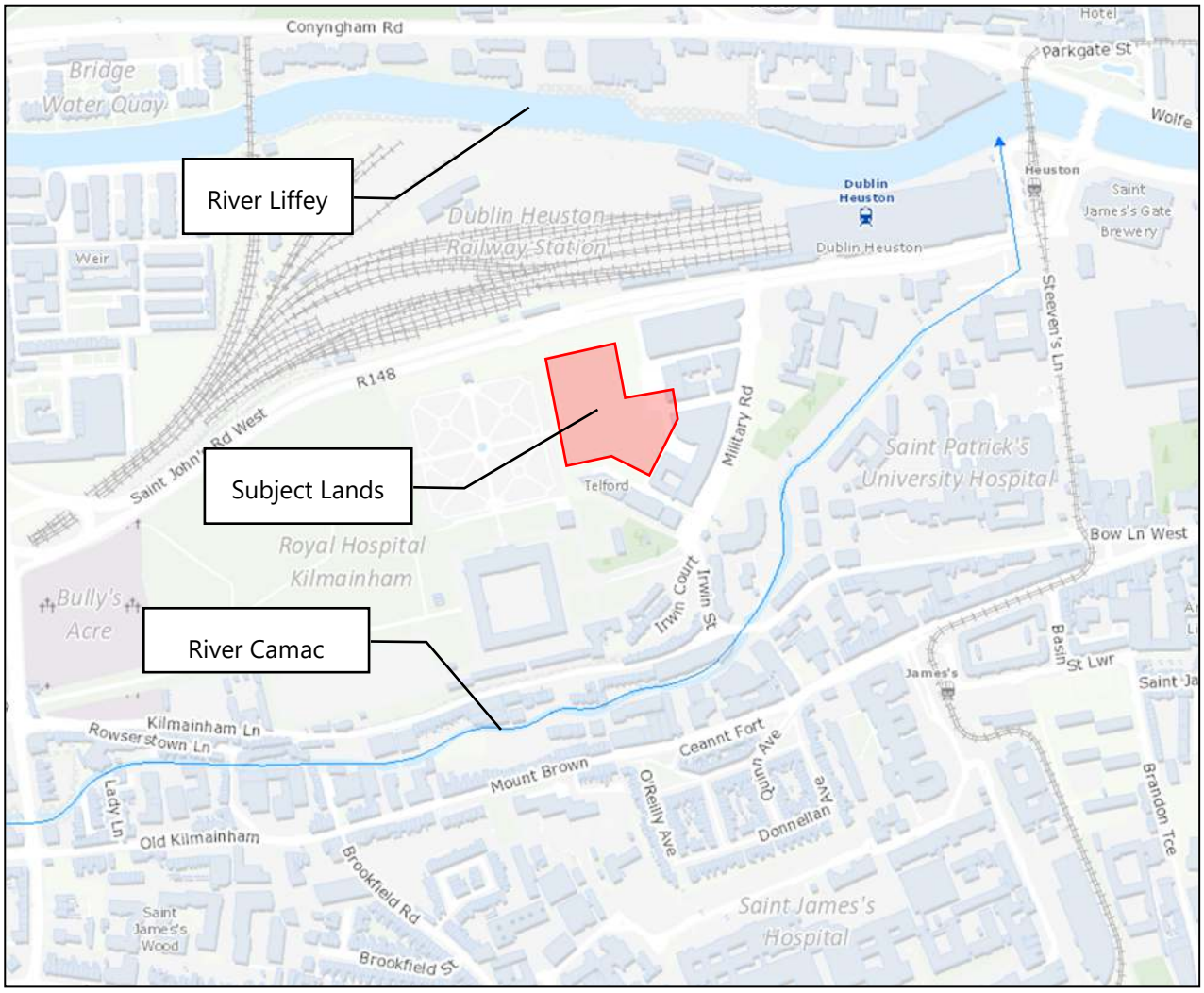
- Tidal/Coastal flooding;
- Fluvial flooding (from adjacent surface water bodies);
- Pluvial (direct rainfall);
- Groundwater flooding;
- Potential for offsite flooding due to infrastructure failure.

8.4 Receiving Environment

8.4.1 Surface Water Features

The main freshwater receiving environment within the vicinity of the proposed development is the River Liffey, which is located approximately 250m to the north of the site. The River Liffey flows in an easterly direction and discharges into the Irish Sea approximately 7 km east of the site. The site is located within the Eastern River Basin District which is the Water Framework Directive designated catchment for the local area. The historical Camac River is culverted for some of its length but is un-cluverted as it passes within a 100m to the east of the subject site. The Camac is culverted as it passes beneath St. Johns Road West and ultimately discharges into the River Liffey. See Figure 8.4.1.1 below for the surface water features close to subject lands.

Figure 8.4.1.1 Surface water features close to subject lands. (source GSI)



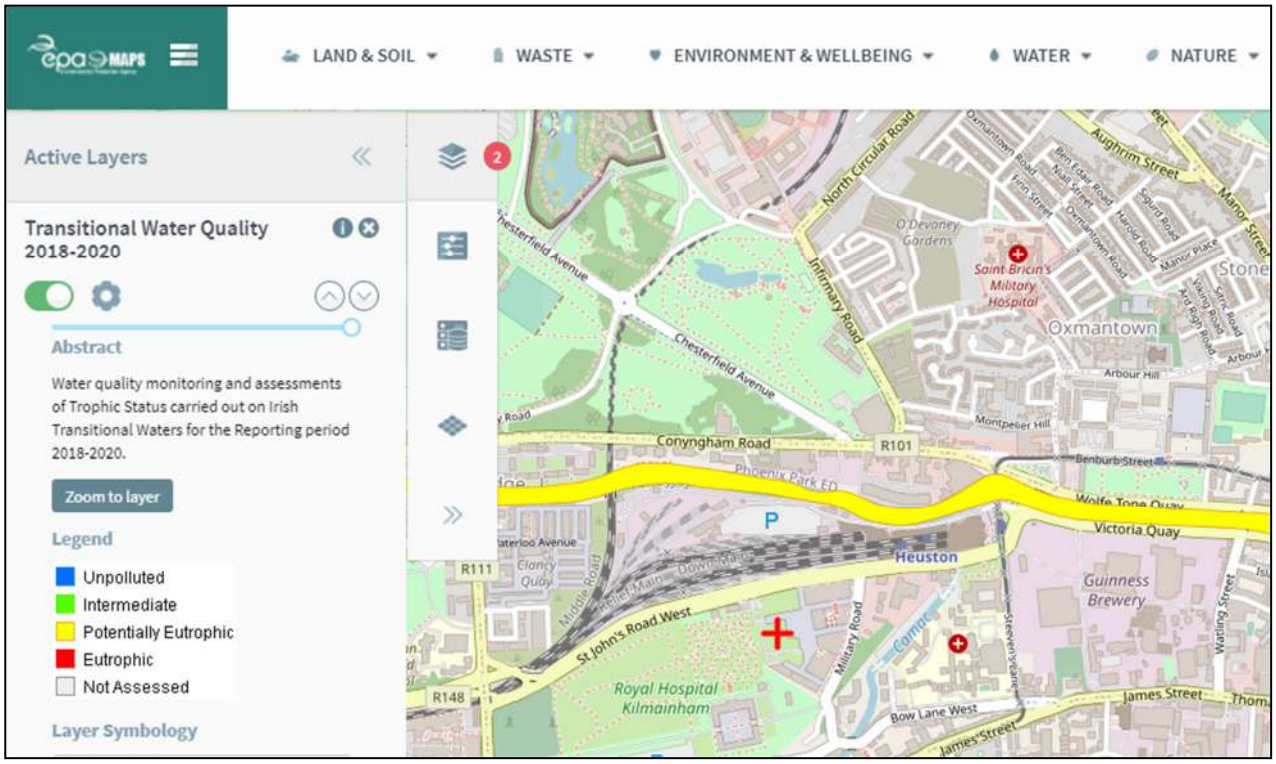
The WFD classification scheme for water quality includes five status classes: high, good, moderate, poor and bad. 'High status' is defined as the biological, chemical and morphological conditions associated with no or very low human pressure. This is also called the 'reference condition' as it is the best status achievable - the benchmark. These reference conditions are type-specific, so they are different for different types of rivers, lakes or coastal waters so as to take into account the broad diversity of ecological regions in Europe.

Assessment of quality is based on the extent of deviation from these reference conditions, following the definitions in the Directive. 'Good status' means 'slight' deviation, 'moderate status' means 'moderate' deviation, and so on. The definition of ecological status takes into account specific aspects of the biological quality elements, for example "composition and abundance of aquatic flora" or "composition, abundance and age structure of fish fauna. The River Liffey in the vicinity of the site is categorised on the EPA Water Quality Map as a transitional waterbody. EPA sampling of watercourses dating from 2010-2015 indicate that the River Liffey had a 'moderate' status.

Information available from the EPA suggests that the River Liffey is "at risk of not achieving good water status" in terms of the WFD. The water quality within the designated water courses will be particularly affected by the quantity and quality of surface water run-off from the adjacent lands. Currently the lands in the vicinity of the site are classified as urban in use.

The most recent surface water quality data for the Liffey and Dublin Bay (2018-2020) indicate that they are 'Potentially Eutrophic'. Under the 2015 'Trophic Status Assessment Scheme' classification of the EPA, Potentially Eutrophic water bodies are those in which criteria in two of the categories are breached and the third falls within 15 per cent of the relevant threshold value. Annual precipitation for this area is approximately 727mm (2018 figures from Met Eireann website).

Figure 8.4.1.2 Transitional Water Quality of river (source EPA) _(Site indicated as red cross)



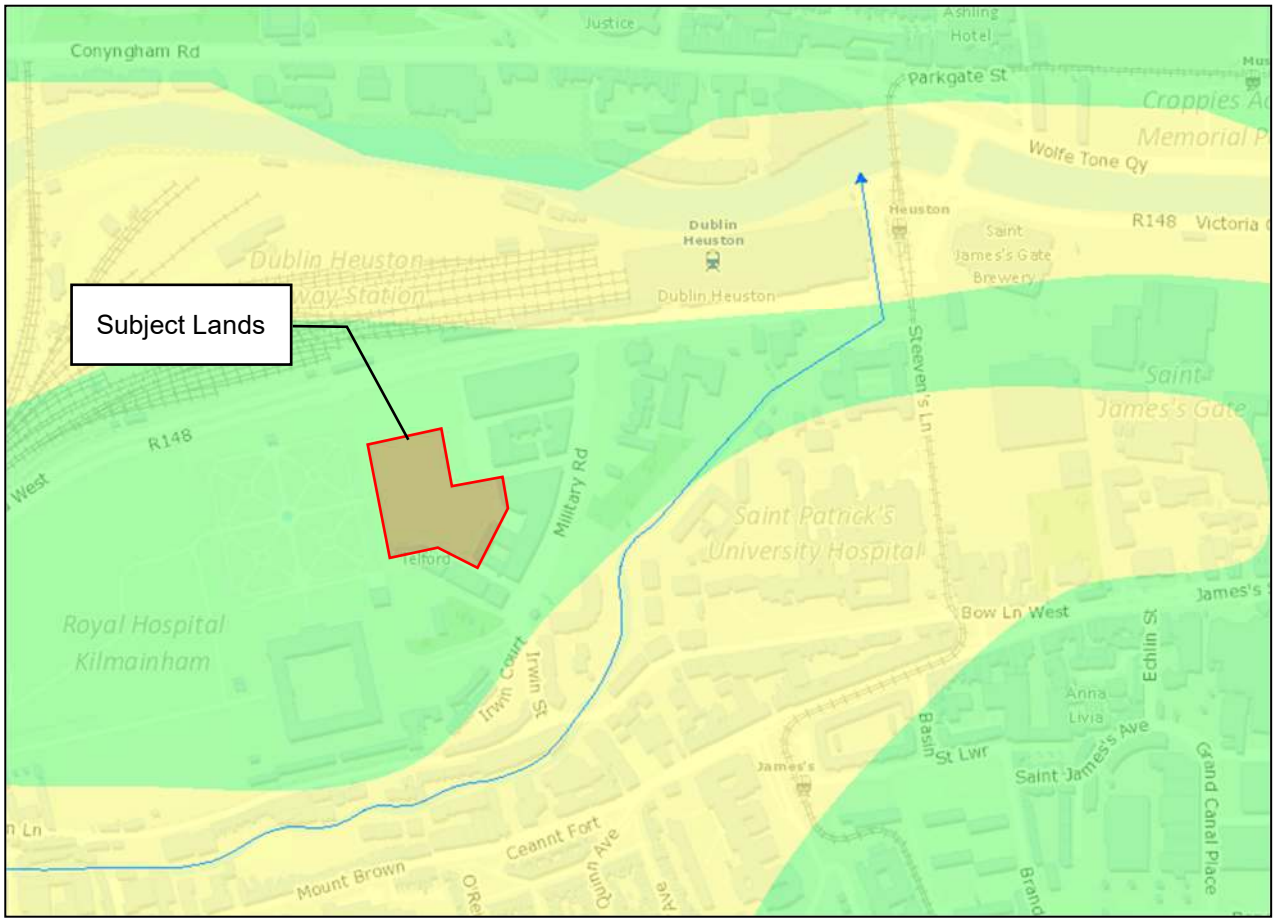
The Camac as a water body is both open and culverted in various stretches along its reach. There is no 'Q – status' designation for the River but it has been as having a 'poor' ecological status (2013 – 2018) under the WFD.

8.4.2 Ground Water

The subject site is within the Dublin Urban Groundwater Body as designated in the ERBD Management Plan. The groundwater body chemical and quantitative status of both of these groundwater bodies has been designated as 'good'. The Geological Survey of Ireland, GSI, has developed a classification system for aquifers based on the value of the resource and their hydrogeological characteristics. The bedrock aquifer is classified as a Locally Important Aquifer (Li) Aquifer which is designated as a productive aquifer in local zones. The GSI, vulnerability rating for pollution from the ground surface is Low. The groundwater flows in a northerly direction towards the River Liffey.

A perimeter secant pile cut-off wall was constructed in 2003, prior to commencement of excavations. A detailed Environmental Assessment, involving sampling, was carried out by URS. The site was then excavated to formation level, which was generally within the virgin black boulder clay.

Figure 8.4.2 Groundwater Vulnerability (source GSI)



8.4.3 Flood Risk

In accordance with the National Flood Risk Guidelines & Dublin City Councils Development Plan Vol. 7 – Strategic Flood Risk Assessment the proposed development has be assessed for tidal, pluvial, fluvial, ground water & infrastructure failure flood risks.

A detailed assessment of the historical, current and proposed flood risks to the site are examined in the Site-Specific Flood Risk Assessment prepared by CS consulting and provided as Appendix 8A.

Based on current Dublin City Council flood mapping and mapping prepared by the Office of Public works the subject land is adjudged to be in Flood Zone 'C'. This classification indicates that the site is located outside of the predicated 1-in-200 tidal flood event and outside the predicated 1-in-1000 fluvial storm water event, therefore the proposed development is deemed suitable for the location.

The analysis for the proposed development has found that the risk on onsite flooding or the potential to cause off site flooding from all possible mechanisms is deemed to be low. As such the proposed development is in accordance with statutory guidelines. See below figure 8.4.3.1, for extract from OPW Fluvial flood Map. See below figure 8.4.3.2, for extract from OPW Tidal flood Map.

Figure 8.4.3.1, Extract from OPW Fluvial flood Map, (Source OPW)

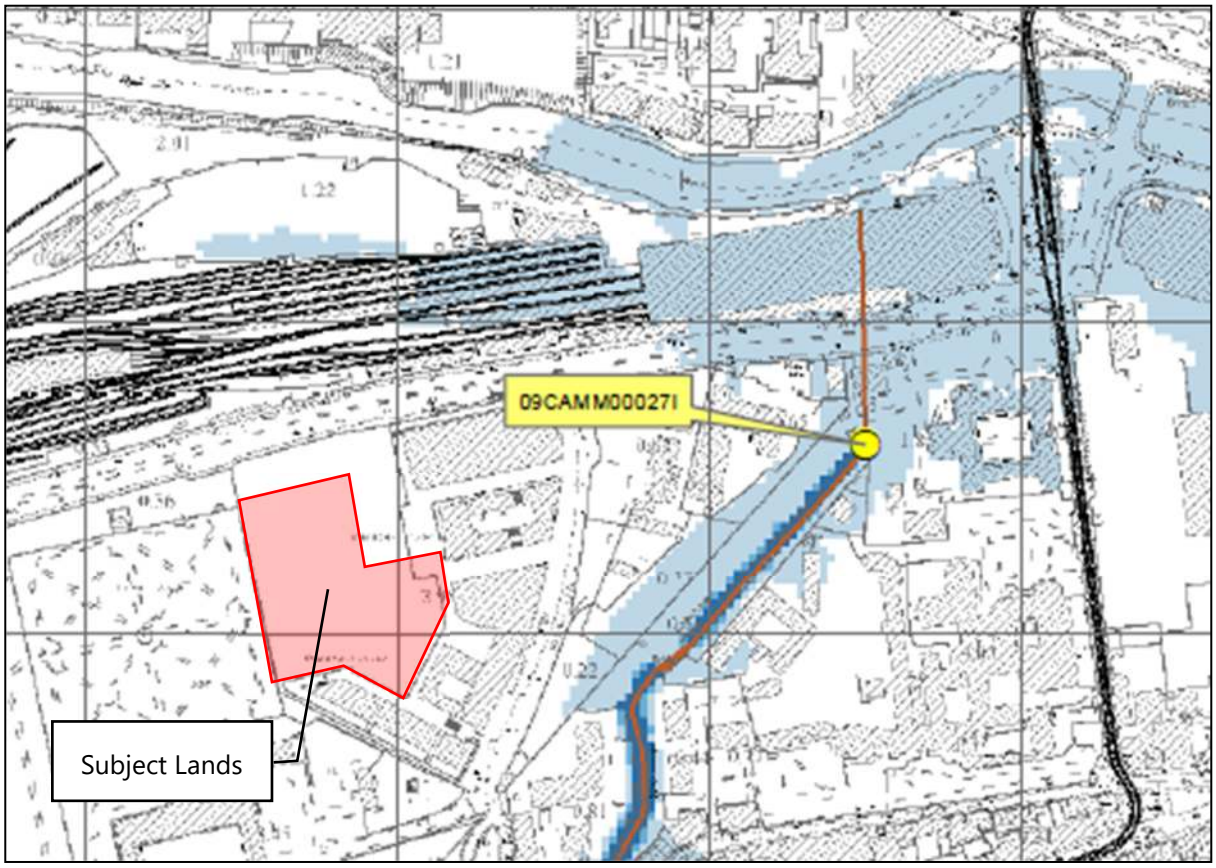
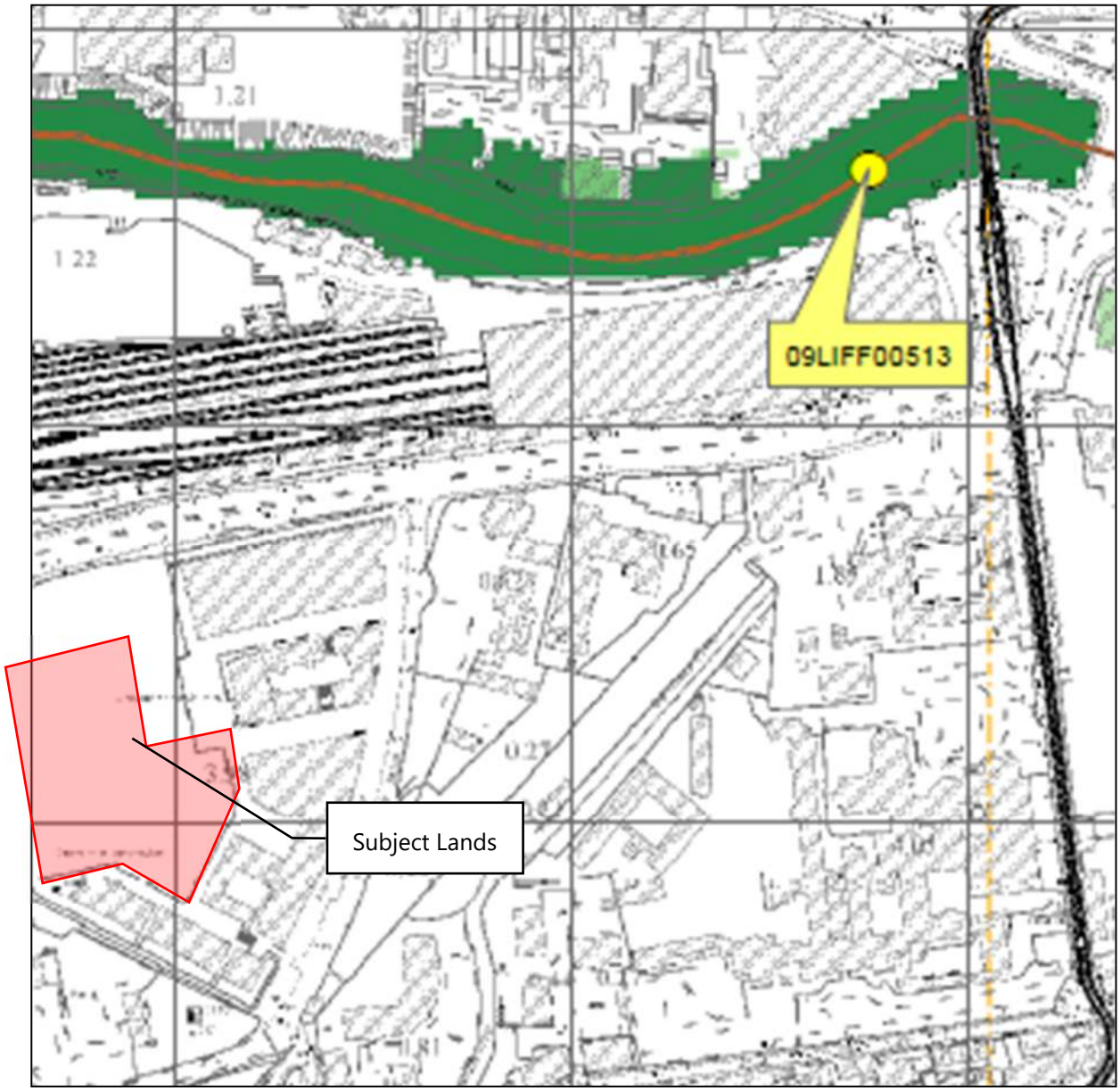


Figure 8.4.3.2, Extract from OPW Fluvial flood Map, (Source OPW)



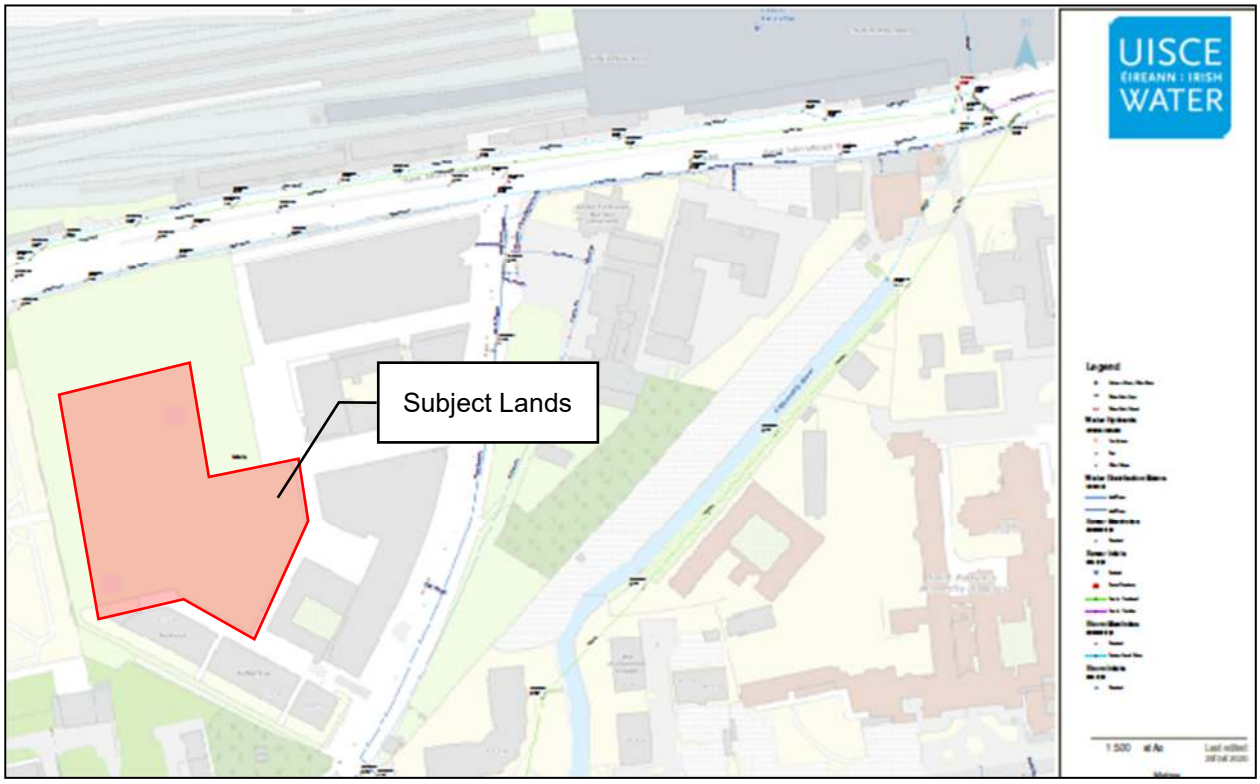
8.4.5 Surface Water Drainage Infrastructure

Dublin City Council's drainage records indicate:

- A 375mm diameter dedicated stormwater sewer along St. Johns Road West, north of the site, which flows west to east.

A review of the Local Authority hydraulic performance maps prepared by Dublin City Council as part of The Greater Dublin Strategic Drainage Study (GDSDS), for the 2031 hydraulic scenario indicates that the storm sewers on site are currently under hydraulic pressure, and flooding is predicated for storm events for return periods of less than 30 years. See below figure 8.4.5, for Irish Waters records, (note a full scale version of this map is in Appendix 8B.

Figure 8.4.5.1 Irish Water Drainage Records (Source IW)



8.5 Identification of Likely Significant Impacts

This section addresses the implications for the proposed development on the existing environment and looks at the possible affects the proposed development may have during the construction & operational phase. Potential issues were identified and assessed. The assessment looked at the time frame and magnitude of the potential issues & mitigation mechanisms to address. The methodology employed in compiling this Chapter of the EIAR incorporates the Draft Guidelines on the Information to be contained in Environmental Impact assessment reports by the Environmental Protection Agency, (EPA 2017). The approach followed to derive effects significance from receptor value and magnitude of impacts is shown in Table 8.5.1. Where Table 8.5.1 includes two significance categories, reasoning is provided in the text if

the lower of the two significance categories is selected. A description of the significance categories used is provided in Table 8.5.2.

Table 8.5.1: Significance Matrix

	Magnitude of Impact (Degree of Change)				
Environmental Value (Sensitivity)		**Negligible**	**Low**	**Medium**	**High**
	High	Slight	Slight or moderate	Moderate or Large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate or large	Profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

Table 8.5.2: Significance categories and typical description.

Significance Category	**Typical Description**
Profound	An effect which obliterates sensitive characteristics
Large	An effect which, by its character, magnitude, duration or intensity altered a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the characterises of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An effect capable of measurement but without significant consequences.

Residual adverse effects of 'large' or 'profound' significance are considered to be 'significant' for the purposes of this assessment. Following the assessment of the level of effect significance, mitigation measures are presented that will be used to avoid, prevent or reduce the magnitude of the potential impact. The significance of the effect taking into account the mitigation is then assessed to give the residual effect significance. The effects of the Proposed Development are also considered cumulatively with those that could

foreseeably result from other known developments in the assessment study area that are going through the planning process.

8.5.1 Construction & Demolition Phase

The principal risks associated with the Construction/demolition Phase are:

- Surface Water – (site runoff and contamination)
- Ground Water – (potential for site development works in affect groundwater quality)
- Flood Risk – (potential for excessive run off from site)

8.5.1.2 Surface Water

Surface water run-off will occur from hardstanding and roof structures during the construction period. As there is a small section of the existing structure to be removed there is the potential for detritus material to wash into the drainage network. This surface water run-off from construction/demolition activities has the potential to be contaminated with the following;

- Hydrocarbons from accidental spillage from construction plant and storage.
- Concrete/cementitious products: arising from construction materials.
- Vehicle wheel wash water.
- Runoff from exposed work areas and excavated material storage areas.
- Solid (municipal) wastes being disposed or blown into watercourses or drainage systems.
- The significance for surface water discharge has been deemed to be short term & moderate.

8.5.1.3 Ground Water

- As the proposed development is to 'build-out' the site, the basement has been constructed as part of the initial works to develop the site. As such the proposed works will not affect the groundwater beneath the constructed basement slab. The significance for groundwater affecting the development has been deemed to be short term & imperceptible.

8.5.1.4 Flood Risk

- Surface water run-off has the potential to flood basement lower levels during the construction period. As the proposed construction of the site will require on going works prior to the storm water system being installed there is a slight risk that should the development experience an intensive storm event while under construction the site may be victim to flooding as the levels of storm water experienced may be excessive. The significance for potential flooding has been deemed to be short term & moderate.

8.5.2 Operational Phase

The principal risks associated with the Operation Phase are:

- Surface Water – (site runoff and contamination)
- Ground Water – (potential for site development works in affect groundwater quality)
- Flood Risk – (potential for excessive run off from site)

8.5.2.2 Surface Water

The proposed development will be constructed on previous works carried out on site. The development is too 'build-out' works completed previously. The hardstanding which changes the sites footprint from the original, (pre-any onsite development) soft landscape increases the percentage of storm water runoff leaving the site during extreme storm water events. It is noted that the proposed development works has already converted the original sites profile from an undeveloped, low stormwater discharge rate, to a semi developed hardstanding site footprint. Overall, the risk to surface water features arising during the operational phase are considered to be longterm & moderate.

8.5.2.3 Ground Water

The proposed works will see the previous works which had commenced on site be completed. The works which have taken place previously on site included the construction of the basement. As the basement is fully completed and the proposed works will not require any further expansion of the basement on site an assessment of the potential risks can be designated as longterm and imperceptible.

8.5.2.5 Flood Risk

The proposed development has been the subject of *Site Specific Flood Risk Assessment*, attached as Appendix 8A.

This assessment found that the operational phase of the development will not adversely affect the subject sites Flood Zone designation or alter same for the local environs. The proposed scheme will not increase the potential for localised or off-site flooding.

In this way, the predicted impact of the proposed development on flooding risk is deemed to be longterm and slight.

Table 8.5.3 Gives a Breakdown of Potential Impacts

Potential Impacts - Hydrology						
	Potential Impact	**Attribute Importance**	**Impact Duration**	**Impact Magnitude**	**Impact Significance**	**Stage**
Environmental Management	Demolition & uncontrolled spillages,	High	Short term	Moderate	Moderate	Construction & demolition

	on/off site impacts					
SW Runoff	On site batching or mixing activities	High	Short term	Moderate	Large	Construction
SW Runoff	On/off site pollution, due to washing down areas	High	Short term	Moderate	Moderate	Construction
SW Runoff	On/off site pollution, due to washing down areas	High	Short term	Moderate	Large	Construction
SW Runoff	On site flooding, due to poor temporary drainage	High	Short term	Slight	Slight	Construction
Site Management	Pollution issues due to site operations	High	Short term	Moderate	Moderate	Construction
SW Discharges	On/off site issues due to Uncontrolled spillages	High	Short term	Moderate	Moderate	Construction
Flood Risk	Site flooding	Low	Short term	Moderate	Slight (in Flood zone C)	Operational
SW Drainage	Site flooding, due to sewer blockage	High	Short term	Moderate	Moderate	Operational
SW Drainage	Offsite flooding due to storm water release	High	Long term	Moderate	Moderate	Operational
River Liffey/Camac	Surface water contamination	Very high	Short term	Moderate	Slight	Operational
Groundwater	Contamination & site flooding	Low	Long term	Imperceptible	Imperceptible	Operational

8.6 Do Nothing Scenario

The "Do Nothing Impact" assesses the environmental impact of not redeveloping the proposed

development site in respect of the existing impacts to water, hydrology and existing drainage and water supply systems at the proposed site.

Under the "Do Nothing Scenario" there would be no change in the current site arrangement and therefore the hydrology environment and drainage system would remain as is. This scenario would have a moderate impact on the hydrological environment. This is due to the fact that at present, surface water generated on site does not pass through any water quality treatment stage before discharging into the public sewer.

8.7 Mitigation Measures

Table 8.7.1 Table of Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Environmental Management	Prior to construction the Contractor will be required to develop an Environmental Management Plan which will incorporate mitigation measures such as containment procedures, audit and review schedules and an Emergency Response Plan in the event of spills, flooding or other incidents that may contribute to pollution to water during construction.
Surface Water Run off	All batching and mixing activities will be located in areas away from watercourses and drains.
Surface Water Run off	Protection measures will be put in place to ensure that all materials used during the construction & demolition phase are appropriately handled, stored and disposed of in accordance with recognised standards and manufacturer's guidance.
Surface Water Run off	Surface water drainage around the batching plant will be controlled and washout from mixing plant will be carried out in a designated, contained impermeable area.
Surface Water Run off	Spills of concrete, cement, grout or similar materials will not be hosed into drains.
Surface Water Run off	Rainwater that accumulates on site will be discharged to the DCC sewer system, under an appropriate discharge licence.
Site Management	The Contractor will comply with the following guidance documents: • CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001) • CIRIA – Guideline Document C624 Development and Flood Risk -

	guidance for the construction industry (CIRIA, 2004).
Surface Water Discharges	Dewatering and surface water discharges on the site, during construction and prior to completion will be controlled. All necessary facilities will be incorporated such as settlement ponds/tanks, oil/grit interceptors with shut down valves, bunded oil storage tanks adjacent to a petrol interceptor for storage of any recovered oil. A monitoring programme including sampling for water quality before discharge to the Council sewer during construction will be carried out to ensure that only clean surface water is discharged to the receiving systems.

Character of potential impact	**Mitigation measure**
Operational Phase	
Flood Risk	The provision of a reduced storm water discharge rate will mitigate against off site flooding form the development. As the site is located in Flood Zone 'C' the risk of site flooding from external sources is not significant.
Surface Water run off (site flooding)	The provision of flow control with storm-water attenuation will ensure the rate of discharge of surface water is limited to greenfield run-off rates of 2 litres/second/hectare with a total allowable surface water discharge of 5.0 litres/second in line with the recommendations of the Greater Dublin Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study.
Surface Water run off (unattenuated flow)	The provision of flow control with storm-water attenuation will ensure the rate of discharge of surface water is limited to greenfield run-off rates of 2 litres/second/hectare with a total allowable surface water discharge of 5.0 litres/second in line with the recommendations of the Greater Dublin Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study.
Surface Water (River Liffey & Camac)	Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system.
Groundwater	As the proposed development will not include any works to extend or deepen the existing basement as the required basement is already constructed. The potential for on-site flooding from groundwater sources has been mitigated against.

8.8 Residual Impacts

8.8.1 Construction Phase

8.8.1.2 Surface Water

The implementation of the mitigation measures outlined in Section 8.6 will prevent the potential for impact on the River Liffey & Camac, and other surface water features during the construction phase of the project. The risk of impact to the River Liffey during the construction phase to considered to be low and temporary in nature. The overall residual risk to water features short term & slight.

8.8.1.3 Ground Water

As noted, as the basement for the proposed scheme has already been constructed and there is no plans to alter same the residual risks as considered to be short term & imperceptible.

8.8.1.5 Flood Risk

The implementation of all mitigation measures will prevent significant impacts on flooding risk. Residual risks as considered to be short term & slight.

8.8.2 Operational Phase

8.8.2.2 Surface Water

The implementation of the proposed surface water infrastructure, as designed, and all mitigation measures will ensure a reduced quantity of surface water discharging to the existing surface water drainage system, therefore reducing the impact on the receiving system.

In addition, it is likely that the long term impact of the proposed development will be positive for the River Liffey due to the removal of impacted made ground which is a source of contamination.

Overall, the operational phase of the development will have a long term & slight impact on surface water quality.

8.8.2.3 Ground Water

As noted, as the basement for the proposed scheme has already been constructed and there is no plans to alter same the residual risks as considered to be long term & imperceptible.

8.8.2.5 Flood Risk

The implementation of all mitigation measures will prevent significant impacts on flooding risk. Residual risks as considered to be long term & slight.

8.9 Interactions Arising

Interactions between this chapter and the other chapters of this EIAR, notably Land & Soils, biodiversity were carried out. As the basement is already constructed the traditional interaction with the Land & Soils chapter is less significant. The potential for groundwater flooding or for groundwater to be an issue when the basement is being constructed is not relevant in this situation. In addition, as the proposed development will not require deep exactions for attenuation storage tanks or new deep sewers to be constructed the interaction with the Land & Soils chapter did not highlight any significant potential risks. With the storm water being discharged at a reduced rate and also being directed into a dedicated stormwater system post sustainable urban drainage measures the overall storm water quality from the scheme post completion a review of the biodiversity chapter did not highlight any significant potential risks.

8.9.1 Human Health

The proposed scheme, will during the construction phase, have implications for the current residents of the sections of the overall lands. As would be expected for any development to take place beside an adjacent residential scheme. Notwithstanding, should planning permission be granted the construction of the proposed development will be required to adhere to the planning conditions set upon it by Dublin City Council regarding noise levels, working hours and disturbance. These conditions are enforced by Dublin City Council to ensure that the potential for disturbance to the existing population is reduced to a minimum while the development is completed.

8.10 Potential Cumulative Impacts

The cumulative impact of the Proposed Development with any/all relevant other planned or permitted developments are discussed below. Regard has been given for existing & granted developments located in the environs of the proposed development a list of which is located in Appendix 1B with this submission.

8.10.1 Construction Phase

The potential cumulative construction phase impacts will be short term and slight. The proposed works are to build out an existing development. No third-party lands with the potential to be developed are adjacent to the subject lands in the short term and moderate.

8.10.2 Operational phase

The potential cumulative impacts may be due to the reduction available storm water capacity in the local storm water drainage system. However, as noted the provision of an attenuated system which will reduce the storm water discharge rate from the development during extreme storm events will mitigate against the loss of hydraulic capacity. Should other sites in the general environs of the subject lands be submitted for planning they will also have to comply with the general requirements of Dublin City Council with regard to storm water management. This would entail appropriate attenuation and storm water flow restrictions being installed limiting storm water discharges during extreme storm water events. The potential

cumulative risks during the operational phase have been deemed to be slight and long term.

8.11 Major Accidents & Disasters

In terms of major accidents and disasters, flooding is the only event associated with hydrology. The sites elevation and surrounding topography would prevent the subject lands from being affected by tidal or pluvial flooding in all but exceptional events. The location of the culverted River Camac to the east of the site and as noted the topography around the subject lands would indicate that should the Camac flood, the flood waters would not be directed towards the site. The sites elevation of 7.40mAOD is higher than the 1-in-1000 year flood level for the River Liffey, predicted by the Office of Public works to be at 3.487mAOD. And the predicted 1-in1000 year flood level for the River Camac predicted to be at 6.09mAOD. A full analysis of potential flooding affecting the subject lands has been undertaken as part of the Site Specific Flood Risk Assessment report. This analysed the site with reference to various potential flooding mechanisms. Potential flooding sources such as tidal, pluvial, fluvial, ground water and infrastructure sources were reviewed. In the unlikely event that there is an internal system failure or fault with the onsite storm water attenuation system and the storm water cannot drain not the public network, emergency storage can be provided in the basement area until the storm water can be disposed of offsite. This would take the form of allowing a section of the basement to retain the storm water while the maintenance issue was resolved.

8.12 Monitoring

8.12.1 Construction Phase

All on site monitor works connected to the proposed project will be under the prepared (and approved by Dublin City Council) construction plans. These plans will clearly outline the safety measures required to ensure that the proposed development is constructed in accordance with current best practice & legislative requirements.

8.12.2 Operational Phase

When the proposed development is complete, elements of the scheme will be under the maintenance control of different entities.

- Public Roads/Landscaping/elements of the housing units will be taken in charge by Dublin City Council,

- All remaining elements will be under the control of a private management company.

The various bodies noted above will take responsibility for the maintenance and operation of the facilities when complete.

The completed stormwater system will remain under the control of a management company and will not be offered to be taken in charge by the Local Authority. As such operational and maintenance

requirements will be addressed by the company's maintenance contractor. Issues which my interfere with the stormwater network pertain to blockages and the lack of appropriate jetting and cleaning of gullies, drains and main sewers are required. These will be monitored and maintained by the developments management company post construction.

8.13 References

In addition to the sources noted above the documents listed below were also consulted.

- Dublin City Development Plan 2016–2022;
- Dublin City Strategic Flood Risk Assessment, 2016 – 2022;
- Regional Code of Practice For development works, Version 6;
- Irish Waters Code of Practice for Water Infrastructure;
- Irish Waters Code of Practice for Wastewater Infrastructure;
- Greater Dublin Strategic Drainage Study;
- Office of Public Works Flood Maps;
- Department of the Environment Flooding Guidelines;
- Geological Survey of Ireland Maps;
- Local Authority/Irish Water Drainage Records.

9. AIR, DUST AND CLIMATIC FACTORS

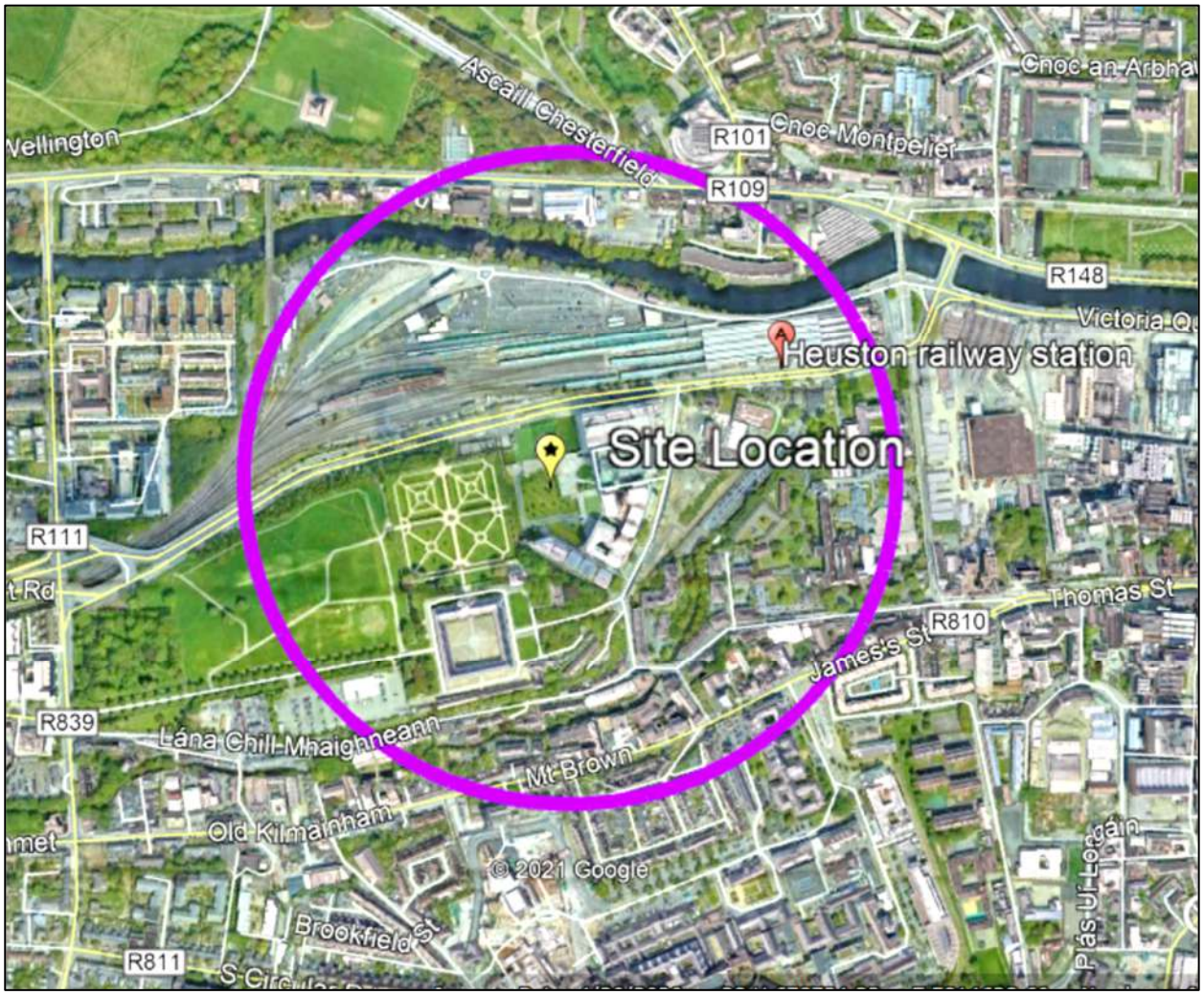
9.1 Introduction

This Chapter of the Environmental Impact Assessment Report was prepared by Imelda Shanahan TMS Environment Ltd who has over 30 years professional experience in preparing assessments of this type for various different types of development. Imelda has a BSc (Hons) in Chemistry from University College Dublin and a PhD in Physical Chemistry, she is a Chartered Chemist and a Fellow of the Institute of Chemistry of Ireland and a Fellow of the Royal Society of Chemistry.

The Microclimate assessments were prepared by IN2 Engineering. The IN2 report is attached at Appendix 9.B and relevant sections are summarised in this section of the EIAR.

This Chapter of the EIAR considers the potential air quality and climate impacts associated with the proposed development. Impacts of site operations are considered by taking account of the existing baseline, the projected impacts and compliance with relevant standards. The extent of the Study Area is shown in Figure 9.1.1 with a radius of detailed assessment up to 350m from the site boundaries.

Figure 9.1.1 Study Area



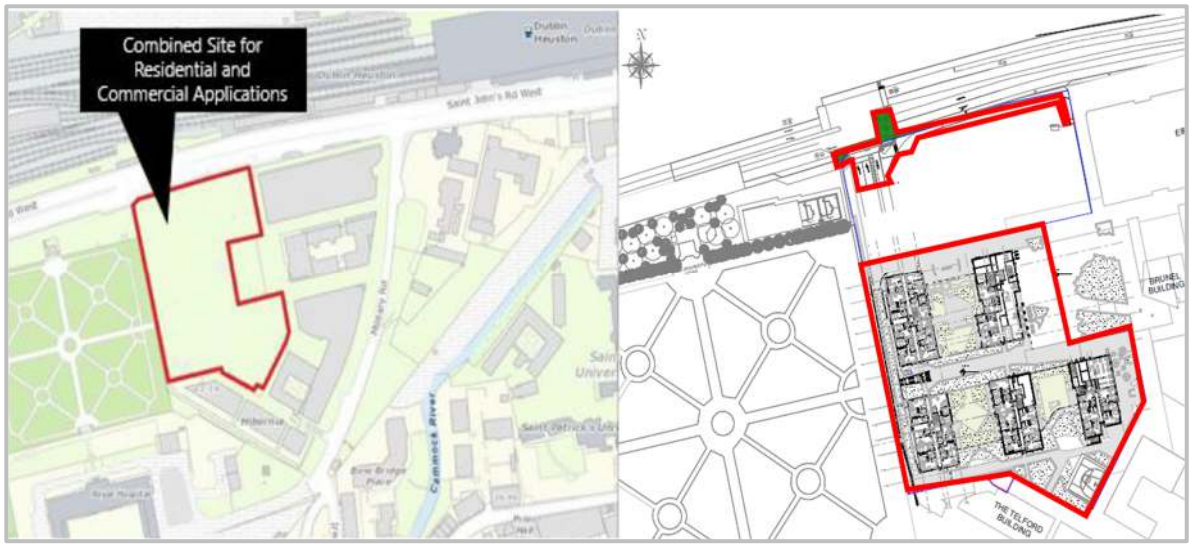
9.2 Characteristics of the Proposed Development

The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over double basement level / podium level. The application site extends to 1.08 ha (10,825 sqm).

The application sites form part of a larger development site known as Heuston South Quarter (HSQ). The site location and context are shown in Figure 9.2.1. The HSQ site is bounded principally by St. John's Road West (to the north) and Military Road (to the east) and by the formal gardens of the Royal Hospital Kilmainham (RHK) to the west and south. The HSQ lands are in close proximity to Heuston Rail Station and the LUAS Red Line service and enjoy excellent connectivity to the City Centre.

The St. John's Road West frontage is characterised as an urban road and together with the approach to Heuston station on the opposite side of the road, this transportation corridor is the main road and rail artery to the west of the country.

Figure 9.2.1 Site location and context



9.3 Site specific Conditions for Impact identification

9.3.1 Existing Activities

The subject site is currently a landscaped site adjoining a busy transport corridor. The only potential for emissions to air from the site itself are associated with the occasional use of landscaping machinery on the site. Existing activities in the immediate vicinity of the site of the proposed development have the potential to exert an influence on air quality by release of emissions associated with the following:

- emissions of particulate matter (PM_{10} and $PM_{2.5}$), Sulphur dioxide (SO_2), nitrogen oxides (NO_x) and carbon monoxide CO from heating sources in the area from existing residential and commercial activities;

- emissions of particulate matter (PM_{10} and $PM_{2.5}$), SO_2, NO_x, CO from road and rail traffic in the

area.

The magnitude of the emissions from the existing site itself is very small relative to the dominant influence on air quality in the surrounding area which is traffic from the adjoining road and rail network and heating sources in the area.

9.3.2 Impact Identification of Proposed Activities

9.3.2.1 Construction Impacts

The proposed development for which planning permission is sought in this application comprises a residential development and associated and ancillary infrastructure and open space provision. The construction phase for this residential development is expected to be completed within 24 – 30 months.

The potential air quality and climate impacts on the surrounding environment that requires consideration for a proposed development of this type includes two distinct stages, the short-term construction phase and the long-term operational phase.

The potential air quality impacts during Construction are summarised as follows:

a) Dust emissions associated with excavations and demolition works

There are some demolition works proposed for the proposed development and as a result there will be approximately 800 – 1,000m^3 of concrete removed over a 3 – 4 month programme of works. No significant excavation or reprofiling works will be required and preliminary earthworks will therefore be minimal.

The most significant of the potential air quality impacts associated with the construction site is dust. Dust can be generated as a result of disturbance of materials, as a result of wind blowing across exposed surfaces and as a result of construction vehicle movements across exposed surfaces.

There are three potential impacts on air quality of the dust / particulate matter emissions. Dust deposition on surfaces is the main potential impact associated with the larger particles, nuisance effects such as reduced visibility could be associated with excessively high levels of suspended particulate matter and respiratory effects could occur as a result of excessive levels of fine particles such as PM_{10} and $PM_{2.5}$.

Dust emissions associated with the Construction Phase of the proposed development are expected to be predominantly in the 10 – 75µm particle size range so these particles, because of their size, will generally be deposited within 100m of the emission source. Only under exceptional meteorological conditions would the dusts be carried further downwind.

Suspended particulate matter (SPM) may also be released and this matter may remain suspended in the air. The main effect would be on visibility but this type of material could also be a respiratory nuisance if present at excessive levels. Emissions of dust in the form of fine particulate matter, PM_{10} and $PM_{2.5}$, may also occur, primarily as a result of materials handling and storage since the dominant particle size of the main construction materials is in the lower size ranges. There may also be some emissions of particles in these size ranges from the general site activities.

b) Construction transport emissions

Emissions of dust raised by vehicle movement on the roads near the site and also on site are considered under the general construction phase emissions in section (a) above. Emissions from the construction vehicles as a result of fuel combustion are considered here. The emissions include PM_{10} and $PM_{2.5}$, NO_2 and NO_x and CO and benzene.

c) Aspergillus emissions from excavation and earthmoving activity

There is concern about a fungal disease, "invasive Aspergillosis" which may be contracted as result of disturbance of materials that release fungal spores into the atmosphere. Fungal spores (the Aspergillus moulds) are found everywhere but are of particular concern when large scale demolition, excavation and earth-moving activity takes place.

9.3.2.2 Operational Impacts

The most significant potential impacts remain the same as those associated with existing activities at and in the vicinity of the site - emissions of particulate matter and combustion gases such as CO, SO_2 and NO_2 from heating and traffic.

Sulphur dioxide emissions originate from the sulphur in the fuel used in the combustion process. Since natural gas is the fuel to be used sulphur dioxide emissions will be negligible. Nitrogen oxides are present in the emission stream as a result of the combustion process. Much of the emissions are in the form of nitrogen oxide (NO) which is expected to be substantially oxidised to nitrogen dioxide in the atmosphere. Nitrogen oxide emissions from boilers using natural gas as fuel are significantly lower than the emissions associated with other fuels.

Particulate matter and carbon monoxide may also arise from the combustion process in the emission stream but only in minor amounts. Again, natural gas is a very clean fuel and particulate emissions from the boilers are predicted to be very low.

There is the potential for a number of greenhouse gas emissions to atmosphere from the boilers which may give rise to CO_2 emissions. However, the level of emissions will be insignificant compared to national greenhouse gas emissions, and the levels will be the same as the existing situation.

9.3.2.3 Traffic Impacts

The assessment of traffic and transport impacts in Chapter 11shows that the proposed development shall not generate excessive vehicular traffic flows in its operational phase.. The actual traffic volume numbers are not significant in terms of potential air quality impact and such a change in traffic volume will not result in a quantifiable change in emissions and therefore traffic emissions will remain similar to the current situation. The principal substances that are associated with transport activity are particulate matter, nitrogen oxides and carbon monoxide. Dust emissions associated with construction traffic are also possible.

9.3.2.4 Microclimate Impacts

Adverse wind effects can reduce the quality and usability of outdoor areas, and could lead to safety concerns in extreme cases. It is therefore important that wind micro-climate assessments are carried out where required in order to ensure that the relevant factors have been considered in the general design and layout of the development. Accordingly, a wind microclimate analysis study was undertaken by IN2 Engineering to evaluate the risk of elevated wind speeds / microclimate impacts arising as a result of the proposed development. Appropriate wind conditions for the area were selected and Computational Fluid Dynamics (CFD) Modelling study was completed to evaluate the impacts. The IN2 microclimate assessment report is included at Appendix 9B.

9.4 Receiving Environment

9.4.1 Meteorological conditions

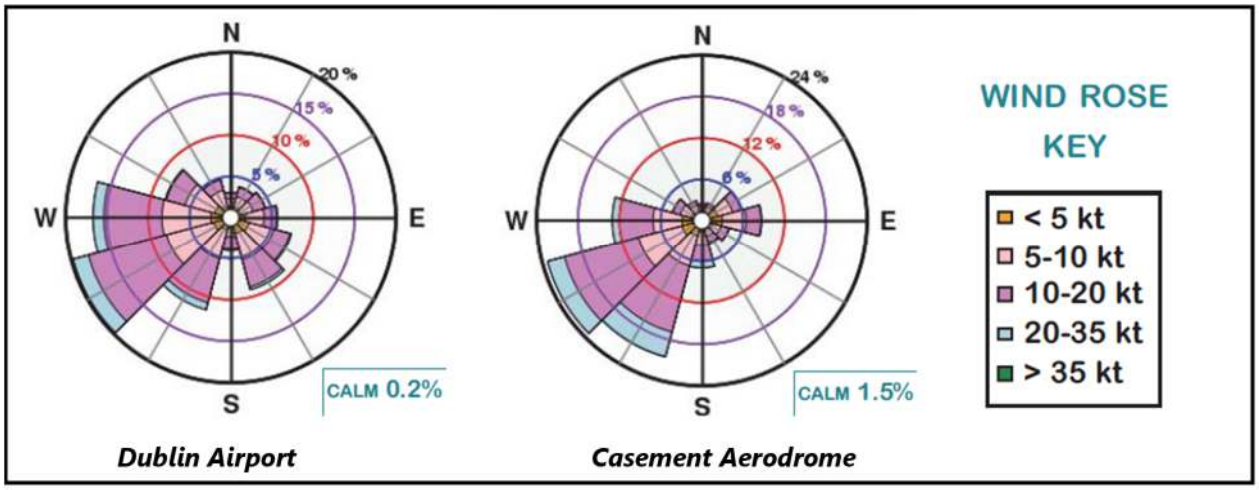
The magnitude of potential impacts of the proposed development on air and climate will largely be influenced by the local meteorological conditions, in particular by wind speed and direction and by precipitation rates. An evaluation of the climatic conditions at the site is therefore useful for an assessment of the type required for this study.

Met Éireann operate a Synoptic Network of weather stations at Belmullet, Malin Head, Rosslare (closed since 2008), Johnstown Castle, Birr, Clones, Kilkenny and Mullingar while the Aviation Division of Met Éireann maintains observing stations at Shannon Airport, Knock Airport, Casement Aerodrome, Dublin Airport and Cork Airport. There is no continuous meteorological monitoring on the subject site but the general guidance on selection of meteorological data for air quality impact assessments is to choose representative data, recently acquired, which best represents conditions at the site. At least three years of recently acquired data is preferred.

Comprehensive monitoring data is available for Dublin Airport (approximately 9km northeast of the site) and for Casement Aerodrome (approximately 10km southwest of the subject site) which would be indicative of the meteorological conditions that are experienced at the site. Data from either station would likely be a reliable indicator of conditions at the site. Wind speed and direction in particular is important in determining how emissions associated with the activity are dispersed. The prevailing wind direction determines which areas are most significantly affected by the emissions from the activity and wind speed determines in part the effectiveness of the dispersion of the emissions.

The long term average windroses for Dublin Airport and for Casement Aerodrome are presented in Figure 9.4.1 sourced from Met Eireann. The windroses show a very similar pattern in the distribution and frequency of wind direction and wind speeds. The dominant wind direction is from the southwest quadrant. The wind speed is below 5m/s for approximately 50% of the time and the average long-term wind speed over the period is less than 5.5 m/s for the two stations.

Figure 9.4.1 Long-term (1981 – 2010) for Dublin Airport and Casement Aerodrome



9.4.2 Influences on Ambient Air Quality

The existing activities at and in the vicinity of the site have the potential to exert an influence on ambient air quality by release of emissions to atmosphere as follows:

- emissions of fine particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO) from domestic, commercial and industrial heating;
- emissions of particulate matter (PM_{10} and $PM_{2.5}$), SO_2, NO_x, CO and benzene from traffic on adjoining roads and the rail line;

Overall, the contribution of traffic travelling on the surrounding road network, rail transport activity and heating sources in the area are considered to be the dominating influence on air quality in the immediate vicinity of the site.

The main substances which are of interest in terms of existing air quality are sulphur dioxide, nitrogen oxides, particulate dusts including PM_{10} and $PM_{2.5}$ which could originate from combustion sources and traffic. There are no new substances expected to be present in emissions released from the proposed development. A description of existing levels of the various substances in ambient air is required to allow completion of the evaluation of air quality impacts associated with the development and is presented in the following section.

9.4.3 Existing Ambient Air Quality

The site is located in an urban area adjoining a major transport corridor. The dominant influences on air quality in the area are emissions from road traffic and to a much lesser extent from rail transport. Emissions from heating sources are expected to be minor contributors to ambient air quality in the vicinity of the site.

The main substances which are of interest in terms of existing air quality are sulphur dioxide, nitrogen oxides (nitric oxide, NO and nitrogen dioxide NO_2, collectively referred to as NO_x), fine particulate matter including PM_{10} and $PM_{2.5}$ which could originate from combustion sources, traffic and the existing

commercial activities in the area. Carbon monoxide is also potentially of interest, and benzene may also be of interest from traffic sources. There are no significant new substances expected to be present in emissions released from the proposed development relative to the existing situation.

Particulate matter is made up of tiny particles in the atmosphere that can be solid or liquid and is produced by a wide variety of natural and manmade sources. Particulate matter includes dust, dirt, soot, smoke and tiny particles of pollutants. Particulate matter of 10 micrometers in aerodynamic diameter or less are also referred to as PM_{10} or more strictly, particles which pass through a size selective inlet with a 50% efficiency cut-off at 10 um aerodynamic diameter. Similarly, $PM_{2.5}$ refers to particulate matter of 2.5 micrometers or less in aerodynamic diameter. In the past domestic coal burning was a major source of particulate matter in Irish cities during winter months. Levels of particles have decreased significantly since then following the introduction of abatement strategies including Special Control Areas and other Regulations regarding the use, marketing, sale and distribution of certain fuels. The significance of particulate matter is predominantly related to human health and respiratory effects.

Nitrogen oxides (NO_x, which is the sum of NO and NO_2), are generated primarily by combustion processes. The main anthropogenic sources are mobile combustion sources (road, air and traffic) and stationary combustion sources (including industrial combustion). The main source of nitrogen oxides in the vicinity of the site is traffic. The significance is health-related for nitrogen dioxide (NO_2) and ecological for nitrogen oxides (NO_x).

Sulphur dioxide also originates from combustion but predominantly from heating sources and not traffic. The trend in ambient SO_2 concentrations in Ireland is very clearly downward and this pollutant is not a matter for concern in Ireland. This reduction can be attributed to fuel switching from high-sulphur fuels, such as coal and oil, to natural gas and to decreases in the sulphur content of oil.

Carbon Monoxide (CO) is a colourless and odourless gas, formed when carbon in fuel is not burned completely. It is a component of motor-vehicle exhaust, which accounts for most of the CO emissions nationwide. Consequently, CO concentrations are generally higher in areas with heavy traffic congestion.

A description of existing levels of the various substances in ambient air is required to allow completion of the evaluation of air quality impacts associated with the development. The available data from the National Ambient Air Quality Network is a reliable data set for consideration in this study as shown below.

The Environmental Protection Agency (EPA) and local authorities maintain and operate a number of ambient air quality monitoring stations throughout Ireland in order to implement EU Directives and to assess the country's compliance with national air quality standards. Ireland's small population and generally good air quality means that a relatively small number of monitoring stations are sufficient across the country for the purposes of implementing the EU Air Directives. For ambient air quality management and monitoring in Ireland, four zones, A, B, C and D are defined in the Air Quality Standards (AQS) Regulations (S.I. No. 180 of 2011) and are defined as follows:

- Zone A: Dublin Conurbation.
- Zone B: Cork Conurbation.
- Zone C: 24 cities and large towns. Includes Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo,

Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Newbridge, Mullingar, Letterkenny, Celbridge and Balbriggan, Portlaoise, Greystones and Leixlip.

- Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B &C.

The subject site is considered to be located in Zone A for assessment purposes. Air Quality Data from representative air monitoring stations in Zone A are therefore considered representative of air quality at the subject site. The EPA publishes Ambient Air Quality Reports every year which details the air quality in each of the four zones. The most recent report, published by the EPA in 2020, is the *Air Quality in Ireland 2019*, which contains monitoring data collected during 2019. Best practice requires that an average of at least three years of recent monitoring data is used for assessments of this type so data for 2017, 2018 and 2019 has been reviewed.

The EPA maintains monitoring stations in a number of locations in Dublin including St John's Road and Winetavern Street to monitor air quality. Other monitoring stations have operated at various times and some new stations have been added to the network, but long-term data is available for the above stations. Data from the Air Quality Monitoring Annual reports for 2017 - 2019 was reviewed and a summary of the data for representative stations for the three most recent years is presented for each parameter of interest in Table 9.4.1.

The approach taken is to take the average of the three most recent years for the most representative Zone A stations and the averages of the values for the stations are reported in Table 9.4.1. This is the data set which is used in the assessment of the potential impact of the proposed development on air quality.

It is noted from the data that existing ambient air quality is good for several of the pollutants with concentration levels well within the EU Standards for all parameters of interest. However, there was an exceedance of the EU Air Quality limit value for nitrogen dioxide at the St. John's Road West station in 2019. An annual average concentration of 43µg/m^3 was measured in 2019 which is above the EU annual limit value for NO2 of 40 µg/m^3. The EPA have determined that this exceedance is as a result of the heavy traffic passing this monitoring station. The exceedance has been reported to the European Commission and an Air Quality Action Plan is being prepared by Dublin Local Authorities in conjunction with the EPA.

Table 9.4.1 Summary baseline air quality data (2017 - 2019)

Data set	Parameter and averaging interval		Concentration µg/m^3
Urban Zone A	Nitrogen dioxide NO_2	*Annual Mean, µg/m^3*	38.1
Urban Zone A	Nitrogen oxides, NO_x	*Annual Mean, µg/m^3*	159.1
Urban Zone A	Particulate Matter PM_{10}	*Annual Mean, µg/m^3*	12.3
Urban Zone A	Particulate Matter $PM_{2.5}$	*Annual Mean, µg/m^3*	8.7
Urban Zone A	Sulphur dioxide, SO_2	*Annual Mean, µg/m^3*	0.5
Urban Zone A	Carbon Monoxide CO	*Annual Mean 8-hour, mg/m^3*	0.21
Urban Zone A	Benzene	*Annual Mean, µg/m^3*	0.5

NOTE

1. Data summarised from the EPA Annual Ambient Air Quality Monitoring Reports 2017 to 2019.

2. Data is from Wine Tavern Street (2017 and 2018, and 2019 for some pollutants; data is from St Johns Road for NO_2, NO_x and PM_{10} / $PM_{2.5}$ in 2019.

9.5 Assessment Methodology

9.5.1 Introduction

The assessment follows a well-established scheme involving identification and characterisation of the air quality impacts that must be addressed, characterisation of the receiving environment to benchmark the existing situation, quantitative prediction of air quality impacts and assessment of the impacts against recognised Air Quality Standards and Guidelines. From this assessment comes a definition of the Management Plans and environmental solutions that are required to ensure that all aspects of the impacts of the development proposal through Construction and Operation Phases are managed and controlled to protect human health, the environment and amenity.

The following Guidance was considered in carrying out the assessment:

1. Advice Notes for Preparing Environmental Impact Statements, (Environmental Protection Agency, Draft September 2017);

2. Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002); and

3. Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

4. European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 – S.I. No. 296 of 2018

The EPA Revised Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports were published in 2017. These draft Guidelines take account of the EIA Directive (2011/92/EU) as revised by Directive 2014/52/EU and are considered in this assessment. Impacts are described in the draft Guidance in terms of quality, significance, magnitude, probability, duration and type. A description of the significance of effects is presented in Table 9.5.1.1, and Table 9.5.1.2 presents the description of the duration of effects as shown in the Draft Guidelines.

In addition to considering the above guidance, the general approach adopted for the air quality impact assessment is summarised as follows.

(i) Describe the existing baseline air quality at the site and in the vicinity of receptors – addressed in Section 9.4;

(ii) Describe the potential impacts of the development on air quality – addressed in Section 9.6;

(iii) Identify appropriate criteria against which to assess the significance of the impacts associated with the proposed development – addressed in Section 9.5;

(iv) Propose mitigation and avoidance measures where required.

(v) Identify and assess all cumulative impacts with potential to impact upon the receiving environment.

Table 9.5.1.1 Describing the Significance of Effects

"Significance" is a concept that can have different meaning for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.

Profound Effects	An effect which obliterates sensitive characteristics.

Table 9.5.1.2 Describing the Duration of Effects

'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years.
Reversible Effects	Effects that can be undone, for example through remediation or restoration.

Climate

The potential climate impact of the proposed development is assessed by comparing the total emissions of Greenhouse Gases (GHG) with those that would occur if the site was left as it is. The Climate Action and Low-Carbon Development Act 2015, which provides for new arrangements aimed at achieving transition to a low-carbon, climate-resilient and environmentally sustainable economy by 2050, requires that the applicant considers and reduces its carbon footprint in all aspects of the proposed development. The Climate Action and Low Carbon Development (Amendment) Bill 2021 (Bill 39 of 2021) is a proposed amendment to the Act which will give a statutory basis to certain matters addressed in the Act and the proposed Amendment. This assessment provides information on how the proposed development considers national climate change objectives in the selection of the preferred approaches for the proposed development.

The principal GHG emissions associated with the proposed development are carbon dioxide (CO_2). For the purposes of this assessment the proposed development is compared with a *Do Nothing* scenario and evaluated. Therefore, 2 scenarios have been assessed as follows: Scenario 1 – Do Nothing, in this scenario, there will be no development at the site, and Scenario 2 – Do Something (proposed development), in this scenario the proposed development is assessed.

The assessment estimates the total GHG emissions from direct and indirect activities associated with the proposed development. Overall emissions over the lifetime of the project are considered. The assessment is presented in terms of relative GHG emissions from the various sources and while there are some uncertainties, the assessment allows a reliable comparison of the Climate Impact of the proposed development relative to the Do Nothing scenario.

Aspergillosis

As noted above, there is concern about a fungal disease, "invasive Aspergillosis" which may be contracted as result of disturbance of materials that release fungal spores into the atmosphere. This is a disease which is detrimental to persons with suppressed immune systems, such as hospital patients. The "*National Guidelines for the prevention of Nosocomial Invasive Aspergillosis during construction/renovation activities*" deals specifically with construction works occurring within or adjacent to hospitals. The report states that the fungal spores responsible for invasive Aspergillosis can originate from a number of sources such as construction, demolition, renovation, disturbance of soil, removal of fibrous insulation material, removal of suspended ceiling tiles and from poorly maintained air ventilation systems. The potential sources of the fungal spores associated with invasive Aspergillosis, as detailed above, are related to the occurrence of these operations either within or in very close proximity to the hospital buildings.

Fungal spores (the *Aspergillus* moulds) are found everywhere but are of particular concern when large scale demolition, excavation and earth-moving activity takes place and especially in close proximity to areas where vulnerable individuals are located. The dispersion of spores (or indeed dust or any other substance) which are released at a particular location depends on a significant number of factors which include the rate and temperature of the release, the release height, the wind speed, rainfall, wind direction, topography, local meteorological conditions, the nature of the substances released, the potential for physical or chemical interactions and the concentrations of the substances released and other factors. The dispersion of fungal spores will depend on all of the above factors and this dispersion is evaluated by considering the factors noted above and the distances from the source at which the predicted impacts are to be assessed. In the first instance, the key factors are the concentration of the spores released and the distance to sensitive receptors. Dispersion of fungal spores released as a result of any activity is a function of time and distance and would be completely dispersed i.e. no measurable concentration at approximately 250m from the source of the release (UK HSE Research Report RR786 Bioaerosols from Composting, 2010). The National Guidelines report referred to above notes that the fundamental requirement in respect of eliminating *Aspergillus* infection from construction works is first to minimise the dust generated during construction and second to prevent dust infiltration into patient care areas.

9.5.2 Impact Assessment Criteria

The assessment of impact significance is based on a comparison of predicted impacts with air quality standards and guidelines, and consideration of the magnitude and duration of the potential impact.

Air Quality Standards in Ireland have been defined to ensure compliance with EC Directives; they are developed at different levels for different purposes. European legislation on air quality has been framed in terms of two categories, limit values and guide values. Limit values are concentrations that cannot be exceeded and are based on WHO guidelines for the protection of human health. Guide values are set as a long-term precautionary measure for the protection of human health and the environment. The WHO guidelines differ from EU air quality standards in that they are primarily set to protect public health from the effects of air pollution, whereas Air Quality Standards are recommended by governments, and other factors such as socio-economic factors, may be considered in setting the standards.

The air quality standards and guidelines referenced in this report are summarized in Table 9.5.2.1. The Clean Air for Europe (CAFE) Directive (Council Directive 2008/50/EC) was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). This Directive and the Irish

Regulations set out the main standards against which the potential impact of the development on air quality are assessed.

In addition to the Air Quality Standards Regulations and the Directive Standards, it is also appropriate to consider the World Health Organisation (WHO) Guidelines. These guidelines were developed by the WHO to provide appropriate air quality targets worldwide, based on the latest health information available. The air quality guidelines for particulate matter (PM_{10}), nitrogen dioxide and sulphur dioxide, and $PM_{2.5}$ are considered in this report (WHO, 2005; updated in 2008). While the WHO Guidelines are not mandatory, they represent current informed opinion on the levels to which we should be aspiring in order to minimise adverse health impacts of air pollution. The WHO guidelines referenced in this report are summarized in Table 9.5.2.2.

There are no national or European Union air quality standards with which dust deposition can be compared. However, a figure of 350 mg/m^2-day based on the German Standard TA Luft Regulations is commonly applied by Local Authorities and the EPA (Environmental Protection Agency) to ensure that no nuisance effects will result from specified industrial activities.

Table 9.5.2.1 Air Quality Standards Regulations 2011 (based on EU Clean Air For Europe [CAFE] Directive 2008/50/EC)

Pollutant	EU Regulation	Limit Type	Margin of Tolerance	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	None	200 µg/m^3 NO_2
		Annual limit for protection of human health	None	40 µg/m^3 NO_2
		Annual limit for protection of vegetation	None	30 µg/m^3 NO +NO_2
Sulphur Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	150 µg/m^3	350 µg/m^3
		Daily limit for protection of human health - not to be exceeded more than 3 times/year	None	125 µg/m^3
		Annual & Winter limit for the protection of human health and ecosystems	None	20 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%	50 µg/m^3
		Annual limit for protection of human health	20%	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health (Stage 1)	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m^3
		Annual limit for protection of human health (Stage 2)	None To be achieved by 2020	20 µg/m^3
Carbon Monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	60%	10 mg/m^3 (8.6 ppm)
Benzene	2008/50/EC	Annual limit for protection of human health	0% by 2010	5 µg/m^3

NOTE

The Air Quality Standards Regulations 2011 (SI 180 of 2011) transposed EU Directive 2008/50/EC (CAFE) into Irish law.

Table 9.5.2.2 WHO Air Quality Standards

Pollutant	Limit Type	Value
Nitrogen Dioxide	Hourly limit for protection of human health	200 µg/m^3
	Annual limit for protection of human health	40 µg/m^3
Sulphur Dioxide	Daily limit for protection of human health	20 µg/m^3
	10-minute limit for protection of human health	500 µg/m^3
Particulate matter (as PM_{10})	24-hour limit for protection of human health	50 µg/m^3
	Annual limit for protection of human health	20 µg/m^3
Particulate matter (as $PM_{2.5}$)	24-hour limit for protection of human health	25 µg/m^3
	Annual limit for protection of human health	10 µg/m^3

9.6 Identification of Likely Significant Impacts

9.6.1 Existing Activities

Section 9.4 describes the existing air quality at and in the vicinity of the site. The available data supports the conclusion that heating and traffic emissions are the dominant influence on air quality in the area. The existing air quality complies with most of the Air Quality Standards but there was an exceedance in 2019 of the NO_2 air quality standard. The EPA determined that the exceedance is due to road traffic and an Air Quality Plan is being prepared before end 2021 to identify ways of improving air quality in the area.

9.6.2 Construction Phase Impacts

Guidance on assessment of dust from demolition and construction was published in 2014 by the Institute of Air Quality Management (IAQM). This Guidance describes a five-step approach to the assessment which is summarised as follows.

(i) Screen the development to determine if there is a requirement for a more detailed assessment.

(ii) Assess the risk of dust impacts for each of the four activities (demolition, earthworks, construction and construction traffic) and take account of the scale and nature of the works, and the sensitivity of the area.

(iii) Determine the site-specific mitigation for each potential activity.

(iv) Examine the residual effects and determine whether or not these are significant.

(v) Prepare the dust assessment report.

This approach has been applied to the development at the proposed site and is summarised below. A detailed assessment is required (IAQM Guidance) when there are human receptors within 350m of the boundary of the site and since the closest human receptors to the site boundary are within this distance, a detailed assessment is required. The Guidance advises that most projects will require a detailed assessment as the approach adopted is conservative. There are no European or designated sites within 50m of the site boundary which is the threshold distance for ecological sensitivity as recommended in the IAQM Guidelines and which I have also assessed as the relevant distance of potential significant impact, So the assessment concludes that there are no significant construction impacts predicted for ecological sites.

The risk of dust being emitted in sufficient quantities to cause a nuisance or health impacts is evaluated by considering the scale of the works programme. The IAQM Guidance Note gives advice on classifying the magnitude of the potential dust impacts and using the advice and information derived from the Construction Management Plan for the site, the magnitude of the dust emissions is estimated as shown in Table 9.6.2.1.

Table 9.6.2.1 Assessment of Magnitude of dust emissions for Construction Programme

Activity	Magnitude of Dust Emission	Sensitivity of receptors and surrounding areas		
		Dust Soiling	Human Health	Ecological
Demolition	Medium	Medium	Low	Low
Excavations	Low	Low	Low	Low
Construction	Low	Medium	Low	Low
Construction Traffic	Low	Medium	Low	Low

The proposed development consists of a relatively small scale demolition programme and a construction programme. The construction phase is estimated to last for 4 years. Some minor excavation work is required as the site is currently landscaped with by far the majority of excavated materials being soils (grassed topsoil, topsoil and subsoil). The Construction programme is moderately significant and therefore significant emissions could be expected.

The significance of the dust emissions and impacts is evaluated in terms of the sensitivity of the receptors in the area that could be affected by the emissions. In general, receptors located close to the construction site boundary are considered high sensitivity with sensitivity decreasing with increasing distance from the source reflecting the exponential decrease in dust levels as distance increases. The highest receptor sensitivity in the immediate vicinity of the proposed site is medium for existing residential receptors in the area and is low for the vast majority of the construction activity.

The potential air quality impact arises from emissions of particulate matter and may result in deposition

of dust around the site, and trackout onto the roads in the vicinity of the site. The magnitude of the potential emissions associated with Construction is assessed as Low using the above criteria.

Using the alternative assessment approach outlined in the Draft Guidelines on Environmental Impact Assessment as outlined in Section 9.5, the significance of potential dust emissions during construction is summarized in Table 9.6.2.2.

Table 9.6.2.2 Assessment of Significance of Dust Emissions for Construction Programme

Activity	Significance of Dust Emission	Duration of Dust Emission
Demolition	Slight	Short-term
Excavations	Slight	Short-term
Construction	Not Significant	Short-term
Construction Traffic	Not significant	Short-term

This assessment shows that the most significant potential impacts are those associated with the limited demolition and excavation work which is very dependent on weather conditions. Damp weather and low wind speeds will reduce the level of impact experienced at the receptor locations. There will be a short-term, slight impact on the closest receptors during the demolition and excavation programme and a short-term, not significant impact on the closest receptors during the construction works. Construction traffic impacts will be not significant and experienced in the short-term. In the absence of mitigation measures, the overall impact of dust arising during the construction phase is considered to be short term in duration and its significance will vary from not significant to slight.

Raw materials required for the construction will be delivered to the site using conventional Heavy Goods Vehicles (HGVs) and some Light Goods vehicles (LGVs), and any wastes requiring removal from the site will be removed using HGVs. The principal substances that are emitted from the vehicles are fine particulate matter, nitrogen oxides and carbon monoxide. Dust and particulate matter impacts associated with the passage of vehicles on roads has already been assessed as part of the dust and particulate matter impacts. The level of traffic movements has been reviewed in the context of potential contributions to air quality in the area.

HGV construction traffic to and from the site shall be associated mostly with the breaking up and removal of existing hardstanding on the development site. Similar rates of HGV trip generation may also occur during concrete pouring, though at a later stage in construction. HGV trips for material delivery, heavy plant transfer, etc. will be sporadic in nature and generally will not occur at the same time as more HGV-intensive activities. As a 'worst-case' scenario, it is assumed that:

- At most 4 (No.) HGV trips will be made to the site each hour (one HGV arrival and one HGV departure every 15 minutes).
- 6 (No.) LGV arrivals and 6no. LGV departures will occur in each of the background peak hours.
- 25 (No.). construction staff car trips will be made to the site during the AM peak hour, and 25

(No.) such trips made from the site during the PM peak hour.

Potential emissions from construction traffic using the local road network have been assessed in this assessment based on projected traffic movements to contribute less than 5% change to the existing air quality emission levels. It can therefore be concluded that the additional construction transport will not generate significant emissions in terms of local air quality and no material change in air quality relative to the existing situation is predicted.

The fundamental requirement in respect of eliminating *Aspergillus* infection from construction works is first to minimise the dust generated during construction and second to prevent dust infiltration into patient care areas. There are no patient care areas within 250m of a possible release source at the site. This is the distance at which fungal spores would be completely dispersed (UK HSE Research Report RR786 Bioaerosols from Composting, 2010) as set out in Section 9.5.1. It is therefore concluded thatdust infiltration or exposure to fungal spores will not occur. It is considered that in the absence of mitigation measures the potential construction phase impact of Aspergillus is short term and imperceptible.

In the absence of mitigation measures the construction phase activities will range from an imperceptible to slight impact on local air quality depending on the activities occurring and in all cases will be short-term in duration.

9.6.3 Operation Phase Impacts

The only predicted air quality impacts associated with operation of the development are emissions to atmosphere from heating sources and traffic associated with the development.

Information derived from the assessment of traffic and transport impacts in Chapter 11has been used to assess the likely change in emissions to air as a result of changes in traffic numbers. Traffic volumes for the Opening Year and Design Year were considered for key junctions for two scenarios, namely; the With Development and Without Development scenarios. The largest change in traffic volume at the key junctions for the opening year was a 3.5% increase. The potential impact on air quality associated with a traffic volume change of this magnitude is considered not significant in a local context and imperceptible in an overall context particularly considering the advanced developments made in cleaner and more efficient vehicle engines.

In the context of elevated ambient NO_2 levels at St Johns Road West as measured by the EPA in 2019, it is noted that the monitoring station was located at a location removed from the subject site and specifically in a location where significant volumes of two-way stationary traffic are observed especially at peak hours. The subject site is located in an open area where two-way stationary traffic is less prevalent than the location where monitoring is completed. It is also noted that the subject site is approximately 60m from the edge of the roadway at the closest point; traffic-derived pollutants are at their highest within 10m of the edge of the carriageway and therefore at the subject site the traffic-derived pollutants would be significantly lower than roadside measurements. The four Dublin Local Authorities are preparing an Air Quality Management Plan aimed at reducing nitrogen dioxide levels which is to be finalised before the end of 2021. No details are yet known, but in the context of an overall objective to reduce nitrogen dioxide levels, there are specific proposals in this Scheme which specifically support this objective as set out below.

The proposed development is a Build-To-Rent Scheme in an urban area with intentionally limited

provision for parking spaces and very generous provision supporting bicycle use with significant capacity for bicycles and visitor cycle parking spaces. This approach, and the location which is served by excellent public transport choices, minimises traffic associated with the proposed development thereby minimising emissions to atmosphere. In addition, a 'Shared Car' scheme is also planned for the proposed development. 8 no. dedicated shared vehicles spaces will be provided within the proposed development which is projected to replace 112 private vehicles. The Management Company will likely engage an external company, such as GoCar or Yuko to provide the service.

The design and construction of all buildings in the proposed development shall be in accordance with National Building Regulations (The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel & Energy – Dwellings) and shall ensure that modern building materials are used and that they are designed to be thermally efficient resulting in a reduction in the volume of fossil fuels required to heat the buildings. The proposed heating energy strategy is to provide a central plantroom for the SHD elements which will supply heat to all blocks and all apartments. This plantroom will include an Air Source Heat Pump supplemented by the existing HSQ district heating network. The heat pump will contribute 60% of the annual heating energy with the remaining 40% made up by the district network. This strategy will achieve compliance with energy and renewable requirements of Part L 2019.

It is predicted that combustion gas emissions will be not significant and will not have an adverse significant impact on the existing ambient air quality in the vicinity of the proposed development site.

The operational phase activities will have a not significant impact on local air quality and will be long-term in duration.

9.6.4 Climate Impact

The principal GHG emissions associated with construction are carbon dioxide from transport and machinery utilised in construction. For the *Do Nothing* Scenario, if the proposed development does not proceed then the emissions of GHGs in the area are projected to remain the same with some relatively minor increases as activity in the area develops. However, GHG emissions will still occur somewhere because the residential accommodation must be provided to cater for existing and future needs.

Although the overall impact of each of the potential scenarios assessed would be the same, opportunities for minimisation of GHG emissions during construction will arise and will be required to ensure that the overall objectives of enhanced energy efficiency and minimisation of GHG emission are achieved.

The operation of the proposed development will result in indirect emissions of GHGs including carbon dioxide (CO_2) resulting from energy generation required for space heating and road traffic. The CO_2 released due to energy usage is directly reduced by enhancing the energy efficiency of the proposed development. In this respect, the selection of the District Central Heating System and the ASHP strategy is the optimum strategy. The detailed energy statement prepared by IN2 Engineering is attached at Appendix 9.A, where the energy analysis undertaken for the proposed development is described. The proposed design considers these factors and contributes to the overall objective of minimising GHG emissions. For new dwellings in Ireland, Near Zero Energy Building (NZEB) performance has been defined as being (primarily) associated with demonstrating that a 70% reduction in carbon emissions has been achieved relative to the 2005 Part L and that 20% of the primary energy comes from renewable sources. Since this development meets these requirements the reduction in carbon emissions relative to the regime

that applied in 2005 has been demonstrated.

The scheme has been designed to provide thermally efficient buildings which will reduce the consumption of fossil fuels within each individual unit. This will reduce the impact the operational phase of the development will have on the micro and macro climate. There will be no passive air vents in the residential units which are thermally inefficient. Thermally enhanced glazing and window frames will reduce the energy requirements of the residential units. These design features will ensure the residential units are thermally efficient leading to a reduced fossil fuel requirement which will result in a reduction of the impact on climate.

Due to the size, nature and design of the development, greenhouse gas emissions resulting from the development will be imperceptible in the national context. There will therefore be no adverse impacts on climate and no significant contribution to Irelands greenhouse gas budget.

The size and nature of the development and the nature and volume of emissions will lead to an imperceptible change in atmospheric conditions. There will be no change to the heat balance in the immediate area.

The construction phase activities will have a not significant impact on climate and will be short-term in duration while the operational phase activities will have an imperceptible impact on climate and will be long-term in duration.

9.7 Microclimate

The Microclimate Wind Analysis undertaken by IN2 Engineering for the proposed residential development at Heuston South Quarter, St John's Road West, Dublin 8 is presented in Appendix 9.B.

The analysis utilises Computational Fluid Dynamics (CFD) modelling software to simulate the wind profiles for each of the twelve cardinal wind directions for the proposed development. The results of the modelling are evaluated using the Lawson Criteria, a best practice methodology for assessing acceptable wind velocities and microclimate effects.

The results of the analysis indicate no unacceptable wind effects. The analysis confirms a small degree of wind acceleration below the bridge between blocks A & C however the Lawson Criteria confirms the area remains suitable for pedestrians. As there is no seating proposed for this area there is no remediation required.

The roof terraces of each block were assessed and in each case found to be suitable for sitting and pedestrian comfort however significant improvements were achieved by raising the parapet height on the West and South sides of the roof gardens. The increased parapet height has been included for each roof garden ensuring all achieve very good microclimate results.

9.8 Mitigation Measures

A Dust Management Plan will be formulated for the construction phase of the project, as construction

activities are likely to generate some dust emissions. The principal objective of the Plan is to ensure that dust emissions do not cause significant nuisance at receptors in the vicinity of the site. The most important features of the Dust Management Plan are summarised in Table 9.8.1 Table of Mitigation Measures.

The design of the construction programme and the location and layout of the construction compound and the storage of materials will be carefully planned to ensure that air quality impacts are minimised. Table 9.8.1 presents a summary of the main mitigation features of the project and the specific mitigation measures which will be employed in order to minimise emissions from the activity and the associated impacts of such emissions.

Table 9.8.1 Table of Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Dust	A designated Site Agent will be assigned overall responsibility for Dust Management;
Dust	Implementation of the Construction Management Plan.
Dust	The design of the site and Construction programme considers dust impact management and chooses design approaches to minimise dust emissions;
Dust, general air quality	An effective training programme for site personnel will be implemented for the duration of the Construction Programme;
Dust, general air quality	A strategy for ensuring effective communication with the local community will be developed and implemented;
Dust	A programme of dust minimisation and control measures will be implemented and regularly reviewed;
Dust	A monitoring programme will be implemented.
Dust	Activities with potential for significant emissions will wherever possible be located at a position as far as possible removed from the nearest residential and commercial receptors;
Dust	The areas on site which vehicles will be travelling on will generally be hard-surfaced or compressed ground thus significantly reducing the potential for dust emissions from the vehicles;
Dust	The construction compound area will have hard standing areas to minimize dust generation from windblow.
Dust	In order to minimise the potential for wind-generated emissions from material storage bays, these bays will be oriented away from the dominant wind direction to minimise the effects of wind on release of dust and particulate.
Dust	Fixed and mobile water sprays will be used to control dust emissions from material stockpiles and road and yard surfaces as necessary in dry and/or windy weather.
Dust	A daily inspection programme will be formulated and implemented in order to ensure that dust control measures are inspected to verify effective operation and management.
Dust	A dust deposition monitoring programme will be implemented at the site boundaries for the duration of the construction phase in order to verify the continued compliance with relevant standards and limits.
Aspergillus	The National Guidelines will be followed with regard to the effective management

Risks	of Aspergillus risks.
	Operational Phase
Climatic Factors	The scheme shall only contain thermally efficient buildings and Mechanical Ventilation and Heat Recovery (MVHR) systems shall be incorporated into the design of the buildings. All buildings shall contain thermally enhanced glazing and window and door frames.

9.9 Cumulative Impacts

The cumulative impacts of the proposed residential development in conjunction with current and future developments in the vicinity of the subject site are considered in this section. Guidance published by the European Commission (1999, Guidelines for the Assessment of Indirect and Cumulative Effects as well as Impact Interactions) was considered in carrying out this element of the assessment.

A review of other existing and / or approved projects in the vicinity of the site was carried out as reported in Appendix 1B of the EIAR and these projects were considered to determine whether any of these existing / approved projects will likely have significant cumulative effects in combination with the proposed project. The assessment also considers whether all of the existing / approved projects if they all occurred simultaneously will likely have significant cumulative effects in combination with the proposed development.

The potential for cumulative impacts to arise is greatest for those developments closest to the proposed development site. There is an adjoining commercial development site which will be constructed at the same time with an overall construction period of circa 4 years, and given the close proximity and potential scale of the development, this proposed development presents the greatest potential for cumulative impacts to arise. . Proposals for the development of the site to the north of the SHD application, referred to as the HSQ Commercial Site, is at the early design and feasibility assessment stage. To facilitate as robust and conservative an assessment of cumulative impacts as possible, a development envelope for a hotel and office development has been established that represents the maximum extent of any possible development on the site, noting that the proposed Commercial Site development has not been sufficiently progressed at the time of the preparation of this EIAR to make any reasonable assumptions regarding construction details and the phasing of that development. It is noted that an EIAR will accompany any future development on the HSQ Commercial Site, and that the assessment process has commenced for the purpose of the consideration of alternatives on that site. For a development of the type being considered for the adjoining site, the type of activities that would be required, the general types of construction activities that would be undertaken and the magnitude of potential air emissions associated with such a proposed development are predicted to be very similar to those predicted for the subject site. Since the assessment for the subject site has concluded that the predicted impacts will be either not significant or slight and short term, there is deemed to be no risk of a significant adverse cumulative impact if both developments proceed simultaneously. In the event that the construction phase of the proposed development coincides with the construction of any other permitted developments within the zone of influence of the subject site (<350m) there is the potential for cumulative dust impacts to the nearby sensitive receptors. While the zone of potential influence extends to 350m for the purpose of the overall assessment, the magnitude and significance of any impacts decreases with distance from the site with the maximum impacts observed within 50m of the site boundaries. The dust mitigation measures

outlined above should be applied throughout the construction phase of the proposed development, and with similar mitigation measures applied for other permitted developments in accordance with both best practice guidance and Dublin City Council requirements then this will prevent any significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the proposed development are deemed slight and short-term.

Once the development is completed and operational, there will be no residual adverse air quality or climate impact on the receiving environment as a result of the proposed development or in conjunction with other local residential developments that are planned for the area.

9.10 Do Nothing Scenario

There will be no change in air quality impacts if no change takes place. In the absence of the development proposal, the air quality is unlikely to change.

9.11 Human Health Impacts

Air Quality Standards (AQS) are set to protect vulnerable people, such as those with respiratory illnesses, the old and infirm. Hence, the human health impact assessment has relied on compliance with the AQS to determine whether significant impacts will arise on human health or not.

The air quality impact assessment notes that dust and particulate matter are the primary sources of construction related impacts for all of the proposed development elements. A short-term Slight adverse impact is predicted for the closest receptors during the Construction Phase with potential short-term impacts from traffic on the surrounding roads within approximately 50m of the proposed development site. There will be no lasting impact, and the short-term impact will be managed by means of an effective Construction Management Plan (CMP) incorporating the mitigation measures outlined in Section 9.7 of this EIAR. The CMP will include a specific Dust Minimisation Plan which will ensure that dust impacts are prevented or minimised during the Construction Phase of the proposed development.

The predicted impact on air quality is short term and not significant hence the potential human health impact during construction is imperceptible.

There will be no significant emissions to atmosphere during the Operation Phase and the impact has been assessed as imperceptible. Therefore the potential human health impact during Operation is imperceptible.

9.12 Residual Impacts

During the construction phase of the proposed development there will be some dust impacts experienced at the nearest receptors to the subject site. It is predicted that the mitigation measures proposed will ensure that the air quality impacts are kept to a minimum. The predicted air quality impacts on the

receiving environment during the construction phase are considered to be not significant and short-term and only affecting a small number of properties.

The only predicted air quality impacts associated with operation of the development are emissions to atmosphere from heating sources and traffic associated with the development. The change in traffic movements and the additional heating sources will have no quantifiable impact on air quality. The predicted air quality and climate impacts on the receiving environment during the operational phase are considered to be imperceptible and long-term.

Due to the size and nature of the development and the nature and volume of the potential emissions, the construction phase activities will have a not significant impact on climate and will be short-term in duration while the operational phase activities will have an imperceptible impact on climate and will be long-term in duration.

9.13 Interactions Arising

The main interactions with air quality are in relation to human beings and biodiversity.

The impact of air quality on human beings living in the area of the proposed development has been addressed above for both the construction and operational phase of the proposed development. The impact assessment shows that the air quality impacts that will be experienced by human beings in the vicinity of the proposed development are all within the prescribed criteria. This interaction is described as negative for the construction phase and neutral for the operational phase and is quantified as Not Significant for both phases.

In relation to the interaction of emissions to atmosphere from the proposed development with flora and fauna, Table 9.5.2.1 sets out Air Quality Standards for the protection of vegetation and ecosystems. This assessment has shown that the emissions generated from the development are very limited and do not have potential to generate a significant adverse impact on the local ecosystems including birdlife and wildlife. Air Quality in the area is good as shown in Section 9.5 and the Air Quality Standards will not be exceeded as a result of the development thereby ensuring that no significant adverse impact on ecosystems arises. This interaction is described as neutral and quantified as Not Significant.

9.14 Monitoring

In order to mitigate against air quality effects at receptors during the Construction Phase, Best Practice Measures will be adopted. These measures will include techniques such as those outlined in the IAQM's (2014a) *Guidance on the Assessment of Dust from Demolition and Construction*.

The Contractor will be required to produce an Air Quality and Dust Management Plan including Best Practice Measures to control dust and, in particular, measures to prevent dust nuisance. The principal objective of the Air Quality and Dust Management Plan will be to ensure that dust emissions do not cause significant nuisance at receptors near the Proposed development. The Air Quality and Dust Management Plan will include a daily inspection programme which will be formulated and implemented in order to

ensure that dust control measures are being operated and managed effectively. A dust deposition monitoring programme will be implemented during the Construction Phase in order to verify the continued compliance with relevant standards and limits.

9.15 Accidents or Unplanned Events

There are no accidents or unplanned events as a result of the proposed development that could occur that will have an adverse or significant impact on air quality or climate that have not already been considered in this chapter.

9.16 References

Dublin City Council Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition

Environmental Protection Agency (2017). Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

Environmental Protection Agency. Air Quality in Ireland 2016, 2007 and 2018: Indicators of Air Quality.

Health Protection Surveillance Centre (2018). National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis During Construction/Renovation Activities.

Institute of Air Quality Management (2014). Guidance on the Assessment of Dust from Demolition and Construction.

Institute of Air Quality Management (2014). Guidance on the Assessment of Odour for Planning.

Institute of Air Quality Management (2017). Land-Use Planning and Development Control: Planning for Air Quality.

European Union (1996). Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management [1996].

European Union (2004). Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air [2004].

European Union (2008). Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe [2008].

Climate Action and Low Carbon Development Act 2015

Climate Change and Low Carbon Development Act (Amendment) Bill 2021

Air Quality Standards Regulations 2011 – S.I. No. 180 of 2011

Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 – S.I. No. 58 of 2009

10. NOISE AND VIBRATION

10.1 Introduction

This Chapter of the Environmental Impact Assessment Report was prepared by Imelda Shanahan TMS Environment Ltd who has over 30 years professional experience in preparing assessments of this type for various different types of development. Imelda has a BSc (Hons) in Chemistry from University College Dublin and a PhD in Physical Chemistry, she is a Chartered Chemist and a Fellow of the Institute of Chemistry of Ireland and a Fellow of the Royal Society of Chemistry.

This Chapter of the EIAR considers the potential noise and vibration impacts associated with the proposed development. Impacts of the construction and operational phases are considered in the context of appropriate standards and guidelines, together with requirements for noise and vibration monitoring and control.

10.2 Characteristics of the Proposed Development

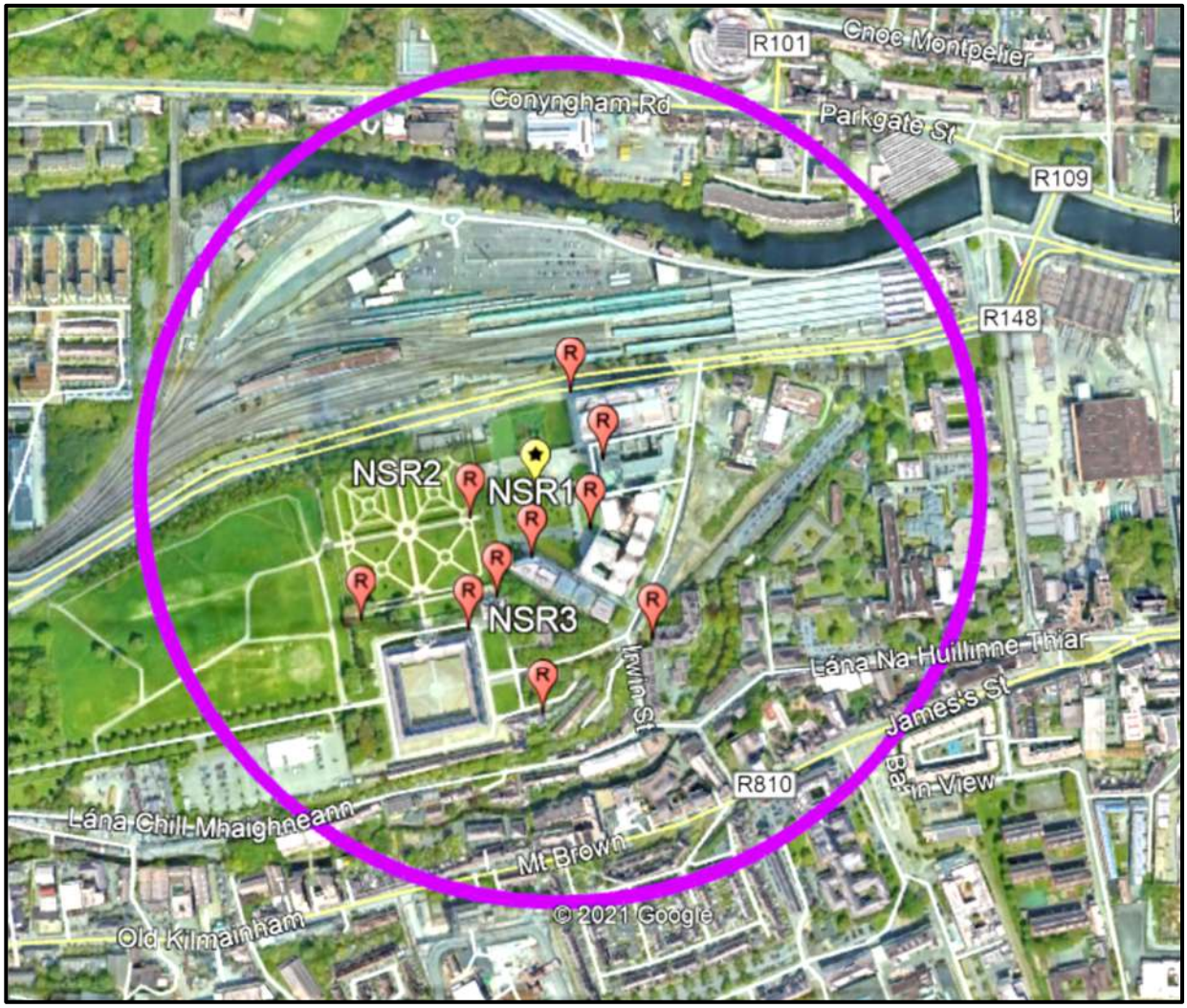
The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over double basement level / podium level. The application site extends to 1.08 ha (10,825 sqm).

The potential noise and vibration impacts on the surrounding environment that requires consideration for a proposed development of this type includes two distinct stages, the short-term construction phase and the long-term operational phase. During the construction phase the main site activities will include demolition and site clearance, building construction, and landscaping. This phase has the greatest potential for noise and vibration impacts on the surrounding environment but this phase will be of short-term impact.

During the operational phase of the proposed development, no significant sources of noise or vibration are expected from within the development. The primary source of noise in the operational context relates to any changes in traffic flows along the local road network and any operational plant noise.

The extent of the Study Area is shown in Figure 10.2.1 with a radius of detailed assessment up to 350m from the site boundaries. Potential noise and vibration impacts associated with the proposed development are predicted to be at their most significant close to the construction works boundaries. The general area surrounding the site was assessed in order to identify the receptors that have the potential to be impacted by noise emissions associated with the proposed development works. Representative noise sensitive receptors were identified close to the site boundaries to ensure that the maximum potential impacts were considered in the assessment and are shown on Figure 10.2.1.

Figure 10.2.1 Study Area and representative Noise Sensitive Receptors (NSRs)



10.3 Receiving Environment

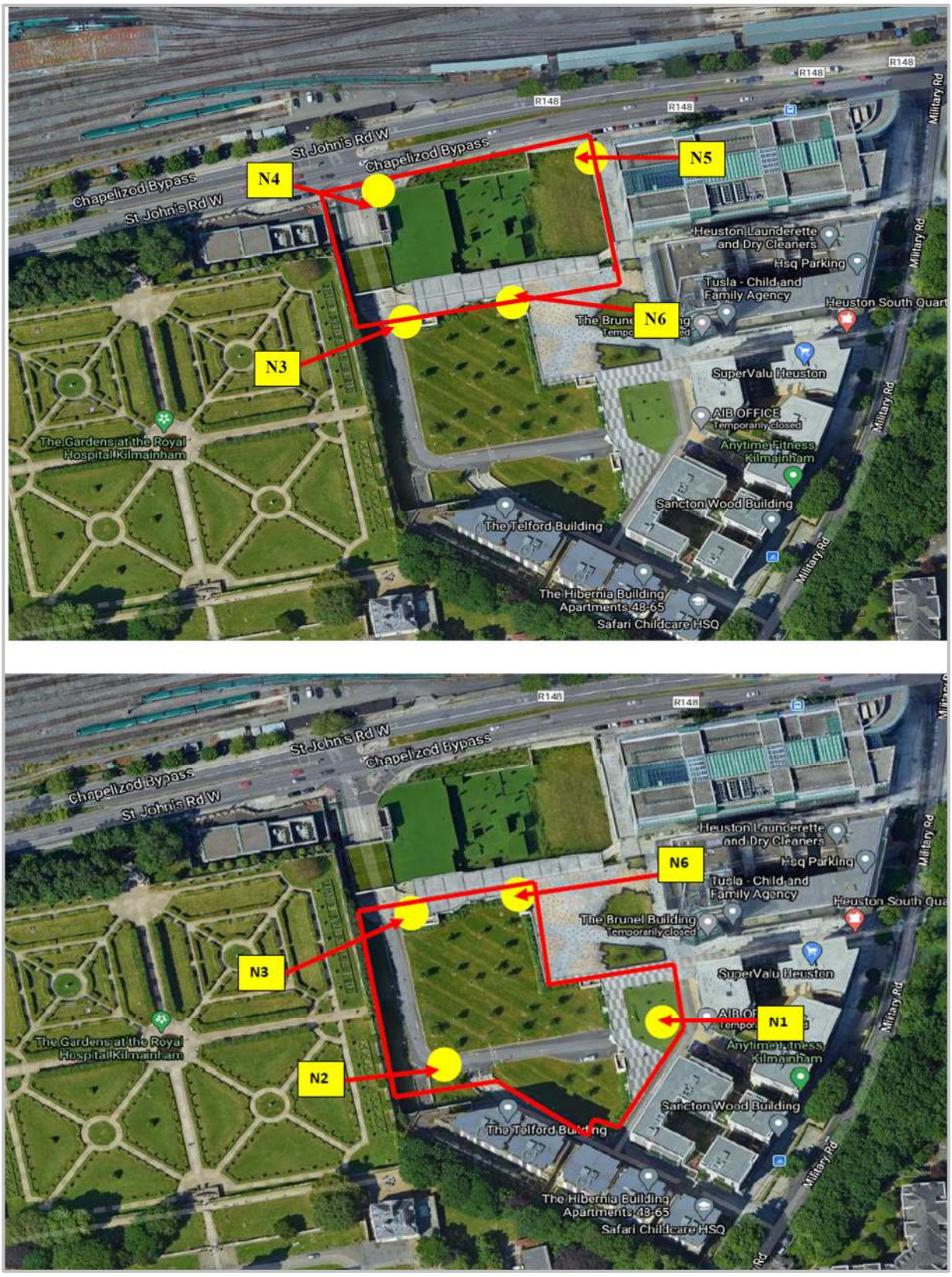
10.3.1 Introduction

The existing noise environment was characterised by conducting measurements at the site of the proposed development. The baseline noise monitoring survey consisted of carrying out attended and unattended continuous noise monitoring at a number of locations in the vicinity of and on the subject site. The detailed noise monitoring survey reports are presented in Appendix 10.A, Appendix 10.B and Appendix 10.C and include a map of the survey locations.

10.3.2 Existing Noise Climate

The baseline noise monitoring locations were chosen in order to best represent the current noise climate at the nearest noise sensitive receptor (NSR) locations in the vicinity of the subject site. In total seven noise monitoring locations were chosen to complete the baseline survey and measurements were carried out during the daytime period (07.00 to 19.00), the evening time period (19.00 to 23.00) and the night-time period (23.00 to 07.00) on 26th January 2021 and on 03 – 09 February 2021. The monitoring locations are shown on Figure 10.3.2.1 where the SHD and Commercial site boundaries are outlined in red.

Figure 10.3.2.1 Noise monitoring locations for Commercial and SHD sites



The measurement parameters included meteorological observations of prevailing conditions at the time of the survey. The main measurement parameter was the equivalent continuous A-weighted sound pressure level, $L_{Aeq,\ T}$. A statistical analysis of the measurement results was also completed so that the

percentile levels, $L_{AN,T}$, for N = 90% and 10% over the measurement intervals were also recorded.

The results of the baseline noise monitoring survey are summarised in Table 10.3.2.1, 10.3.2.2 and 10.3.2.3 below. These results are an accurate representation of the existing baseline noise climate in the vicinity of the site.

The noise climate is described in terms of the following measurement parameters.

- L_{Aeq} : The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over a given period.
- L_{A90}: the sound pressure level in dB(A) which is exceeded for 90% of the time.
- L_{A10}: the sound pressure level in dB(A) which is exceeded for 10% of the time.

The measurements were carried out over 30 minute intervals in accordance with Standard Methods. Noise levels at all locations were dominated by road traffic noise as expected for this location.

The measurement results are consistent with expectations for this location. As expected, noise levels at the boundary adjacent to St John's Road are the highest levels recorded and lowest at locations removed from St John's Road. Noise levels on the subject SHD site are lower than those on the commercial site which is consistent with expectations as the SHD site is further away from the road.

Table 10.3.2.1 Baseline noise monitoring results: SHD Site

Date	Period	L_{AEq}	L_{A90}	L_{A10}
Location N3, northern boundary removed from St John's Road				
26 Jan 2021	Day	55	50	58
Location N6, southern boundary removed from St John's Road				
26 Jan 2021	Day	52	48	54
Location N1, south eastern boundary of proposed SHD site				
26 Jan 2021	Day	53	48	54
Location N2, southwestern boundary of proposed SHD site				
26 Jan 2021	Day	53	48	54

Note

Day is 07:00 to 19:00, evening is 19:00 to 23:00 and night is 23:00 to 07:00

Table 10.3.2.2 Baseline noise monitoring results: Commercial Site

Date	Period	L_{AEq}	L_{A90}	L_{A10}
Location N3, southern boundary removed from St John's Road				
26 Jan 2021	Day	55	50	58
Location N4, northwestern boundary fronting St John's Road				
26 Jan 2021	Day	72	55	77
Location N5, northeastern boundary fronting St John's Road				
26 Jan 2021	Day	65	58	68
Location N6, southern boundary removed from St John's Road				
26 Jan 2021	Day	52	48	54

Note

Day is 07:00 to 19:00, evening is 19:00 to 23:00 and night is 23:00 to 07:00

Table 10.3.2.3 Indicative Daytime (16-hour) and Night-time (8-hour) Noise Levels (N7)

Time	Average Noise levels / dB	
	Daytime $L_{Aeq,16hr}$	Night-time $L_{Aeq,8hr}$
03 February 2021	54	52
04 February 2021	56	52
05 February 2021	57	51
06 February 2021	54	49
07 February 2021	53	50
08 February 2021	55	51
09 February 2021	56	53

It was observed that the dominant source of noise at all noise monitoring locations was passing traffic on the surrounding road network including the adjacent St John's Road West. The baseline noise environment within the general vicinity of the proposed development site was observed to be typical of an urban environment where road traffic activities were the main contributors to the prevailing noise environment.

10.3.3 Existing Vibration Climate

There are no significant sources of vibration in the vicinity of the subject site. The main vibrations experienced at the nearest sensitive receptor locations relates to the passing traffic along the surrounding

road network. Low-level, short-term vibrations could be experienced when fully loaded HGVs travelling at speeds in excess of 50km/hr pass in close proximity to private residences. However traffic does not generally pass the site at these speeds and therefore vibration levels are imperceptible at the site.

10.4 Assessment Methodology

10.4.1 Impact Assessment Methodology

The EPA published the draft document *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* in 2017. These draft Guidelines take account of the revised EIA Directive (2014/52/EU) and are considered in this assessment. Impacts or effects are described in the draft Guidance in terms of quality, significance, magnitude, probability, duration and type. Table 10.4.1.1 below presents the description of the significance of effects and Table 10.4.1.2 presents the description of the duration of effects as shown in the Draft Guidelines.

Table 10.4.1.1 Describing the Significance of Environmental Effects (EPA 2017)

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

Table 10.4.1.2 Describing the Duration of Environmental Effects (EPA 2017)

Duration of Effects	Description
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years.

In addition to the above, the methodologies presented below were used to inform the noise and vibration impact assessment and to identify and assess all cumulative impacts with the potential to impact upon the receiving environment and to propose mitigation and avoidance measures where required.

1. Carry out a series of baseline noise measurements to provide information on existing background and specific site noise levels at the nearest sensitive receptors.

   A baseline noise survey was completed in the vicinity of the subject site according to the requirements of *ISO 1996: Acoustics - Description and Measurement of Environmental Noise* and in addition, with reference to the EPA publication; *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), 2016*. Noise monitoring was carried out at a total of seven representative noise monitoring locations in order to determine the existing noise environment at the proposed site locations. The detailed baseline noise monitoring survey reports are presented in Appendix 10.A, Appendix 10.B and Appendix 10.C.

2. Identify appropriate criteria against which to assess the significance of the noise and vibration impacts associated with the proposed development. Criteria for noise assessment are discussed in Section 10.4.2 and the criteria for vibration assessment are discussed in Section 10.4.3 below.

3. Provide predictions of resultant noise and vibration levels at the nearest sensitive receptors and assess these against the selected assessment criteria.

   Noise prediction modelling was carried out in order to predict the noise emissions that would be experienced at sensitive receptor locations as a result of the various activities associated with the proposed development. Prediction calculations for the noise generating activities including plant and equipment operation, construction activities and vehicle movements on site have been conducted generally in accordance with ISO 9613: *Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation*, 1996.

4. Propose mitigation and avoidance measures where required.

5. Identify and assess all cumulative impacts with potential to impact upon the receiving environment.

10.4.2 Noise Assessment Criteria

There is no specific Irish legislation which sets out environmental noise limits that must be achieved and therefore the assessment criteria that are presented in this report are based on the guidelines set out by regulatory bodies such as the Environmental Protection Agency (EPA), the World Health Organisation (WHO), the Department of Housing, Planning, Community and Local Government (DHPCLG) whose guidance and standards are based on international best practice.

Construction Noise Criteria

Construction noise is temporary in nature and is usually experienced over a short to medium-term period and this characteristic requires it to be considered differently to other longer term noises. Construction activities on larger-scale construction projects such as this one will inevitably result in noise being generated.

British Standard *5228-1:2009+A1:2014 –Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise* (BS 5228-1) is a commonly used Standard to assess the potential noise impacts associated with the construction phase of a project. This Standard states that noise complaints related to new industrial/commercial noise sources are more likely to arise as the difference between the industrial noise source and the existing background noise increases. Practical noise reduction measures are detailed in BS 5228-1 and these measures can be implemented in order to reduce the overall noise emissions from a construction site.

There is no Irish Guidance specifically published for the short to medium-term construction work such as that proposed for the subject site. Construction noise impacts are assessed in terms of the requirements of BS 5228-1. Annex E of this Standard details acceptable construction noise limits for differing scenarios. Annex E.2 looks at the significant of noise impacts based on fixed noise limits and states:

> "*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 and urban areas away from main road traffic and industrial noise;*
> - *75 decibels (dBA) in urban areas near main roads in heavy industrial areas.*
>
> *These limits are for daytime working outside living rooms and offices. In noise-sensitive situations, for example, near hospitals and educational establishments – and when working outside the normal hours say between 19.00 and 22.00 hours – the allowable noise levels from building sites will be less: such as the reduced values given in the contract specification or as advised by the Environmental Health Officer (a reduction of 10 dB(A) may often be appropriate). Noisy work likely to cause annoyance locally should not be permitted between 22.00 hours and 07.00 hours.*"

International best practice dictates that noise limits in the range 65dB $L_{Aeq,1hr}$ to 75dB $L_{Aeq,1hr}$ are generally acceptable in the community during daytime construction activities.

Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)) is the only government body in Ireland to publish construction noise limits which are presented in their document *'Guidance for the Treatment of Noise and Vibration in National Road Schemes (2004)'*.

The guidelines are not mandatory but are recommended to achieve appropriate consistency with respect to the treatment of noise and vibration. The Guidance points out that there is no published Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. However, it states that Local Authorities, where appropriate, should control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. The NRA Guidance presents indicative noise levels that are typically deemed acceptable during construction phase of road developments. These are presented below in Table 10.4.2.1.

Table 10.4.2.1 NRA Maximum Permissible Construction Phase Noise Levels at the façade of dwellings

Days & Times	$L_{Aeq, (1hr)}$ dB	$L_{pA(max) slow}$ dB
Monday to Friday - 07:00 to 19:00hrs	70	80
Monday to Friday - 19:00 to 22:00hrs	60[2]	65[2]
Saturday - 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays - 08:00 to 16:30hrs	60[2]	65[2]

Note 1: Noise levels measured at facade of dwellings.

Note 2: Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority.

Dublin City Council has adopted a number of policies to help manage environmental noise exposure throughout the city and has co-operated with the three Dublin County Councils to produce a combined Noise Action Plan, which covers the period from 2018 to 2023 and sets out the measures for the management of environmental noise. There are no specific noise limit values currently in place within each Local Authority and in general, Local Authorities may only specify advisory levels.

The Dublin City Council "*Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition*" is a good practice Guide which sets out guidance on the measures which all developers should consider prior to commencement of work in the Dublin City Council Local Authority area to ensure that demolition and construction work does not have an adverse impact on those living and working nearby. The Guide sets out the Risk Assessment Approach to be followed whereby sites are classified as either Low, Medium or High Risk depending on the locality, the type of Work and Duration of work. When this risk assessment is carried out, the site is identified as a High Risk Site due to the close proximity of residential receptors.

The Dublin City Council (DCC) Guide sets out the approaches to be followed for setting appropriate noise limits as follows:

"*The 'ABC' Method detailed in Paragraph E.3.2 of BS 5228-1:2009 shall be used to determine acceptable*

noise levels for day, evening and night time work."

It is noted that the British Standard was revised in 2014 and the most up to date version of the Standard is quoted and applied in the current assessment.

The DCC Guide also sets vibration limits:

"*Vibration levels must be kept below 1.0 mm/sec (PPV) where possible. Where levels are expected to exceed this value residents must be warned and an explanation given".*

The BS5228 methodology referenced in the DCC Guide defines a set of threshold noise values which are applicable to construction sites and which apply only to residential receptors. The threshold values are selected based on the ambient noise level prior to commencement of the construction activity, and where a potentially significant effect is identified "*The assessor then needs to consider other project-specific factors such as the number of receptors affected and the duration and character of the impact to determine if there is a significant effect.*" Taking account of the baseline noise level data and applying the BS5228 approach, the noise level should not increase by more than 5 decibels to ensure a tolerable environment unlikely to cause complaints. Applying this approach and taking account of the existing noise climate, the appropriate noise limits for the development are defined in the Dublin City Council Guide as derived directly from BS5228-1 the noise limits set out in Table 10.4.2.2 are derived.

Table 10.4.2.2 Maximum Permissible Construction Phase Noise Levels at the façade of dwellings

Days & Times	$L_{Aeq, (1hr)}$ dB	$L_{pA(max) slow}$ dB
Daytime and Saturday (07:00 to 19:00hrs, 07:00 – 13:00 hours, respectively)	70	Not specified
Evening and weekends	60	Not specified
Night time (23:00 to 07:00hrs)	50	Not specified

Note 1: Noise levels measured at facade of dwellings.

It is considered that the noise limits set out in Table 10.4.2.2 above represent a good compromise between the practical limitations in a construction project such as this one and the requirement to ensure acceptable noise levels at the nearest noise sensitive receptor locations.

Operational Noise Criteria

The WHO *Guidelines for Community Noise* states that, "*in dwellings, the critical effects of noise are on sleep, annoyance and speech interference*". In order to avoid sleep disturbance it is recommended that indoor guideline values for bedrooms are 30dB L_{Aeq} for continuous noise and 45dB L_{AMax} for single sound events. However, it is noted that lower levels may be annoying, depending on the nature of the noise source. During the night-time, sound pressure levels at the outside facades of the living spaces should not exceed 45dB L_{Aeq} and 60dB L_{Amax}, so that people may sleep with bedroom windows open. These values have been determined by the WHO by assuming that the noise reduction from outside to inside with a window partly open is 15dB. Similarly, during the daytime the outdoor sound level from steady, continuous noise should

not exceed 50dB L_{Aeq} on balconies, terraces and in outdoor living areas to protect the majority of people from being moderately annoyed.

The *Design Manual for Roads and Bridges Volume 11, Section 3* (Highways Agency 2011) also offers guidance on 'long-term' noise impacts associated with changes in traffic noise level. For the Operational Phase, traffic impacts are assessed against the 'long-term' impact classification, presented in Table 10.4.2.2.

Table 10.4.2.2 Classification of Magnitude of Traffic Noise Impacts in the Long-Term (Operational Phase)

Change in Sound Level (dB L_{A10})	Magnitude of Impact
0	No change
0.1 to 2.9	Negligible
3.0 to 4.9	Minor
5.0 to 9.9	Moderate
10+	Major

The criteria above reflect the key benchmarks that relate to human perception of noise. A change of 3dB is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB change in noise represents a doubling or halving of the noise level.

It is considered that the criteria specified in Table 10.4.2.2 above provide a good indication as to the likely significance of changes in noise levels in this case and have been used to assess the impact of the operational noise.

10.4.3 Vibration Assessment Criteria

Some activities during the construction phase of the proposed project have the potential to generate ground vibrations at sensitive receptor locations. Activities such as rock-breaking, movement of loaded HGVs and other construction traffic can all cause significant vibration to occur. The levels of vibration associated with these activities would not normally be expected to cause structural damage to buildings but may have the potential to impact negatively on humans depending on environmental factors such as distance from source and mitigation measures employed.

The operational phase of the proposed development will not generate any observable vibration emissions and is consequently not required to be considered.

Construction Vibration Criteria

Vibration standards are concerned with those dealing with human comfort, and those dealing with structural or cosmetic damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

Humans are particularly sensitive to vibration and can detect vibration levels as low as 0.3 mm/sec PPV and levels above this may cause annoyance. However, significantly higher levels than this are tolerated for single short-term events and do not cause annoyance or disturbance to humans. British Standard BS 5228-2:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites* provides guidance on vibration and its control and management on various site types. The standard also presents details on the human response to vibration and Table 10.4.3.1 below outlines these effects.

Table 10.4.3.1 Human Response to Vibration

Vibration Level PPV (mm/sec)	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

The response of a building to groundborne vibration is affected by numerous factors including the type of foundation, underlying ground conditions, the building construction and the state of repair of the building.

British Standard 7385 *Evaluation and Measurement for Vibration in Buildings* provides guidance on vibration measurement, data analysis and reporting as well as building classification and guide values for building damage. The damage threshold criteria presented in BS 7385-2 are based upon systematic studies using a carefully controlled vibration source in the vicinity of buildings. The Standard states that there should be no cosmetic damage to buildings if transient vibration levels do not exceed 15 mm/sec in the low frequency range and this rises to 20 mm/sec at frequencies of 15 Hz and 50 mm/sec at 40 Hz and above. These guidelines should be reduced by up to 50% for listed structures or similar. It is also noted that the probability of damage to buildings tends towards zero at 12.5 mm/sec at component PPV.

The NRA Guidance Document recommends vibration levels to ensure that there is no potential for vibration damage during road construction activities. These values have been derived through consideration of various European standards and compliance with their guidance should ensure that there is little to no risk of even cosmetic damage to buildings. The guide values are presented below in Table 10.4.3.2.

Table 10.4.3.2 NRA Maximum Permissible Construction Phase Vibration Levels

Vibration Level – Peak Particle Velocity at the closest part of any sensitive property to the source of vibration at a frequency of		
Less than 10Hz	**10 to 50Hz**	**50 to 100Hz (and above)**
8 mm/s	12.5 mm/s	20 mm/s

10.5 Identification of Likely Significant Impacts

10.5.1 Construction Phase

The construction works associated with the development proposed in this planning application is expected to take place over an extended period of time, up to a maximum of four years, with the hours of construction typically from 07.00 to 19.00 Monday to Friday and 08.00 to 14.00 Saturdays. Although there may occasionally be the need to work outside the normal hours of construction, heavy or noisy construction activities will be minimised during these periods. Construction is expected to be phased and it is proposed that the blocks shall be constructed from South to North; i.e. Blocks B, C and D, followed by Blocks A and E.

A variety of items of plant will be in use for the purposes of demolition, site clearance, foundations, and construction activities. There will be no blasting techniques or rock breaking used during construction. Some of the most significant activities in terms of potential noise and vibration impacts include sawing and breaking of concrete, piling and the general construction activities associated with a scheme of this magnitude. There will be no perimeter secant or contiguous piling required, as this is already in place. The buildings will have piled foundations.

The general sequence of works is as follows:

- Site establishment and erection of hoarding;
- Demolition of the existing basement and podium structure where required.
- Construction of the foundations and substructure.
- Construction of superstructures.

Each of these activities would be expected to generate noise as a result of the activity and the various plant and machinery required for completion. Some of the activities would also generate vibration.

Plant and equipment to be used during the construction works will include the following:

- articulated and rigid trucks;
- Pilling-rigs (Continuous Flight Auger (CFA) rigs);
- bulldozers, excavators, backhoes, with ancillary equipment (rock hammers or saws);
- Tower cranes / mobile cranes;
- concrete delivery trucks;
- concrete pumps;
- man, and material hoists;

- scissor, boom and fork lifts.

10.5.2 Operational Phase

The proposed residential development will consist of private dwellings and will also include car parking spaces, pedestrian/cycle and vehicular access together with all ancillary, infrastructure, landscaping and boundary treatments. The only predicted contributions to the noise environment during the operation phase in the vicinity of the site will result from increased traffic movements as a result of the increased activity in the area. There are no significant vibration sources associated with the operation phase.

10.6 Predicted impacts

10.6.1 Predicted Construction Noise Impact

The actual noise level produced by construction work will vary at the nearest sensitive receptor boundary at any time depending upon a number of factors including the type of plant in use, plant location, duration of operation, hours of operation and intervening topography. It is therefore difficult to accurately determine the likely noise levels without knowing greater detail, therefore the impact assessment carried out for the proposed development presents the highest likely noise levels at the nearest receptors based on the demolition, piling, infrastructure work, general site activities and building construction work in the vicinity of the closest approach to the nearest noise sensitive receptors.

The noise levels associated with the Construction Phase of the Proposed Project have been calculated using a Model constructed in accordance with ISO9613-2 and BS5228-1. The noise model accounts for the impacts on noise propagation associated with the magnitude of the noise source, the distance from the source to the receptor, the intervening ground type and topography, the presence of screens or buildings, meteorological impacts and the time that a noise source would be operating.

Noise data for plant and machinery associated with the various construction activities of the Construction Phase were sourced from *BS 5228-1 Noise and Vibration Control on Construction and Open Sites, 2014*, which provides sound pressure level data for a wide range of plant and equipment used for different construction activities, and also from machinery manufacturers for plant and equipment likely to be used during the Construction Phase. Building layouts and heights have also been taken into account. Ground topography has been considered as flat as there are no hills, mountains, valleys or notable geographical features near the subject sites.

The noise model has calculated noise levels for a set of specified NSR locations. NSR locations were chosen for the closest NSRs near the Proposed Project works to account for where construction works will take place. The nearest noise sensitive receptor (NSR) locations to the proposed construction works are the properties within the other elements of the as-built HSQ scheme. The closest distance for the construction works to approach the NSRs is approximately 11m from the closest residential unit and approximately 10m from the boundary of the Royal Hospital grounds. All other works will occur across the site at varying distances of up to 150m. The named NSR locations for the purposes of the impact assessment are:

- NSR1 – Telford Building at 11m from nearest site construction works;

- NSR2 – Royal Hospital Kilmainham Grounds at circa 10m from nearest site construction works.
- NSR3 – Royal Hospital Kilmainham at ca 85m from the nearest construction works.

For some of the works, the distances are much greater eg for the only demolition works that will occur, the distances from those activities at the closest point to each receptor are between 25m and 150m and this has been considered in the assessment.

The construction works have been broken down into a number of separate stages to differentiate the key construction activities for the impact assessment:

- Stage 1 relates to site excavation and site preparatory works;
- Stage 2 relates to demolition works,
- Stage 3 is the foundation works;
- Stage 4 is general site activities, and
- Stage 5 relates to the construction of the buildings.

The predicted noise levels are indicative only and are intended for comparison with the adopted noise criteria. Depending on the specific activities occurring at the site, the predicted noise levels will vary accordingly.

For the purposes of a conservative assessment, Table 10.6.1.1 presents the typical expected plant items and their estimated on-time which have been assumed in the model for each of the key construction activities associated with each Stage assessed. An on-time or operating time of 66% for plant items is presented in the assessment, which assumes that plant will operate for a full eight hours over a 12-hour daytime working period (07:00 to 19:00) or for 40 minutes every hour. This is considered a conservative approach for construction activities such as those on this Proposed Project, considering the dynamic nature of construction works and construction sites.

The nearest NSR locations have been used as the named receptors in order to assess the potential noise impacts associated with the different stages of the construction works. The plant items are assumed to be operating at a nominal 10m from the construction boundary closest to the nearest NSR, even though in reality they will be much further removed for much of the time. There are no screening reductions applied for the unmitigated assessment scenario other than the screening achieved with standard construction site hoarding, and all relevant plant and equipment was assessed as running simultaneously.

Table 10.6.1.1 Construction Phase Activity

Construction Works	Plant Detail	BS 5228-1 Reference	Number of Plant Items Operating	Sound Power Level (Lw, dB(A))	Operating Time (%)
Stage 1 Excavation and site preparation	Tracked excavator	C2.2	2	105	66
	Dozer	C2.11	2	107	66
	Wheeled loader	C2.28	1	104	66
	Dump truck	C2.30	2	107	66
Stage 2 Demolition	Concrete saw	C.4.72	1	108	66
	Concrete breaking	C.1.6	1	114	66
	Angle grinder	C4.93	1	108	25
Stage 3 Foundations	Piling rig (CFA)	C.4.21	1	111	66
	Generator	C4.77	1	88	66
	Dewatering	C4.88	2	97	100
	Concrete pump and truck	C4.28	1	103	66
	Poker vibrator	C4.34	1	97	66
	Angle grinder	C4.93	1	108	10
Stage 4 General site activities	Dump truck	C2.30	1	107	66
	Wheeled loader	C2.28	1	104	66
	Mobile crane	C4.41	1	99	66
	Generator	C4.77	2	88	66
	Angle grinder	C4.93	1	108	25
Stage 5 Building construction	Mobile crane	C4.41	1	99	66
	Tower crane	C4.48	2	104	66
	Dump truck	C2.30	1	107	66
	Generator	C4.77	2	88	66
	Concrete pump and truck	C4.28	1	103	66
	Poker vibrator	C4.34	1	97	66
	Cutting/grinding	C4.72	1	107	66

Note

These are typical scenarios for construction sites of this type listing likely types of plant and machinery and operating conditions.

Predicted noise levels have been calculated at each of the closest NSR locations that have been identified for the subject site. A worst-case scenario is assumed by having all plant and equipment items operating continuously for two thirds of the time at the construction boundary point in the vicinity closest to the noise sensitive receptor even though in reality they will be much further removed. Hand-held equipment are assessed as operational for 25% of the time. The generators and cranes are assumed to operate for 100% of the time. A partial screening contribution from an acoustic construction barrier has also been considered in the assessment. For the Piling works which will be of relatively short duration, a Continuous Flight Auger (CFA) piling technique will be employed to minimise noise emissions. This type of work which is one of the noisiest activities proposed will be undertaken at the least sensitive times to minimise disruption to the neighbouring properties. The duration of this Phase of works is short at approximately 2 months.

Therefore, the results presented in Tables 10.6.1.2 to 10.6.1.7 show the maximum noise levels predicted for each NSR and represent the noise levels when the construction activity is ongoing at the closest point within the construction site to each NSR. This is a very conservative approach and for the majority of the time, works will be undertaken at greater distances from the noise sensitive receptors and therefore the noise levels will be lower.

Table 10.6.1.2 Calculated Construction Noise Levels for Excavation & Site Preparation Works

Plant Details	Calculated Noise Level, dB $L_{Aeq,T}$ at the named receptor locations		
	NSR1	NSR2	NSR3
Tracked excavator	61	62	44
Dozer	63	64	46
Wheeled loader	60	61	43
Dump truck	63	64	46
Combined L_{Aeq} (when all plant items are operating together)	68	69	51

Note These are representative noise impact calculations for these types of construction activities

Table 10.6.1.3 Calculated Construction Noise Levels for Demolition Stage

Plant Details	Calculated Noise Level, dB $L_{Aeq,T}$ at the named receptor locations		
	NSR1	NSR2	NSR3
Concrete saw	48	57	42
Concrete breaking	54	63	48
Angle grinder	48	57	42
Combined L_{Aeq} (when all plant items are operating together)	56	65	49

Note These are representative noise impact calculations for these types of construction activities

Table 10.6.1.4 Calculated Construction Noise Levels for Foundations

Plant Details	Calculated Noise Level, dB $L_{Aeq,T}$ at the named receptor locations		
	NSR1	NSR2	NSR3
Piling rig (CFA)	67	68	50
Generator	44	45	27
Dewatering	53	54	36
Concrete pump and truck	59	60	42
Poker vibrator	53	54	36
Angle grinder	64	61	47
Combined L_{Aeq} (when all plant items are operating together)	70	70	52

Note These are representative noise impact calculations for these types of construction activities

Table 10.6.1.5 Calculated Construction Noise Levels for General Site activities

Plant Details	Calculated Noise Level, dB $L_{Aeq,T}$ at the named receptor locations		
	NSR1	NSR2	NSR3
Dump truck	63	64	46
Wheeled loader	60	61	43
Mobile crane	55	56	38
Generator	S44	45	27
Angle grinder	64	65	47
Combined L_{Aeq} (when all plant items are operating together)	68	69	50

Note These are representative noise impact calculations for these types of construction activities

Table 10.6.1.6 Calculated Construction Noise Levels for construction of buildings

Plant Details	Calculated Noise Level, dB $L_{Aeq,T}$ at the named receptor locations		
	NSR1	NSR2	NSR3
Mobile crane	55	56	38
Tower crane	60	61	43
Dump truck	63	64	46
Generator	44	45	27
Concrete pump and truck	59	60	42
Poker vibrator	53	54	36
Cutting/grinding	63	64	46
Combined L_{Aeq} (when all plant items are operating together)	68	69	51

Note These are representative noise impact calculations for these types of construction activities

Table 10.6.1.7 Summary Assessment of Construction Phase Works

Noise Sensitive Receptor	Highest Predicted Construction Noise Level dB $L_{AEq, 1hr}$	Compliance with Assessment Criteria 70dB $L_{Aeq\ 1hr}$
NSR 1	70	Yes
NSR 2	70	Yes
NSR3	52	Yes

The results indicate that the predicted construction noise levels associated with site works will not exceed the assessment criteria for construction works of 70dB LAeq,1hr for the works assessed. There is potential for the assessment criteria to be exceeded at the nearest NSR locations when construction works are occurring at the closest boundary point so a conventional construction screening barrier at the boundary of the works site is provided for in the assessment.

It should be noted however, that in reality it is anticipated that noise levels as a result of construction works will be much lower than the predicted worst-case levels for the vast majority of the construction works. This is because all the items of machinery modelled will not typically be in operation simultaneously and they will not be located at the nearest boundary point but for the most part will be much further removed from the NSR locations. The implementation of the mitigation measures presented in Section 10.6 will ensure that the proposed noise criteria are satisfied for all construction works.

It should be noted that the construction noise levels are short-term impacts and are transient in nature and therefore the likely noise impact is considered to vary from Imperceptible to Moderate.

10.6.1.2 Predicted Impact of Construction Traffic

The traffic information in Chapter 11 of this EIAR calculates that during peak construction activity, it is assumed that site works will generate the following traffic movements:

- At most 4 (No.) Heavy Goods Vehicle (HGV) trips will be made to the site each hour (one HGV arrival and one HGV departure every 15 minutes).
- 6 (No.) LGV arrivals and 6 (No.) Light Goods Vehicle (LGV) departures will occur in each of the background peak hours.
- 25 (No.) construction staff car trips will be made to the site during the AM peak hour, and 25 (No.) such trips made from the site during the PM peak hour.

HGV construction traffic to and from the site shall be associated mostly with the breaking up and removal of existing hardstanding on the development site. No significant excavation or reprofiling works will be required and preliminary earthworks will therefore be minimal. Similar rates of HGV trip generation may also occur during concrete pouring, though at a later stage in construction. HGV trips for material delivery, heavy plant transfer, etc. will be sporadic in nature and generally will not occur at the same time as more HGV-intensive activities. Periodic deliveries of materials shall be made by Light Goods Vehicles. LGV trips

are however unlikely to occur in significant numbers at the same time as HGV trips take place.

A doubling of road traffic volume would typically result in an approximate 3dB increase in noise level at adjacent properties. The additional traffic generated as a result of the construction phase of the proposed development results in a very small increase in peak hour traffic. Therefore, the noise contribution from site traffic during the construction phase will not be perceptible and can be classified as "not significant" and it will be short term in duration.

10.6.1.3 Predicted Impact of Construction Vibration

The only construction activities with the potential to generate appreciable vibration levels will be the movement of loaded HGVs moving into and out of the site, and the piling for the foundations. There is no blasting required and it is also envisaged that there will be no rock-breaking required during site clearance works. The Noise Sensitive Receptors identified in Section 10.6.1 are the closest sensitive receptors for which vibration impacts are assessed.

The piling activity will occur over a period of approximately 2 months and will utilise a CFA (Continuous Flight Auger) or Screw Piling technique. CFA drilling or Continuous Flight Auger piling is ideal for alluvial soils and clay and can also be used in sandy or gravel-based ground conditions. The piling rig uses circular hollow galvanised steel pile shafts with one or more steel helices attached, these are screwed into the ground much like a screw is fastened into wood. The CFA piles are filled with concrete then reinforced with a welded steel rebar cage that is pushed down into the unset concrete.

CFA (Continuous Flight Auger) rigs minimise the spoil created by installation and are an especially quiet method of piling in suitable ground conditions such as those at the development site. The technique also gives rise to minimum vibration levels.

Therefore, considering the distance to the nearest off-site sensitive buildings, vibration levels at the closest residences are expected to be significantly lower than those presented in Table 10.4.3.2 above, thus ensuring no cosmetic damage to buildings will occur. Vibration levels are also expected to be below a level that would give rise to complaint from building occupants as per Table 10.4.3.2.

Due to the low level of vibration associated with the CFA piling technique and the favourable underlying ground conditions, vibration impacts will not cause significant nuisance and will not lead to any type of damage at the closest receptors. This includes any sensitive structures in the neighbouring Royal Hospital grounds. No specific mitigation is required for this aspect of the proposed works.

10.6.2 Operational Phase

Detailed traffic assessments have been undertaken by CS Engineering, as presented in Chapter 11 of this EIAR. Information from this chapter has been used to determine the predicted change in noise levels in the vicinity of the roads and junctions that pass the entrance to the subject site.

For the purposes of assessing potential noise impact, the relative increase in noise level associated with traffic movements in the immediate vicinity of the site with and without the development is considered. The traffic figures used in the assessment are taken from the Traffic and Transportation Assessment (Chapter 11 of the EIAR). Table 10.4.2.2 offers guidance as to the likely impact associated with any particular change in traffic noise level. The predicted increase in traffic noise associated with the proposed

development is less than 1dB, which is not perceptible and associated with a negligible magnitude of impact.

Overall, the noise climate in the area would be expected to remain very similar to the present situation as currently the predominant source of noise is passing traffic on the surrounding roads. There is no significant change in traffic patterns predicted for the area and overall traffic volumes are predicted to increase slightly from current levels hence there is no observable change to the noise climate predicted.

In summary, the predicted change in noise levels associated with vehicles is neutral, long term and not significant. There is no observable source of vibration associated with the operational phase of the proposed development and consequently there is no vibration impact predicted for the operational phase.

A detailed Acoustic Design assessment and Statement has been completed and is presented in Appendix 10.D. The Acoustic Statement sets out recommended internal noise targets for the proposed development which are derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out as follows to ensure that reasonable internal conditions are satisfied:

- daytime limit of 40 dB LAeq, 16 hour (07.00 to 23.00)
- night-time limit of 35 dB LAeq, 8 hour (23.00 to 07.00)

The assessment has shown that the design internal noise goals for the proposed residential units can easily be achieved. The assessment has also shown that by incorporating specific design features into the communal areas that the target noise levels can be achieved in the external amenity areas.

The potential impact of increased traffic associated with the related Commercial development proposed for the site is also assessed as negligible. Chapter 11 provides details of the additional traffic movements associated with that proposed development and the cumulative noise impact of traffic associated with both developments should they proceed is negligible.

10.6 Do Nothing Scenario

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

In the case where the proposed development does not proceed then the noise climate in the area will remain essentially unchanged from the current situation. Traffic is projected to increase at rates of up to 29% in 2039 without the development and this level of change will lead to a change in noise levels in the area. When the new technologies that are being utilised for transport are considered it is expected that traffic noise levels will decrease in the area in line with the requirements of the Nosie Action Plan.

It is considered that there will be no observable difference between the noise climate of the area now and the operational phase of the proposed development. Consequently, the do-nothing impact and the operational phase impact are thought to be practically the same with no observable difference between the two.

10.7 Mitigation Measures

Whilst the construction phase can proceed in compliance with the proposed limits, the guidance on the control of noise and vibration from demolition and construction activities presented in BS 5228 will be followed in accordance with best practice and in order to minimise any noise and vibration impacts associated with the proposed development. These measures are presented in Table 10.7.1. There are no adverse noise or vibration impacts associated with the operational phase of the development and consequently there are no mitigation measures proposed.

Specific mitigation measures that are recommended for specific activities are specified in Table 10.7.2. These measures are included as best practice measures that will minimize the impact of the proposed development works on noise sensitive receptors.

Table 10.7.1 Table of Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Traffic and plant noise	Avoid unnecessary revving of engines and switch off equipment when not required;
Traffic noise	Keep internal haul routes well maintained and avoid steep gradients;
Impact noise	Use rubber linings in chutes and dumpers to reduce impact noise;
Impact noise	Minimise drop height of materials;
Traffic and plant noise	Start-up plant and vehicles sequentially rather than all together;
Traffic and plant noise	In accordance with best practicable means, plant and activities to be employed on site will be reviewed to ensure that they are the quietest available for the required purpose;
Traffic and plant noise	Where required, improved sound reduction methods, e.g. enclosures should be used;
Plant noise	Site equipment should be located away from noise sensitive areas, as much as is feasible;
Traffic and plant noise	Regular and effective maintenance by trained personnel should be carried out to reduce noise and/or vibration from plant and machinery;
Traffic and plant noise	Limit noisy construction works to 8am to 6pm weekdays with Saturday working from 8am to 1pm unless otherwise agreed with the local authority. Relatively quiet construction activities could be carried out outside these hours, subject to controls in place;
General site noise	Maintain ongoing contact with local residents to ensure any complaints relating to construction phase noise for the project from local residents can be addressed. Also, prior to any particularly noisy activities, local residents should be contacted in order to minimise the perceived noise impact;
Traffic and plant noise	The contractor shall erect construction site hoarding along noise sensitive boundaries, particularly where no existing screening such as boundary walls are in place at the nearest NSRs.
General site noise	The contractor should appoint a community relations officer who will deal

	on a one-to-one basis with local stakeholders and will notify them before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works. The community relations officer shall also distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.
General site noise	The contractor should prepare a Noise and Vibration Management Plan (NVMP) which will deal specifically with on-site activities in a strategic manner to remove or reduce significant noise and vibration impacts associated with the construction works.

Table 10.7.2 Table of Site specific Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Construction noise	The contractor shall ensure that when work is undertaken on the rising floors that an acoustic synthetic barrier shall be employed along the external facade to minimise noise transmission to the surrounding environment.
Generators	Generators should be located as far as possible from sensitive boundaries especially the residential buildings.
Concrete breaking	Concrete breaking is one of the activities forecast to have the highest potential noise impact. During concrete breaking, the activity shall be screened with localised temporary barriers in order to break line of sight to the sensitive receptors. This may give up to a 10 dB reduction in noise levels which would ensure compliance with the required limits even when other activities are underway.
Foundation Works	Although CFA Piling is virtually vibration free and is the lowest noise level technique for piling routinely available, there are associated activities with potential to cause disturbance. The cutting of steel for the piles will give rise to significant noise levels when carried out in close proximity to residential receptors. It is therefore proposed that this activity shall be carried out at locations removed from the boundary of the site wherever possible to minimise noise impact. Where this is not feasible, an acoustic shroud / barrier shall be employed to minimise noise impact.
Monitoring	It is proposed to undertake vibration monitoring when the demolition works are underway and during the installation of piles. Although CFA piling is virtually vibration free, it is proposed that monitoring shall be undertaken to ensure that there is no nuisance as a result of this activity. Noise monitoring will also be undertaken throughout the construction phase in accordance with Dublin City Council Good Practice Guide as follows. Carry out regular on site observation monitoring and checks/audits

	to ensure that Best Practicable Means (BPM) is being used at all times. Such checks shall include; • Hours of work • Presence of mitigation measures • Number and type of plant • Construction methods Monitor noise and vibration continuously during demolition, piling, excavation and sub and superstructure works at agreed locations and report to DCC at agreed intervals and in an agreed format.

10.8 Cumulative Impact Assessment

The cumulative impacts of the proposed residential development in conjunction with current and future developments in the vicinity of the subject site are considered in this section. Guidance published by the European Commission (1999, Guidelines for the Assessment of Indirect and Cumulative Effects as well as Impact Interactions) was considered in carrying out this element of the assessment.

A review of other existing and / or approved projects in the vicinity of the site was carried out as reported in Appendix 1B of the EIAR and these projects were considered to determine whether any of these existing / approved projects will likely have significant cumulative effects in combination with the proposed project. The assessment also considers whether all of the existing / approved projects if they all occurred simultaneously will likely have significant cumulative effects in combination with the proposed development.

The potential for cumulative impacts to arise is greatest for those developments closest to the proposed development site. There is an adjoining commercial development site which will be constructed at the same time with an overall construction period of circa 4 years, and given the close proximity and potential scale of the development, this proposed development presents the greatest potential for cumulative impacts to arise. Proposals for the development of the site to the north of the SHD application, referred to as the HSQ Commercial Site, is at the early design and feasibility assessment stage. To facilitate as robust and conservative an assessment of cumulative impacts as possible, a development envelope for a hotel and office development has been established that represents the maximum extent of any possible development on the site, noting that the proposed Commercial Site development has not been sufficiently progressed at the time of the preparation of this EIAR to make any reasonable assumptions regarding construction details and the phasing of that development. It is noted that an EIAR will accompany any future development on the HSQ Commercial Site, and that the assessment process has commenced for the purpose of the consideration of alternatives on that site. For a development of the type being considered for the adjoining site, the type of activities that would be required, the general types of construction activities that would be undertaken and the magnitude of potential noise and vibration emissions associated with such a proposed development are predicted to be very similar to those predicted for the subject site. The assessment for the subject site has concluded that the predicted impacts will be within the prescribed levels as set out by Dublin County Council in their guidelines even when a worst-case assessment scenario is applied. The quantitative assessment has determined that the zone of potentially significant cumulative impacts is 20m from the site boundary for construction works and

therefore there is the potential for cumulative impacts to arise. The layout of the site and the potential impact on receptors was considered and it was deemed that provided the mitigation measures proposed are applied that there is no risk of a significant adverse cumulative impact if both developments proceed simultaneously.

In the event that the construction phase of the proposed development coincides with the construction of any other permitted developments within the zone of influence of the subject site there is the potential for cumulative noise impacts to the nearby sensitive receptors. While the zone of potential influence extends to 350m for the purpose of the overall assessment, the magnitude and significance of any impacts decreases with distance from the site with the maximum impacts observed within 20m of the site boundaries. The mitigation measures outlined above should be applied throughout the construction phase of the proposed development, and with similar mitigation measures applied for other permitted developments in accordance with both best practice guidance and Dublin City Council requirements then this will prevent any significant cumulative impacts on receptors. With appropriate mitigation measures in place, the predicted cumulative impacts associated with the construction phase of the proposed development are deemed short-term.

Construction phase and operational phase traffic impacts are deemed to be imperceptible due to the relatively low level of traffic associated with the proposed development. Consequently there is no scope for cumulative impacts to lead to a significant adverse impact.

10.9 Summary of Residual Impacts

During the construction phase of the proposed development there will be some noise impacts experienced at the nearest receptors to the subject site. It is predicted that the mitigation measures proposed will ensure that noise and vibration impacts are kept to a minimum. The predicted noise and vibration impacts on the receiving environment during the construction phase are considered to be negative, moderate and temporary and will occur over a relatively short time-period. The assessment has concluded that there will be no significant residual impacts.

The potential for noise generation during the operational phase of the proposed development is limited to additional vehicles on the surrounding road network. The change in vehicle numbers predicted is not significant in an overall context. The predicted noise and vibration impacts on the receiving environment during the operational phase are considered to be not significant and long-term. The assessment has concluded that there will be no significant residual impacts.

10.10 Interactions Arising

The main interactions with noise are in relation to human beings. The impact of noise on human beings living in the area of the proposed development has been addressed above for both the construction and operational phase of the proposed development. The impact assessment shows that the noise impacts that will be experienced by human beings in the vicinity of the proposed development are all within the prescribed criteria. This interaction is described as negative for the construction phase and neutral for the

operational phase and is quantified as Not Significant for the construction phase and Not Significant for the operation phase.

10.11 Monitoring

On-site noise monitoring during the actual construction works will be carried out as a key part in the mitigation programme for the proposed works. Monitoring of the noise levels at sensitive receptor locations for comparison with limits and background levels during the construction works will be completed and the measurement results will be passed onto the Site Manager and will be used to assist the scheduling of works to ensure that the noise emissions from the various works are kept within the limits.

In addition the appointed contractor will prepare a Noise and Vibration Management Plan (NVMP) which will deal specifically with on-site activities in a strategic manner to remove or reduce significant noise and vibration impacts associated with the construction works. The NVMP will be a live document and should specify the specific noise and vibration monitoring and reporting that will be carried out ensuring that all potential NSRs are covered in the monitoring programme.

10.12 Human Health

Construction noise is temporary in nature and will be experienced to different degrees by different receptors as construction progresses across the proposed development site. Measures to ensure that acceptable noise levels are not exceeded during the construction works are set out in this chapter. With these mitigation measures in place, effects on human health from noise arising during the construction phase will be imperceptible.

Operational phase noise is predicted to be not significant and there are no operational phase vibration impacts predicted. Therefore no adverse effects on human health as a result of the operational phase of the proposed development are anticipated.

10.13 Accidents or Unplanned Events

There are no accidents or unplanned events as a result of the proposed project that could occur that will have an adverse or significant impact on noise and vibration that have not already been considered in this chapter.

10.14 References

British Standards Institution (1993). BS 7385-2 – Evaluation and Measurement for Vibration in Buildings:

Guide to Damage Levels Arising from Groundborne Vibration.

British Standards Institution (2014a). BS 5228-1:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites, Part 1: Noise.

British Standards Institution (2014b). BS 5228-2:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites, Part 2: Vibration.

Dublin City Council Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition

Environmental Protection Agency (2016). Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).

Environmental Protection Agency (2017). Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

Highways Agency (2011). Design Manual for Roads and Bridges. Volume 11, Section 3, Part 7.

Institute of Acoustics (2002). Guideline for Noise Impacts Assessment.

International Organization for Standardization (1996). ISO 9613-2:1996 – Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.

11. MATERIAL ASSETS: TRAFFIC AND TRANSPORT

11.1 Introduction

This chapter of the EIAR assesses and evaluates the likely impact of a proposed 399-unit Strategic Housing Development at Heuston South Quarter on the operation of the surrounding road network, in respect of both the construction phase and the operational phase, as well as identifying proposed mitigation measures to minimise any identified impacts.

This chapter has been prepared by Gordon Finn, Roads and Traffic Engineer with Cronin & Sutton Consulting Engineers (CS Consulting). Gordon holds BA/BAI and MAI degrees in Civil, Structural, and Environmental Engineering from the University of Dublin, and is a member of the Institute of Engineers of Ireland. His relevant professional experience includes the preparation of Traffic and Transport Assessments, Travel Plans, and Environmental Impact Assessment Report chapters for a broad range of residential, commercial, and institutional developments.

This chapter presents an analysis of the proposed development's traffic impact, which is also presented in the Traffic and Transport Assessment (TTA) report submitted separately in support of this planning application. While the content of this chapter is common to both documents, the TTA provides a more exhaustive range of junction assessment scenarios, as well as examining certain further aspects of the proposed development (e.g. internal layout) that are not pertinent to an EIAR.

11.2 Characteristics of the Proposed Development

A full description of the proposed development is provided in Chapter 3 of this EIAR.

Briefly summarised, the development will comprise the construction of 5 new blocks over existing double basement to provide 399 BTR apartments comprising 46 studios, 250 1 bed apartments and 103 2 bed apartments. The apartments are arranged in 5 blocks (Block A to E) that vary in height from 3 storeys to 18 storeys over (existing) basement levels.

The application site extends to approximately 1.08 ha, resulting in a gross residential density of approximately 369 units per hectare. The proposed development also includes a retail unit of 120 sq. m GFA at ground floor / podium level at the northern end of Block B.

Ancillary car parking to serve the proposed residential development will be provided at basement level. A total of 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces) are proposed to serve the proposed development. Secure bicycle parking and storage is provided at basement level in the form of 300 no. double stacked cycle parking spaces providing capacity for 600 no. stored bicycles for the use of residents of the scheme. An additional 52 no. Sheffield type bicycle stands are provided at podium level to provide 104 no. visitor cycle parking spaces. Provision is also made within the basement car park for 4 no. dedicated motorcycle parking spaces.

Figure 11.2.1 Site Extents and Environs

All car parking will be located at basement level within the development, and vehicular servicing will also be carried out internally at basement level. Vehicular access to the subject site will be via the 2no. existing access junctions of the Heuston South Quarter (HSQ) complex (see Figure 11.2.1), located on Military Road and on St. John's Road West (R148). Existing ramps from both access junctions bring vehicular traffic down from street level to basement level.

During the development's construction phase, it is proposed to temporarily restrict use of the existing northern HSQ access junction (on St. John's Road West) to construction traffic and heavy servicing vehicles. All other vehicular traffic entering or exiting the HSQ complex will be required to use its eastern access junction on Military Road.

11.3 Assessment Methodology

The assessment of the proposed development's potential traffic impact has been carried out in accordance with the following guidance and established best practice:

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, Draft August 2017)
- Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines 2014
- Transport Infrastructure Ireland (TII) Project Appraisal Guidelines 2011

Reference has also been made to:

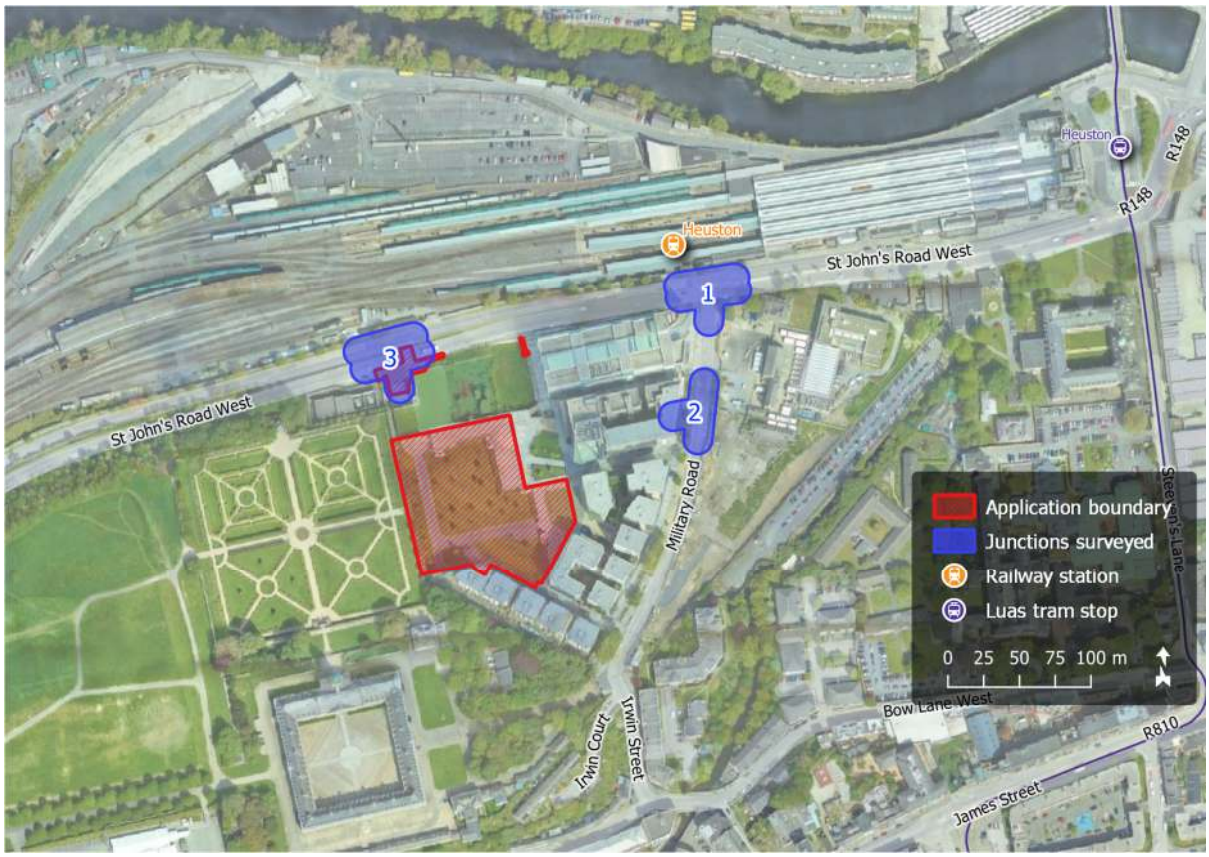
- the Dublin City Development Plan 2016–2022
- the Trip Rate Information Computer System (TRICS) database
- CSO 2016 Census data

11.3.1 Traffic Impact Assessment Methodology

The assessment methodology adopted to assess traffic impacts is summarised as follows:

- Traffic flow data – Morning and evening classified vehicular traffic counts were undertaken on Tuesday the 19th of September 2017 by CS Consulting. These were conducted between 07:00 and 09:30, and between 16:30 and 18:30, at 3no. junctions on the surrounding road network. These traffic flow data were scaled up to 2021 baseline levels using TII growth factors (given in Section 11.5.2). As described in Section 11.5.1, COVID-related disruption to typical travel patterns precluded the use of a contemporary traffic survey.
- Trip generation – A development trip generation assessment has been carried out using data extracted from the Trip Rate Information Computer System (TRICS) database of traffic surveys, to determine the potential vehicular trips to and from the proposed development site during peak hours. The TRICS database is maintained by a consortium of English County Councils but covers the entirety of Great Britain and Ireland. The potential trip generation of associated intended future development on an adjacent site has also been established, as has that of a nearby committed development on Military Road.
- Trip distribution – Based upon existing traffic characteristics and the surrounding road network, an appropriate distribution has been assigned to site development vehicular trips across the road network.
- Existing junction assessment – A spreadsheet model was created which contains the baseline year do-nothing traffic count data described above. The traffic count data were used to develop a computer model (using industry-standard TRANSYT software) of 3no. key junctions on St. John's Road West and on Military Road, including the subject site's 2no. existing vehicular accesses. The performance of these modelled junctions was then assessed for the baseline year 2021.
- Future junction operation assessments – Future year traffic forecasts were derived from TII growth factors and development trip generation figures. These traffic flows were applied to the TRANSYT model. The performance of the modelled junctions was assessed for the development's proposed year of opening (2024), 5 years after opening (2029), and 15 years after opening (2039; the Design Year assessment).

Figure 11.3.1.1 Junctions Surveyed and Assessed



11.3.2 Methodology for Assessing Public Transport and Pedestrian/Cyclist Infrastructure

The methodology adopted to evaluate existing public transport services and pedestrian/cyclist facilities – as well as the development's potential impacts on these – is summarised as follows:

- Existing pedestrian and cyclist facilities – Existing pedestrian footpaths, cycle tracks, and cycle lanes on the street network surrounding the development site have been noted.
- Existing public transport services – Walking times (isochrones) from the development site have been mapped and the existing bus stops, tram stops, and railways stations within these isochrones have been noted. The existing bus, rail, and tram routes serving these stops have been noted.
- Public transport, pedestrian, and bicycle trip generation – Based upon the maximum potential population of the proposed development and the modal split targets recommended for its Residential Travel Plan (in turn derived from CSO census data), the development's maximum potential peak hour generation of public transport users, pedestrians, and cyclists have been estimated.

11.4 Receiving Environment (Baseline Scenario)

11.4.1 Baseline Traffic Scenario

TRANSYT assessment of the 3no. modelled junctions indicates that the junctions shown in Figure 11.3.1.1 currently operate within effective capacity on all approaches during both the AM peak hour and the PM peak hour. Junctions J1 and J3, which are located on the R148 (St. John's Road West) have higher degrees of saturation than junction J2 (the eastern access to the HSQ complex), due to the significant mainline traffic flows along the R148. The baseline scenario TRANSYT modelling results are summarised in Tables 11.4.1.1 to 11.4.1.3. Vehicle queue lengths are given in Passenger Car Units (PCU).

Table 11.4.1.1 2021 Baseline Assessment Results – Junction 1

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**[1]	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S / L	39	71	6	15	4	9	8	19	128	27
	S	30	60	4	12	3	7	5	13	197	51
Military Rd	L	52	77	2	8	2	7	60	57	74	17
	R	71	43	3	4	3	3	78	41	26	110
R148 West	S	83	61	12	11	9	8	12	13	9	48

Table 11.4.1.2 2021 Baseline Assessment Results – Junction 2

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Military Rd South	S / L	2	4	0	0	n/a	n/a	0	0	5132	2167
HSQ Access	L / R	9	11	0	0	n/a	n/a	1	1	893	715
Military Rd North	S	3	2	0	0	n/a	n/a	0	0	3140	3667
	R	6	3	0	0	n/a	n/a	0	0	1421	2691

1 S = straight ahead, L = left turn, R = right turn

Table 11.4.1.3 2021 Baseline Assessment Results – Junction 3

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S	37	71	11	19	9	15	9	11	141	27
	L	1	2	0	0	n/a	n/a	0	0	8785	5667
HSQ Access	L	12	40	1	2	1	2	46	51	648	123
R148 West	S	72	45	13	5	6	3	6	3	25	100
	R	48	14	2	1	2	1	53	44	87	534

The traffic flows employed in these assessments are those surveyed in 2017, conditioned through the removal and reassignment of illegal right-turn manoeuvres at junctions J1 and J3, and scaled up to 2021 levels using standard TII growth factors.

Under these baseline conditions, Junction 1 experiences:

- mean maximum vehicle queues of at most 12 PCU during the AM peak hour and at most 15 PCU during the PM peak hour;
- mean delays per vehicle of at most 78 seconds during the AM peak hour and at most 57 seconds during the PM peak hour.

Under these baseline conditions, Junction 2 experiences:

- no discernible vehicle queueing on average during either the AM peak or the PM peak hour;
- mean delays per vehicle of at most 1 second during both the AM peak hour and the PM peak hour.

Under these baseline conditions, Junction 3 experiences:

- mean maximum vehicle queues of at most 15 PCU during the AM peak hour and at most 20 PCU during the PM peak hour;
- mean delays per vehicle of at most 67 seconds during the AM peak hour and at most 51 seconds during the PM peak hour.

In summary, the 3no. modelled junctions operate efficiently and within their design limits under the baseline traffic scenario.

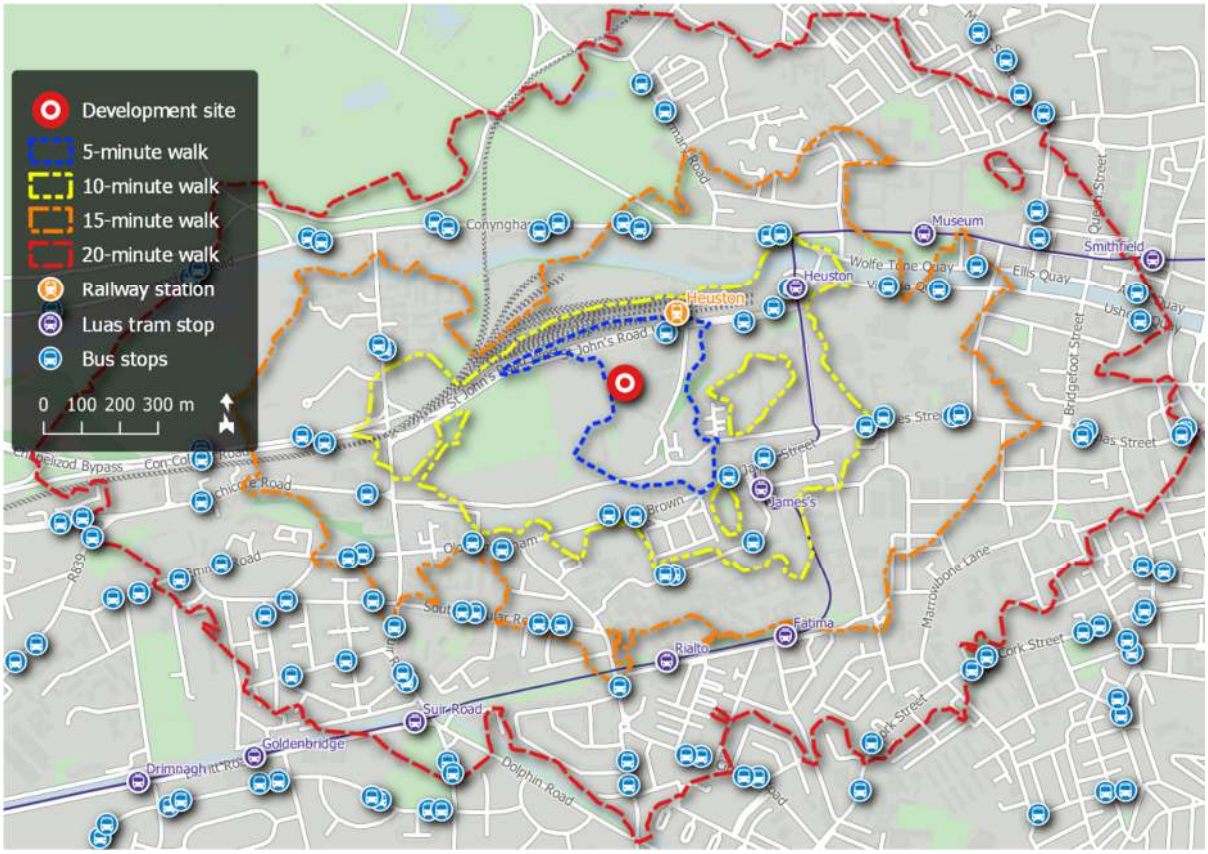
11.4.2 Baseline Transport Scenario

The development site benefits from proximity to good quality public transport services. As shown in Figure 11.4.2.1, the development site is situated within a 5-minute walk of Heuston Station and within a 10-minute walk of the Heuston and James's stops on the Luas Red Line, which is served by frequent trams to and from Dublin city centre, as well as to/from Saggart and Tallaght in the south-west. These walking times have been calculated on the basis of an average walking speed of 5.1km/h.

Bus stop no. 2638, located on St. John's Road West within a 5-minute walk of the site, is served by a total of 3no. Dublin Bus routes (nos. 51d, 79, 79a). Of these, one route (no. 79, between Aston Quay and Spiddal Park/Parkwest) operates at intervals of less than 10 minutes at peak times. A further 39no. bus routes serve stops within a 10-minute walk of the subject site.

Existing pedestrian facilities on the site's surrounding street network are generally of a good standard, including the provision of public lighting. An advisory cycle lane is in place on St. John's Road West on the northern boundary of the development site. No existing cycle facilities are in place on Military Road.

Figure 11.4.2.1 Walking Times and Public Transport Service Points



11.5 Traffic Impact Assessment

11.5.1 Traffic Counts

Full turning movement classified traffic counts were carried out by CS Consulting on Tuesday the 19th of September 2017, at the following 3no. junctions (see Figure 11.5.1.1):

J1. St. John's Road West (R148) / Military Road

(3-arm signal-controlled junction)

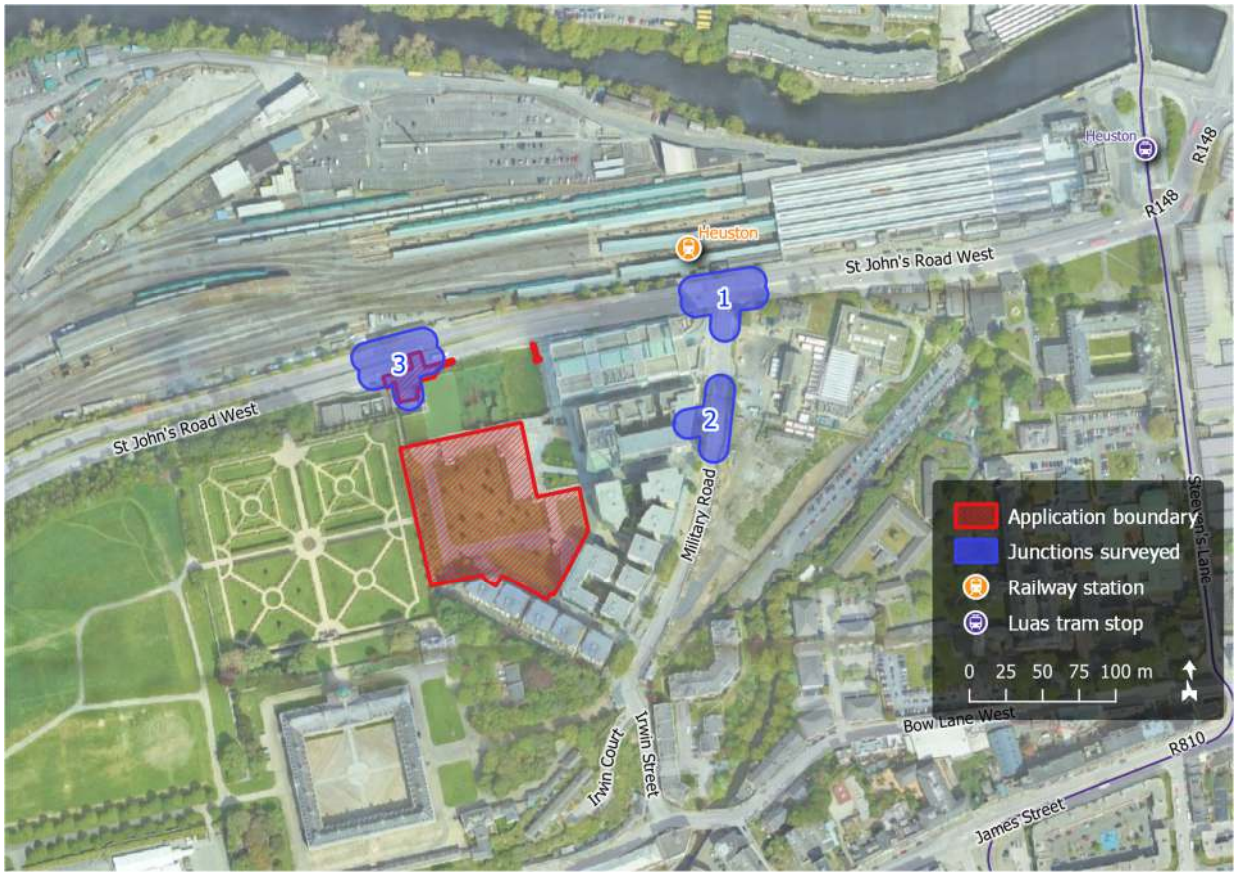
J2. Military Road / Heuston South Quarter (East Access)

(3-arm priority-controlled junction)

J3. St. John's Road West (R148) / Heuston South Quarter (North Access)

(3-arm signal-controlled junction)

Figure 11.5.1.1 Surveyed Road Junctions



These traffic counts were conducted between 07:00 and 09:30 in the morning, and between 16:30 and 18:30 in the evening. The peak hour traffic flows across all three surveyed junctions were found to occur between 07:30 and 08:30 (AM peak period) and between 16:30 and 17:30 (PM peak period).

Recent travel restrictions and varying working patterns resulting from the current COVID-19 public health emergency precluded conducting a contemporary traffic survey, as data obtained through such a survey would not be representative of typical traffic patterns.

The 2017 traffic movements at each of the surveyed junctions during the peak hours have therefore been isolated from the count data and have been scaled up to baseline levels for the year 2021 using standard TII growth factors. These total survey year and baseline year peak hour flows at the survey junctions are given in Tables 11.5.1.1 and 11.5.1.2.

Table 11.5.1.1 Total Peak Hour Traffic Flows at Surveyed Junctions – Survey Year 2017

Time Period	Total Surveyed Junction Traffic Movements (PCU)		
	J1	J2	J3
AM Peak (07:30-08:30)	2018	284	1943
PM Peak (16:30-17:30)	2339	477	2286

Table 11.5.1.2 Total Peak Hour Traffic Flows at Surveyed Junctions – Baseline Year 2021

Time Period	Total Surveyed Junction Traffic Movements (PCU)		
	J1	J2	J3
AM Peak (07:30-08:30)	2152	303	2073
PM Peak (16:30-17:30)	2494	509	2437

11.5.2 Background Traffic Growth

The operational impact of traffic on the road network within the proposed development's area of influence has been assessed for the following years:

- 2021 Baseline year
- 2024 Proposed opening year
- 2029 5 years after opening
- 2039 Design year (15 years after opening)

Unit 5.3 of the TII *Project Appraisal Guidelines* (PE-PAG-02017 *Travel Demand Projections*) has been used to apply growth factors to the existing surveyed background traffic flows for the future year junction assessments. The TII annual growth rates applied are given in Table 11.5.2.1 and the resultant cumulative growth in background traffic for each assessment year is given in Table 11.5.2.2

Table 11.5.2.1 TII Central Growth Rates (Light Vehicles)

Geographic Area	Background Traffic Growth per Year		
	2016-2030	2030-2040	2040-2050
Dublin Metropolitan Area	+ 1.62%	+ 0.51%	+ 0.44%

Table 11.5.2.2 Predicted Background Traffic Growth (cumulative increases over 2017 traffic levels)

2021 Baseline year	2024 Year of opening	2029 Opening year +5	2039 Opening year +15
+ 6.7%	+ 11.9%	+ 21.2%	+ 29.0%

11.5.3 Proposed Development Trip Generation – Operational Phase

Trip generation factors from the TRICS database have been used to predict the trip generation to and from the proposed development in its operational phase, for both the AM and PM peak hour periods. Full details of the TRICS information used in the assessments are in Appendix 11A.

The proposed development comprises 399no. apartments and a retail unit with a gross floor area of

120m^2. Due to its small size and the fact that it is expected to serve exclusively the proposed development (or those already passing through it), the development's retail unit is not considered to have any potential to generate external vehicular trips to and from the development. It has therefore been excluded from the trip generation calculations detailed here.

TRICS trip rates for the proposed development have been selected from the sub-category '03 Residential / C – Flats Privately Owned', restricted insofar as possible to similar edge-of-city-centre locations, and further refined with reference to 2016 CSO census data. The trip rates selected are given in Table 11.5.3.1 and the resultant proposed development trip generation figures obtained are given in Table 11.5.3.2.

Table 11.5.3.1 TRICS Apartment Trip Generation Rates

Time Period	**Arrivals** per hour per unit	**Departures** per hour per unit
AM Peak (07:30-08:30)	0.031	0.089
PM Peak (16:30-17:30)	0.127	0.092

Table 11.5.3.2 Proposed Development Trip Generation from TRICS

Time Period	**Arrivals**	**Departures**	**Total Trips**
AM Peak (07:30-08:30)	12	36	48
PM Peak (16:30-17:30)	51	37	88

11.5.4 Proposed Development Trip Distribution – Operational Phase

It has been assumed that all vehicular traffic to and from the proposed development, once complete, shall be distributed across the surrounding road network in the same manner as the existing traffic arriving to and departing from the existing Heuston South Quarter (HSQ) complex.

The 2017 traffic survey encompassed both existing vehicular access junctions of the Heuston South Quarter (HSQ) complex. From these survey data, it was possible to determine the distribution of existing HSQ traffic between its access junctions on Military Road (to the east) and on St. John's Road (to the north). Across the surrounding wider street network, trips to and from the existing HSQ complex may arrive or depart via the following points:

- from/to the east along St. John's Road (R148);
- from/to the south along Military Road; or
- from/to the west along St. John's Road (R148).

A distribution of existing HSQ traffic across these 3no. origin/destination points was derived from the balance of traffic between the complex's 2no. access junctions, with the following specific assumptions made:

- all traffic departing via the northern access must turn left and head westward on St. John's Road.

- traffic departing via the eastern access is split north/south along Military Road in accordance with the directional splits surveyed at that junction.
- all traffic departing northward along Military Road shall then head eastward on St. John's Road.
- traffic arriving via the northern access is split east/west along St. John's Road in accordance with the directional splits surveyed at that junction.
- traffic arriving via the eastern access is split north/south along Military Road in accordance with the directional splits surveyed at that junction.
- all traffic arriving from the north along Military Road has arrived from the east along St. John's Road.
- no traffic arriving to the northern access from the east (along St. John's Road) has travelled via Military Road.

The resultant distribution of existing HSQ traffic across the surrounding network is given in Tables 11.5.4.1 and 11.5.4.2 and is illustrated in Figures 11.5.4.1 and 11.5.4.2.

Table 11.5.4.1 Network Origin Splits of Existing HSQ Traffic

Time Period	Arrivals From			TOTAL
	R148 St. John's Rd (East)	**Military Road** (South)	**R148 St. John's Rd** (West)	
AM Peak	29%	20%	51%	100%
PM Peak	36%	37%	27%	100%

Table 11.5.4.2 Network Destination Splits of Existing HSQ Traffic

Time Period	Departures To			TOTAL
	R148 St. John's Rd (East)	**Military Road** (South)	**R148 St. John's Rd** (West)	
AM Peak	19%	43%	38%	100%
PM Peak	17%	20%	64%	100%

Figure 11.5.4.1 HSQ vehicular trip origin/destination proportions – AM peak

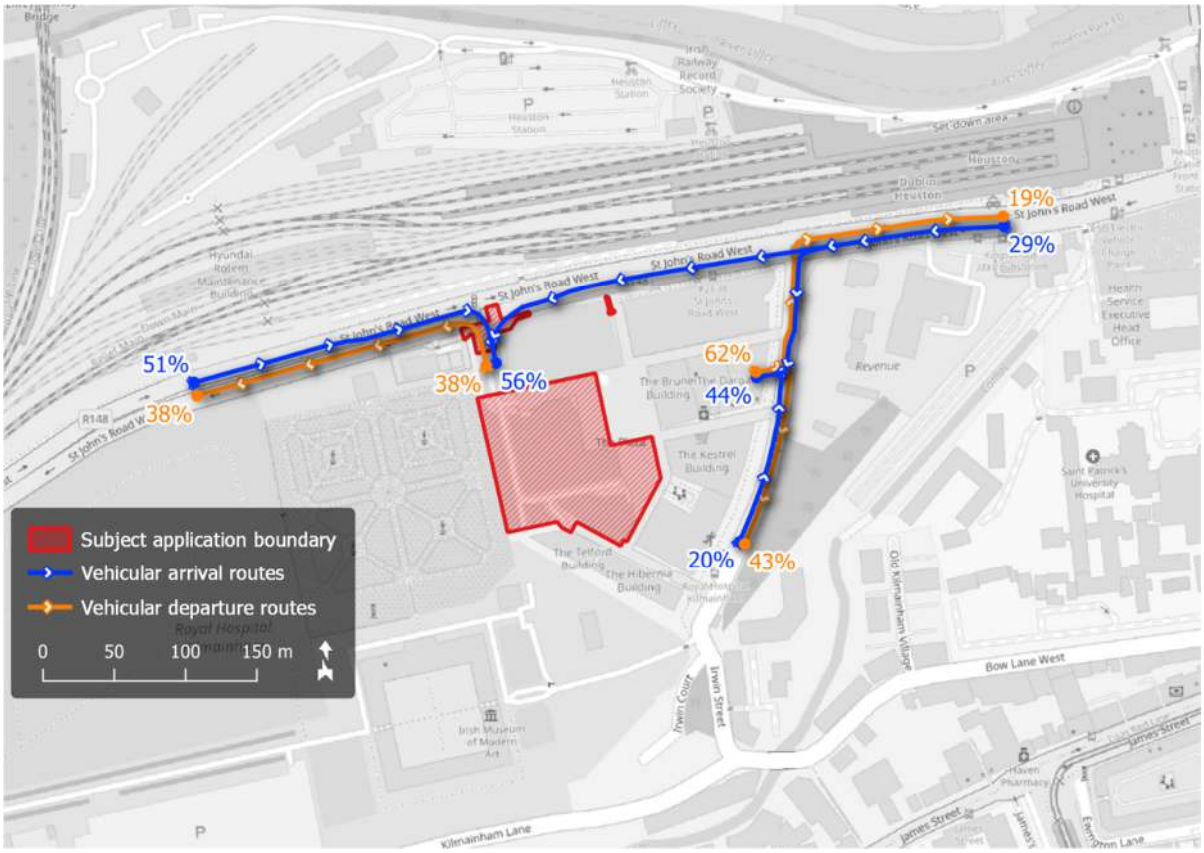
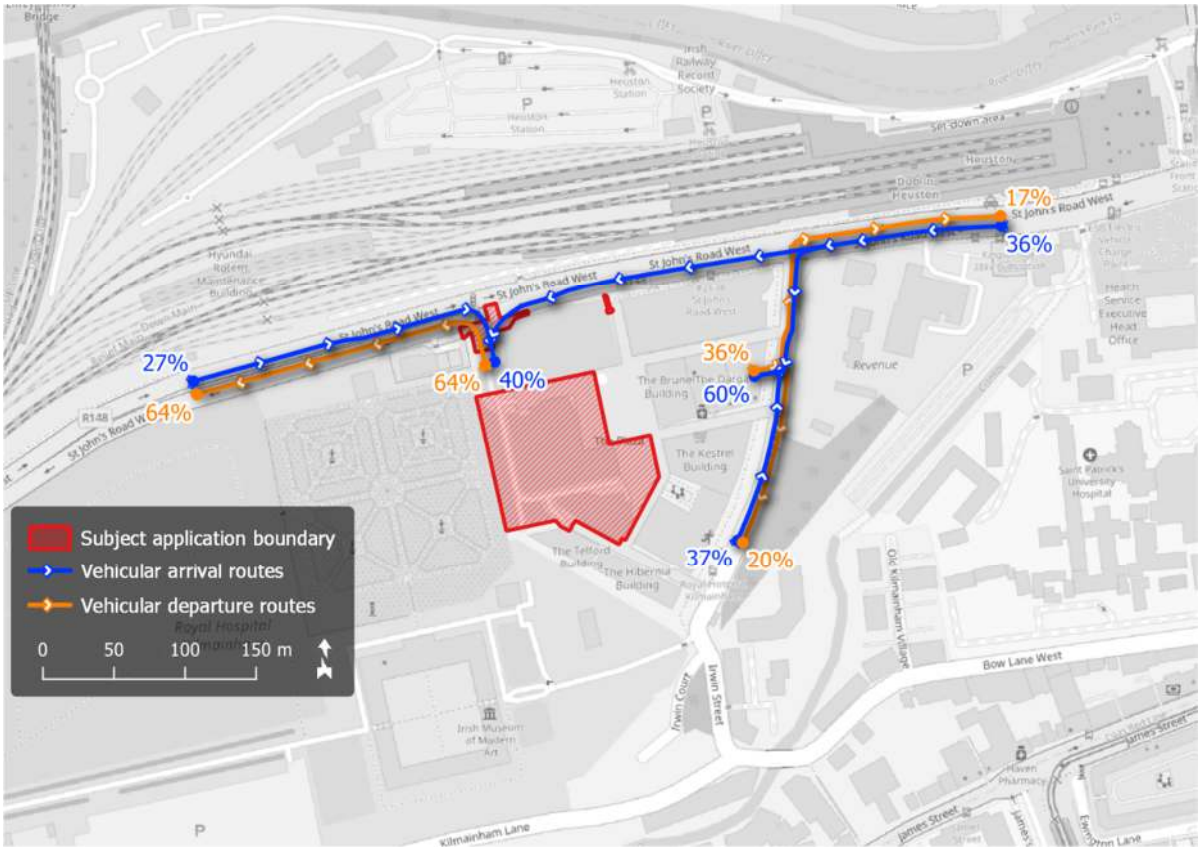


Figure 11.5.4.2 HSQ vehicular trip origin/destination proportions – PM peak



11.5.5 Proposed Development Vehicle Trip Generation – Construction Phase

Heavy Goods Vehicle (HGV) construction traffic to and from the site shall reach a peak during the breaking up and removal of existing hardstanding on the development site. As the subject site has already been partially developed and the ground level reduced, no significant excavation or reprofiling works will be required. Preliminary earthworks, requiring spoil removal or fill importation by HGVs, will therefore be minimal. Similar rates of HGV trip generation may also occur during concrete pouring, though at a later stage in construction. Other construction activities requiring HGV trips to and from the site include material delivery and heavy plant transfer; these will be sporadic in nature and also will not occur at the same time as more HGV-intensive activities. The final programming and scheduling of all construction activities shall be determined by the lead contractor appointed to the project.

As a 'worst-case' scenario, therefore, it is assumed that at most 4no. HGV trips may be made to the site each hour (one HGV arrival and one HGV departure every 15 minutes). This would equate to total traffic movements of 18 PCU in each of the background peak hours.

In addition to HGV traffic, periodic deliveries of materials to site shall be made by Light Goods Vehicles. To the extent possible, these shall be scheduled to take place outside of the background peak traffic hours. Such trips are also unlikely to occur frequently during the stages of construction that require frequent GHV trips; LGV trips are therefore unlikely to occur in significant numbers at the same time as HGV trips take place. For the purposes of estimating a worst-case construction traffic generation scenario, however, 6no. LGV arrivals and 6no. LGV departures (total traffic movements of 12 PCU) are assumed in each of the background peak hours.

Limited car parking for construction personnel is likely to be provided on site during construction works. Some additional vehicular trips shall therefore be made to and from the site each day by construction personnel commuting to and from work. The majority of these trips are expected to fall outside the background traffic peak hours. In the worst-case scenario, it is assumed that 25no. such light vehicle trips may be made to the site during the AM peak hour, and 25no. such trips may be made from the site during the PM peak hour.

The anticipated worst-case scenario vehicular trip generation of the subject site during construction is summarised in Table 11.5.5.1.

Table 11.5.5.1 Maximum Peak Hour Construction Traffic Generation

Time Period	Arrivals	Departures	Total Trips
AM Peak (07:30-08:30)	40	15	55
PM Peak (16:30-17:30)	15	40	55

11.5.6 Proposed Development Vehicle Trip Distribution – Construction Phase

It is proposed to employ the existing northern HSQ access on St. John's Road West (R148) as the sole vehicular access to the subject site during construction. All HGV construction traffic will be required to follow a designated access route to and from the west along the R148, which continues as a dual carriageway as far as the M50 motorway.

Light vehicle construction traffic (cars and vans) exiting the site shall likewise be obliged to turn left onto

the R148 westbound, as this is an existing restriction at this access junction. In the case of light vehicles entering the construction site, however, it is assumed that a proportion will arrive from the east along the R148. This proportion is assumed to be equivalent to the share of existing inbound trips to the HSQ complex currently accommodated by its eastern access on Military Road, as given in Table 11.5.5.2.

Table 11.5.6.1 Access Origin Splits of Existing HSQ Traffic

Time Period	Arrivals Via		TOTAL
	Eastern Access (Military Road)	**Northern Access** (St. John's Road West)	
AM Peak	44%	56%	100%
PM Peak	61%	39%	100%

At the existing junction of the R148 with Military Road, it is assumed that all inbound light vehicle construction traffic passing through this junction will be distributed in accordance with the existing directional splits observed at this location. These are given in Table 11.5.5.3.

Table 11.5.6.2 Surveyed Arrival Splits to R148 West at Junction with Military Road

Time Period	Arrivals From		TOTAL
	R148 St. John's Rd (East)	**Military Road** (South)	
AM Peak	93%	7%	100%
PM Peak	84%	16%	100%

11.5.7 Reallocation of Existing HSQ Vehicular Traffic during Construction

As it is proposed to employ the existing northern HSQ access on St. John's Road West (R148) as a construction access, it shall be necessary to temporarily restrict the use of this junction. With the exceptions of longer or taller vehicles (e.g. articulated trucks), all operational traffic currently using the northern HSQ access would be required to instead travel via the eastern HSQ access on Military Road for the duration of construction activity.

To account for this proposed temporary restriction, the following adjustments to background traffic flows have been made as part of the construction phase assessment:

- All vehicular trips currently made via the northern HSQ access are removed from the local road network.
- These trips are reassigned via the eastern HSQ access, being distributed in accordance with the observed network origin/destination splits of existing traffic travelling via the northern HSQ access (given in Tables 11.5.7.1 and 11.5.7.2).

Table 11.5.7.1 Network Origin Splits of Existing HSQ North Access Traffic

Time Period	Arrivals From			TOTAL
	R148 St. John's Rd (East)	**Military Road** (South)	**R148 St. John's Rd** (West)	
AM Peak	8%	0%	92%	100%
PM Peak	32%	0%	68%	100%

Table 11.5.7.2 Network Destination Splits of Existing HSQ North Access Traffic

Time Period	Departures To			TOTAL
	R148 St. John's Rd (East)	**Military Road** (South)	**R148 St. John's Rd** (West)	
AM Peak	0%	0%	100%	100%
PM Peak	0%	0%	100%	100%

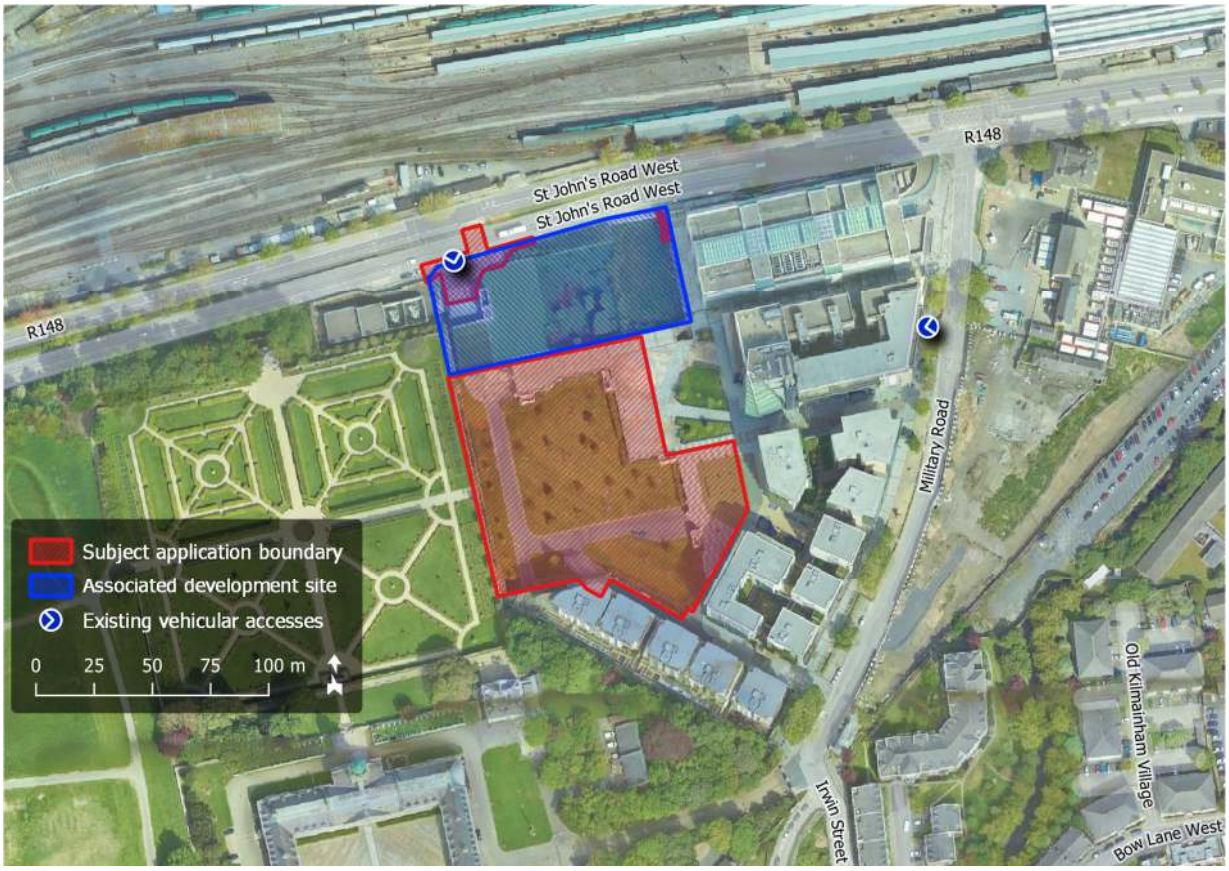
11.5.8 Future Commercial Development: Vehicle Trip Generation and Distribution

The subject site forms the southern part of the applicant's landholding in the existing Heuston South Quarter (HSQ) complex. In the northern part of this landholding, it is intended to apply for permission for a commercial development, provisionally comprising:

- offices with a total Gross Floor Area of approx. 27,000m^3
- a 250-bedroom hotel

For the purposes of the present assessment, it has been assumed that the future development of this associated site in the applicant's ownership shall proceed and shall be completed by the year 2024 (the projected opening year of the proposed development).

Figure 11.5.8.1 Associated Development Site



As for the proposed development, the predicted vehicular trip generation of the associated planned development has been calculated using trip generation factors sourced from the TRICS database. In this case, the TRICS sub-categories '02 Employment / A – Office' and '06 Hotel, Food & Drink / A – Hotels' have been employed. The trip rates selected are given in Table 11.5.8.1 and the resultant trip generation figures obtained are given in Table 11.5.8.2.

Table 11.5.8.1 TRICS Commercial Trip Generation Rates

Time Period	Offices		Hotel	
	Arrivals per hour/100m²	**Departures** per hour/100m²	**Arrivals** per hour/bedroom	**Departures** per hour/bedroom
AM Peak	0.060	0.024	0.055	0.114
PM Peak	0.042	0.083	0.058	0.039

Table 11.5.8.2 Associated Development Trip Generation from TRICS

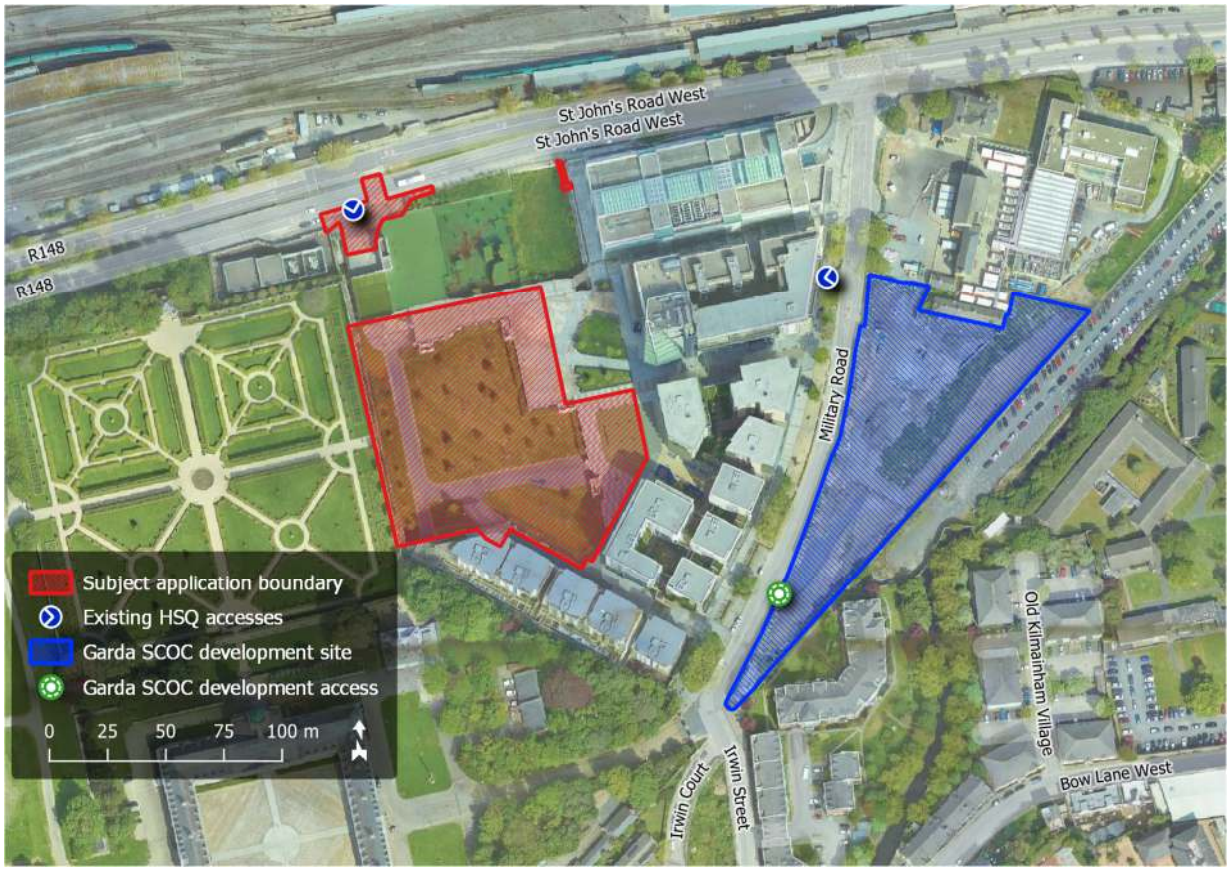
Time Period	Arrivals	Departures	Total Trips
AM Peak (07:30-08:30)	30	35	65
PM Peak (16:30-17:30)	26	32	58

All vehicular trips to and from this associated future commercial development have been distributed

across the surrounding street network in the same manner as the trips to be generated by the proposed development. These additional traffic flows to and from the HSQ complex have been included in all future year junction assessments.

11.5.9 Committed Development: Vehicle Trip Generation and Distribution

Figure 11.5.9.1 Nearby Committed Development Site



The Commissioners for the Public Works in Ireland have granted permission under Part 9 of the Planning and Development Regulations 2001 (as amended) for the construction of a new Garda Security and Crime Operations Centre (Garda SCOC) on a site to the east of Military Road, facing the existing HSQ complex. This development is understood to comprise a new four- to six-storey office building with a total office Gross Floor Area of 10,060m2, over a two-storey basement car park, with vehicular access to/from Military Road (see Figure 11.5.9.1).

For the purposes of the present assessment, it has been assumed that this committed development shall be completed and operational by the year 2024 (the projected opening year of the proposed development). The predicted vehicular trip generation of this development has been calculated using the TRICS trip generation factors for offices given in Table 11.5.8.1; the resultant trip generation figures are given in Table 11.5.9.1.

A full schedule of existing and permitted developments in the vicinity of the subject development site is given in Appendix 1B to this EIAR, for the purposes of determining cumulative impacts of the proposed development in conjunction with other relevant developments. With regard to traffic and transport, the Garda SCOC development is the only permitted development relevant to cumulative impact assessment.

Table 11.5.9.1 Committed Development Trip Generation from TRICS

Time Period	Arrivals	Departures	Total Trips
AM Peak (07:30-08:30)	6	2	8
PM Peak (16:30-17:30)	4	8	12

The committed development's vehicular access junction shall be located on Military Road, approx. 140m south of the existing HSQ eastern access. It is therefore assumed that vehicular traffic to and from this development shall be distributed north/south along Military Road in the same proportions as the existing traffic to and from the eastern HSQ access. These directional splits are given in Tables 11.5.9.2 and 11.5.9.3.

Table 11.5.9.2 Surveyed Arrival Splits to HSQ Eastern Access

Time Period	Arrivals From		TOTAL
	Military Road (North)	**Military Road** (South)	
AM Peak	56%	44%	100%
PM Peak	38%	62%	100%

Table 11.5.9.3 Surveyed Departure Splits from HSQ Eastern Access

Time Period	Departures To		TOTAL
	Military Road (North)	**Military Road** (South)	
AM Peak	26%	74%	100%
PM Peak	44%	56%	100%

At the existing junction of the R148 with Military Road, it is assumed that all Garda SCOC traffic passing through this junction will be distributed in accordance with the existing directional splits observed at this location. These are given in Tables 11.5.9.4 and 11.5.9.5.

Table 11.5.9.4 Surveyed Arrival Splits to Military Road at Junction with R148

Time Period	Arrivals From		TOTAL
	R148 St. John's Rd (East)	**R148 St. John's Rd** (West)	
AM Peak	100%	0%	100%
PM Peak	100%	0%	100%

Table 11.5.9.5 Surveyed Departure Splits from Military Road at Junction with R148

Time Period	Departures To		TOTAL
	R148 St. John's Rd (East)	**R148 St. John's Rd** (West)	
AM Peak	58%	42%	100%
PM Peak	36%	64%	100%

The vehicular traffic flows to and from the committed Garda SCOC development have been included in all future year assessment scenarios.

11.5.10 TRANSYT Modelling

To determine the likely traffic impact of the proposed development, operational assessments of 3no. key junctions have been undertaken using the industry-standard TRL computer program TRANSYT, for both the weekday AM peak hour (07:30-08:30) and the weekday PM peak hour (16:30-17:30). The following junctions have been modelled and assessed (see Figure 11.5.10.1):

J1. St. John's Road West (R148) / Military Road

(3-arm signal-controlled junction)

J2. Military Road / Heuston South Quarter (East Access)

(3-arm priority-controlled junction)

J3. St. John's Road West (R148) / Heuston South Quarter (North Access)

(3-arm signal-controlled junction)

The performances of these junctions have been assessed under the following scenarios relating to the proposed development's operational phase:

- 2021 – existing baseline traffic conditions
- 2024 (planned year of opening) – with & without proposed development
- 2029 – with & without proposed development
- 2039 (design year) – with & without proposed development

The proposed development includes changes to the configuration of the existing HSQ access junction on St. John's Road West, including the removal of the left-turn slip from the east into the HSQ complex. TRANSYT modelling of this junction has been conducted under all 'without development' scenarios using the existing junction configuration; modelling under all 'with development' scenarios has been conducted using the proposed new configuration.

In addition to the operational phase junction performance assessments, a supplementary assessment of junction J2 (the eastern access to the HSQ complex) has been conducted in order to establish the impact of temporarily rerouting all HSQ traffic via this access during construction of the proposed development.

Figure 11.5.10.1 Modelled Road Junctions

Figure 11.5.10.2 TRANSYT Model Structure

Junction performance is assessed based upon the five metrics defined in Table 11.5.10.1. Full TRANSYT

outputs are provided in Appendix 11B.

Table 11.5.10.1 Junction Assessment Criteria

Criterion	Definition
Degree of Saturation	The ratio of current traffic flow to ultimate capacity (also known as RFC) on a link or traffic stream. Account is taken of the green time given to the link per cycle when calculating this value (for signalised junction approaches), as well as blocking effects and oversaturation effects.
Mean Maximum Queue	The highest estimated mean number of Passenger Car Units (PCU) queued in any lane of a junction approach, averaged over the entire analysis period.
Mean End of Red Queue	The mean length of queue in any lane of a signal-controlled junction approach link by the end of the red signal phase for that approach, measured in Passenger Car Units (PCU).
Mean Delay per Vehicle	The average delay incurred by a vehicle on a junction approach as a result of having to wait at a signal or give way at a priority-controlled junction.
Practical Reserve Capacity	The percentage by which the arriving traffic flow on a stream could increase before that junction approach would reach its effective capacity (i.e. 90% saturation).

11.5.11 Traffic Impacts: Construction Phase

Tables 11.5.11.1 to 11.5.11.3 give the TRANSYT modelling results for the 3no. assessed junctions under a worst-case scenario during the development's construction phase in the year 2024. The traffic flows employed in these assessments are those surveyed in 2017, conditioned through the removal and reassignment of illegal right-turn manoeuvres at junctions J1 and J3, scaled up to 2024 levels using standard TII growth factors, and with the addition of:

- operational phase vehicular trips generated by the associated and committed developments described in Sections 11.5.8 and 11.5.9;
- vehicular trips generated by the proposed development during its construction stage (see Sections 11.5.5 and 11.5.6); and
- the temporary reallocation of traffic currently travelling via the HSQ northern access (see Section 11.5.7).

Under this assessment scenario, all junctions are shown to operate within effective capacity on all approaches, in both peak hour periods.

Table 11.5.11.1 2024 Assessment Results – Construction Phase – Junction 1

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S / L	44	83	7	20	5	12	8	29	107	8
	S	32	68	4	14	3	9	5	18	179	33
Military Rd	L	69	86	3	12	3	10	72	61	30	5
	R	70	37	3	4	3	3	72	35	28	145
R148 West	S	88	69	19	18	11	11	16	25	2	30

Table 11.5.11.2 2024 Assessment Results – Construction Phase – Junction 2

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Military Rd South	S / L	2	4	0	0	n/a	n/a	0	0	4563	1988
HSQ Access	L / R	19	31	0	0	n/a	n/a	1	3	371	189
Military Rd North	S	3	3	0	0	n/a	n/a	0	0	2793	3347
	R	21	10	0	0	n/a	n/a	1	1	334	772

Table 11.5.11.3 2024 Assessment Results – Construction Phase – Junction 3

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S	40	78	13	22	10	17	10	12	123	15
	L	2	1	0	0	n/a	n/a	0	0	3834	8967
HSQ Access	L	13	30	1	2	1	2	46	49	570	199
R148 West	S	81	49	18	5	7	3	8	3	12	85
	R	28	12	1	1	1	1	47	43	224	629

During its construction phase, the proposed development is predicted to result in a short-term slight adverse impact on the operation of junctions on the surrounding road network. This impact will be confined to the duration of construction activity on site and will therefore be entirely reversible.

It is noted that construction of the associated planned HSQ commercial development – if permitted – would likely proceed in tandem with that of the proposed development. It is therefore unlikely that this associated development would be completed and operational while the proposed development is still under construction. It is also unlikely, however, that significant additional construction traffic would be generated by the associated development, as construction activities and storage/parking facilities across

the two sites would be coordinated to avoid this.

The inclusion within this construction phase assessment of operational phase traffic generated by the associated development is therefore intended simply to ensure that a robust 'worst-case' scenario is considered.

11.5.12 Traffic Impacts: Operational Phase/Cumulative Impacts

Tables 11.5.12.1 to 11.5.12.3 give the TRANSYT junction modelling results for the design year 2039, with the inclusion of vehicular traffic generated by the proposed development. The traffic flows employed in these assessments are those surveyed in 2017, conditioned through the removal and reassignment of illegal right-turn manoeuvres at junctions J1 and J3, scaled up to 2039 levels using standard TII growth factors, and with the addition of:

- operational phase vehicular trips generated by the proposed development (see Sections 11.5.3 and 11.5.4); and
- operational phase vehicular trips generated by the associated and committed developments described in Sections 11.5.8 and 11.5.9.

Under this assessment scenario:

- Junction J1 (that of Military Road with St. John's Road West) is predicted to reach ultimate capacity during the AM peak hour on approach from the west along St. John's Road West (R148) and to exceed effective capacity during the AM peak hour on the right-turning approach from Military Road.
- Junction J2 (the existing eastern access to the HSQ complex) shall continue to operate well within effective capacity on all approaches, in both peak hour periods.
- Junction J3 (the existing northern access to the HSQ complex) is predicted to slightly exceed effective capacity during the AM peak hour on approach from the west along St. John's Road West (R148) but shall remain within ultimate capacity on all approaches in both peak hour periods.

Table 11.5.12.1 2039 Do Something Assessment Results – Operational Phase – Junction 1

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S / L	49	90	8	26	5	15	9	33	84	0
	S	37	74	5	17	4	10	5	18	145	22
Military Rd	L	62	89	3	11	3	10	67	76	45	1
	R	98	53	8	5	8	4	175	42	-8	71
R148 West	S	100	75	55	20	28	12	58	23	-10	21

Table 11.5.12.2 2039 Do Something Assessment Results – Operational Phase – Junction 2

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Military Rd South	S / L	2	5	0	0	n/a	n/a	0	0	4047	1661
HSQ Access	L / R	21	20	0	0	n/a	n/a	2	2	336	359
Military Rd North	S	4	3	0	0	n/a	n/a	0	0	2431	2900
	R	9	7	0	0	n/a	n/a	0	0	915	1135

Table 11.5.12.3 2039 Do Something Assessment Results – Operational Phase – Junction 3

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S/L	47	81	6	10	5	9	10	12	92	11
	S	43	75	6	9	5	7	8	9	109	20
HSQ Access	L	13	69	1	5	1	5	40	64	570	30
R148 West	S	87	54	24	7	8	4	12	3	3	66
	R	53	45	3	1	3	1	51	59	69	98

In the design year 2039, with the proposed development in place, Junction 1 is predicted to experience:

- mean maximum vehicle queues of up to 55 PCU during the AM peak hour and up to 26 PCU during the PM peak hour;
- mean delays per vehicle of up to 175 seconds during the AM peak hour and up to 76 seconds during the PM peak hour.

In the design year 2039, with the proposed development in place, Junction 2 is predicted to experience:

- no discernible vehicle queueing on average during either the AM peak or the PM peak hour;
- mean delays per vehicle of at most 2 seconds during both the AM peak hour and the PM peak hour.

In the design year 2039, with the proposed development in place, Junction 3 is predicted to experience:

- mean maximum vehicle queues of up to 24 PCU during the AM peak hour and up to 10 PCU during the PM peak hour;
- mean delays per vehicle of up to 51 seconds during the AM peak hour and up to 64 seconds during the PM peak hour.

The impact of the proposed development on the operation of the three assessed road junctions in the design year 2039 may be represented quantitatively by the differences in TRANSYT modelling results between the Do Nothing and Do Something assessment scenarios for that year. These comparisons are

given in Tables 11.5.12.4 to 11.5.12.6.

Table 11.5.12.4 2039 Proposed Development Influence – Operational Phase – Junction 1

Junction Approach Arm and Traffic Stream		Change in Degree of Saturation (%)		Change in Mean Maximum Queue (PCU)		Change in Mean End of Red Queue (PCU)		Change in Mean Delay per Vehicle (seconds)		Change in Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S / L	+1	+2	0	+1	0	+1	+1	+2	-4	-2
	S	+1	0	0	0	0	0	0	0	-4	0
Military Rd	L	-10	0	0	0	0	0	-18	0	+20	0
	R	-9	+2	-2	0	-3	0	-95	+1	+8	-6
R148 West	S	+1	0	+6	0	+5	0	+12	0	-1	0

Table 11.5.12.5 2039 Proposed Development Influence – Operational Phase – Junction 2

Junction Approach Arm and Traffic Stream		Change in Degree of Saturation (%)		Change in Mean Maximum Queue (PCU)		Change in Mean End of Red Queue (PCU)		Change in Mean Delay per Vehicle (seconds)		Change in Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Military Rd South	S / L	0	0	0	0	n/a	n/a	0	0	-39	-68
HSQ Access	L / R	+5	+4	0	0	n/a	n/a	0	0	-140	-89
Military Rd North	S	0	0	0	0	n/a	n/a	0	0	0	0
	R	+1	+2	0	0	n/a	n/a	0	0	-58	-525

Table 11.5.12.6 2039 Proposed Development Influence – Operational Phase – Junction 3

Junction Approach Arm and Traffic Stream		Change in Degree of Saturation (%)		Change in Mean Maximum Queue (PCU)		Change in Mean End of Red Queue (PCU)		Change in Mean Delay per Vehicle (seconds)		Change in Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S	+2	-5	-8	-14	-5	-11	0	-2	-7	+6
	L	42	+73	+6	+9	n/a	n/a	+8	+9	-5940	-3826
HSQ Access	L	-7	+11	0	+1	0	+1	-7	+7	+228	-24
R148 West	S	0	0	0	0	0	0	0	0	0	0
	R	-14	+23	0	+1	0	+1	-15	+14	+35	-219

At Junction 1 in the design year 2039, the inclusion of traffic generated by the proposed development is predicted to result in:

- increases in mean maximum vehicle queues of at most 6 PCU during the AM peak hour and at most 1 PCU during the PM peak hour;
- increases in mean delays per vehicle of at most 12 seconds during the AM peak hour and at most 2 seconds during the PM peak hour.

At Junction 2 in the design year 2039, the inclusion of traffic generated by the proposed development is predicted to result in no discernible increase in either average vehicle queue length or mean delay per vehicle, in either the AM peak hour or the PM peak hour.

At Junction 3 in the design year 2039, the inclusion of traffic generated by the proposed development is predicted to result in:

- increases in mean maximum vehicle queues of at most 6 PCU during the AM peak hour and at most 9 PCU during the PM peak hour;
- increases in mean delays per vehicle of at most 8 seconds during the AM peak hour and at most 14 seconds during the PM peak hour.

It may be observed that the inclusion of traffic generated by the proposed development shall result in decreased vehicle queue lengths and delays on certain junction approaches, due primarily to the redistribution of traffic signal green time between approaches.

During its operational phase, the proposed development is therefore predicted to result overall in a long-term slight adverse impact on the operation of junctions on the surrounding road network. This impact should be considered reversible to a degree, as any future measures that reduce local vehicular traffic volumes (e.g. improvements in public transport or cycling infrastructure, junction redesign, or changes in general traffic flow restrictions) have the potential to improve local traffic flows generally, as well as to reduce vehicle trips to/from the proposed development.

11.6 Potential Significant Impacts

11.6.1 Construction Phase Impacts

The proposed development will generate vehicular trips to and from site during the construction phase, as detailed in Sections 11.5.5 and 11.5.6. Temporary access restrictions will also be required during construction, resulting in the diversion of some light vehicle traffic that currently uses the northern access junction of the HSQ complex. The most significant potential impact shall be upon the operation of the existing eastern HSQ access junction on Military Road, through which it is proposed to divert all non-construction-related light vehicle traffic for the duration of construction works (see Section 11.5.7).

A supplementary assessment of junction performance under these conditions has therefore been conducted, as described in Section 11.5.11, and found that all junctions will operate within effective capacity on all approaches, in both peak hour periods. In this way, impacts arising from this aspect of the construction phase will be adverse in nature, short-term in duration, and slight in significance. These effects will be confined to the duration of construction activity on site and will therefore be entirely reversible.

It is also recognised that there is potential during the construction phase for construction-related activity to impact upon the surrounding road network in ways beyond the operational performance of the junctions assessed. These further impacts would potentially take the form of surrounding roads being temporarily obstructed by stopped/parked construction vehicles or by delivery/loading operations, or their condition being temporarily degraded by the presence of dirt/debris originating from the construction site. In the absence of mitigation measures, these impacts will be adverse in nature, short-term in duration, and significant.

The construction phase mitigation measures detailed in Section 11.7 are intended to prevent and minimise these impacts, and these measures will be strictly adhered to.

Given the high capacity of nearby public transport services and the fact that most construction personnel will travel outside of background peak hours, the adverse effects of construction personnel using public transport for travel to and from the site will be imperceptible and short-term.

11.6.2 Operational Phase Impacts

In its operational phase, the proposed development shall generate regular vehicular trips on the surrounding road network, increasing traffic flows at nearby existing junctions. Should the resultant total traffic flows at these junctions become too high (particularly at peak times), the junctions may become oversaturated and cease to function efficiently. The purpose of the present assessment is therefore to quantify the trip generation of the proposed development, establish the distribution of these trips and the resultant total traffic flows at nearby junctions, and to assess the operational performance of these junctions with the proposed development in place.

This assessment found that the addition of vehicular traffic generated by the proposed development will increase vehicle queue lengths at any junction by a maximum of 6 PCU, and increase mean vehicle delay by a maximum of 12 seconds at any junction (in comparison with the Do Nothing scenario for the design year 2039). In this way, impacts arising from this aspect of the operational phase will be adverse in nature, long-term in duration, and slight in significance. These effects should be considered reversible to a degree, as any future measures that reduce local vehicular traffic volumes (e.g. improvements in public transport or cycling infrastructure, junction redesign, or changes in general traffic flow restrictions) have the potential to improve local traffic flows generally, as well as to reduce vehicle trips to/from the proposed development.

In its operational phase, the development also has the potential to affect the operation of adjacent public transport services, pedestrian and cyclist facilities. Table 11.6.2.1 shows both the assumed starting modal splits for the proposed development and the suggested initial target modal splits, as given in the accompanying Residential Travel Plan (submitted under separate cover). These have been informed primarily by CSO census data from the year 2016, as well as by the proposed car parking provision within the proposed development.

Table 11.6.2.1 Initial Target Modal Splits for Development Occupants

Transport Mode	Assumed Starting Proportion of Trips	Suggested Initial RTP Targets
Driving a Car	10%	7%
Passenger in a Car	3%	1%
Bicycle	14%	16%
Motorcycle	1%	1%
Bus	19%	20%
Train or Tram	32%	33%
Walking	21%	22%

The proposed development comprises 296no. 1-bedroom apartments and 103no. 2-bedroom apartments. Based on a maximum possible occupancy of 2no. residents per bedroom, the maximum possible population of the development is 1,004no. residents (of which at most 798no. residents are assumed to be adults). Applying the initial modal split targets given in Table 11.6.2.1, the development may therefore be expected to generate the following maximum possible numbers of public transport users, pedestrians, and cyclists during each weekday peak hour:

- 331no. Luas/train passengers
- 201no. bus passengers
- 221no. pedestrians
- 161no. cyclists

As is the case in respect of vehicular trip generation (see Section 11.5.3), the development's small retail unit is not considered likely to generate any additional public transport, pedestrian, or bicycle trips to and from the development.

Table 11.6.2.2 Maximum Peak Hour Non-Motorised Trip Generation

Transport Mode	Number of Users
Bicycle	161
Bus	201
Train or Tram	331
Walking	221

Given the high capacity of public transport services within easy reach of the subject site (including the Luas Red Line, mainline rail services, and numerous bus services), the proposed development is likely to have a long-term imperceptible adverse effect on the operation of these services. The proposed development is also likely to have a long-term imperceptible adverse effect upon the operation of adjacent pedestrian and cyclist facilities.

11.6.3 Cumulative Impacts

The cumulative impact of the proposed development in conjunction with both the adjacent commercial scheme planned development and the nearby committed Garda SCOC development has been considered in all future year junction assessments. The cumulative impacts on traffic as a result of the proposed development and nearby planned/committed schemes are therefore equivalent to the operational phase impacts previously described in Section 11.6.2. These effects will be adverse in nature, long-term in duration, and slight in significance

Cumulative impacts have not been considered in respect of transport modes other than motor vehicle traffic, as data on the expected occupancy and modal splits of the nearby committed Garda SCOC development are not available.

11.7 Mitigation Measures

11.7.1 Construction Phase

The lead contractor appointed for the construction of the development will be required to prepare a site-specific Construction Management Plan (CMP), including a plan for the scheduling and management of construction traffic, which will outline measures to be taken to mitigate the effects of construction traffic on the surrounding road network. A Designated Community Liaison Officer (DCLO) will be nominated for the proposed development, who will work with DCLOs on other active sites to coordinate construction activities. The DCLO will also act as a point of contact for local residents, Dublin City Council, and An Garda Síochána.

The final site-specific CMP will be based upon the outline CMP prepared by CS Consulting provided in Appendix 6A. This includes (inter alia) the following measures for minimising construction traffic and mitigating its effects:

- routing all heavy construction traffic to/from the west along the R148, via the existing northern HSQ access junction, avoiding the junction of Military Road with the R148;
- conducting all loading and unloading operations within the site, away from the public road;
- scheduling deliveries outside of peak hour periods to avoid disturbance to surrounding pedestrian and vehicular traffic;
- staggering HGV movements to/from site to avoid site queues;
- preventing haulage vehicles travelling in convoys of more than two vehicles at any time and spacing haulage vehicles by a minimum of 250m at all times;
- installation of a wheel wash at exit from the site to prevent any dirt being carried out into the public road; and
- deployment of a road sweeper as necessary to keep the public roads around the site clean.

Construction personnel will be encouraged to make use of the available high-quality public transport links to the area and/or to commute by bicycle, to minimise private car trips to and from the site. To avoid

problems of parking overspill on surrounding streets, however, limited essential staff parking shall be provided within the site. In parallel with this, parking restrictions and management measures on surrounding streets will be reviewed and implemented as necessary in agreement with local residents and Dublin City Council.

The impact of construction personnel using public transport for travel to and from the site will be minimal, given the high capacity of nearby public transport services and the fact that most construction personnel will travel outside of background peak hours. Nonetheless, as an additional mitigation measure, the lead contractor appointed to the project will be required to make provisions for the alternative group transport of construction personnel by:

- providing a charter bus service to/from suitable collection areas; and
- facilitating car sharing among construction personnel.

The above measures will be subject to public health guidance applicable at the time of construction.

Table 11.7.1.1 Table of Mitigation Measures – Construction Phase

Character of potential impact	Mitigation measures
Reduction of adjacent road junctions' operational performance due to vehicular trips to/from proposed development	Deliveries and material removal trips will be scheduled outside of peak hour periods
	HGV movements to and from the site will be staggered
	Haulage vehicles will be prevented from travelling in convoys of more than two vehicles at any time
	Haulage vehicles will be spaced by a minimum of 250m at all times
Obstruction of adjacent roadways by parked or queuing construction vehicles	All loading and unloading operations will be conducted within the site
	Limited essential parking for construction personnel and visitors will be provided within the site
	Construction personnel will be supported in making use of public transport and/or in cycling, when commuting to site
	Parking restrictions and parking management measures will be implemented on surrounding streets
Fouling of adjacent roadways by construction-related dirt/debris	All loading and unloading operations will be conducted within the site
	A vehicle wheel wash will be installed at the exit from the site
	A road sweeper will be deployed as necessary to keep surrounding streets clean
CMP	All mitigation measures in the Construction Management Plan will be implemented

11.7.2 Operational Phase

The development shall incorporate several design and management elements intended to mitigate the impact of the development on the surrounding road network during its operational phase. These include:

- a reduced car parking provision, which shall discourage higher vehicle ownership rates and excessive vehicular trips to the development (by residents and visitors);
- a high provision of secure bicycle parking, which shall serve to encourage bicycle journeys by both development occupants and visitors; and
- an internal car-share club providing 8no. shared cars for the sole use of the development's residents, which shall support a reduced level of car ownership and help to discourage unnecessary car journeys.

As described in the Residential Travel Plan (RTP) framework document prepared in support of this planning application and attached as Appendix 11C, a Residential Travel Plan Coordinator shall be appointed for the proposed development, with the remit to implement and oversee an ongoing RTP. This shall assist development occupants and visitors in making the most of sustainable transport opportunities and in avoiding single-occupant car journeys to and from the development site where possible.

Development occupants' use of sustainable travel modes (public transport, walking, and cycling) constitutes the primary means by which the development will avoid the excessive generation of motor vehicle trips. As described in Section 11.6.2, use of these travel modes will however have imperceptible effects on the operation of nearby public transport services and adjacent pedestrian and cyclist facilities. No mitigation measures are therefore required in this respect.

Table 11.7.2.1 Table of Mitigation Measures – Operational Phase

Character of potential impact	Mitigation measures
Reduction of adjacent road junctions' operational performance due to vehicular trips to/from proposed development	The development design includes a limited internal car parking provision
	The development design includes a high provision of internal bicycle parking
	A residential car-share club will be established for the exclusive use of residents
	A Residential Travel Plan will be implemented
Residential Travel Plan	A Residential Travel Plan Coordinator will be appointed to implement the Residential Travel Plan

11.8 Residual Impacts

11.8.1 Construction Phase

With full implementation of the above mitigation measures, the residual traffic-related impact of the proposed development during its construction phase will be limited to the effects of construction traffic on the operation of nearby road junctions. As previously noted, such adverse effects shall be short-term

and slight in nature, and will be confined to the duration of construction activity on site.

Given the high capacity of nearby public transport services and the fact that most construction personnel will travel outside of background peak hours, the adverse effects of construction personnel using public transport for travel to and from the site will be imperceptible and short-term.

11.8.2 Operational Phase

With full implementation of the above mitigation measures, the residual traffic-related impact of the proposed development during its operational phase will be those identified in Section 11.5.12 (Operational Phase/Cumulative Impacts). In this way, residual effects are considered to be adverse in nature, long-term in duration, but slight in significance.

As noted in Section 11.6.2, the proposed development is likely also to have a long-term imperceptible residual adverse effect on the operation of nearby public transport services and upon the operation of adjacent pedestrian and cyclist facilities.

11.9 Do Nothing Scenario

11.9.1 Traffic: Do Nothing Scenario

Tables 11.9.1.1 to 11.9.1.3 give the TRANSYT junction modelling results for the design year 2039, without the inclusion of vehicular traffic generated by the proposed development. The traffic flows employed in these assessments are those surveyed in 2017, conditioned through the removal and reassignment of illegal right-turn manoeuvres at junctions J1 and J3, scaled up to 2039 levels using standard TII growth factors, and with the addition of vehicular traffic to be generated by both the planned associated development adjacent to the subject site and the nearby committed Garda SCOC development on Military Road.

Under this assessment scenario:

- Junction J1 (that of Military Road with St. John's Road West) is predicted to exceed ultimate capacity during the AM peak hour on the right-turning approach from Military Road, and to exceed effective capacity during the AM peak hour on approach from the west along St. John's Road West (R148).
- Junction J2 (the existing eastern access to the HSQ complex) shall continue to operate well within effective capacity on all approaches, in both peak hour periods.
- Junction J3 (the existing northern access to the HSQ complex) is predicted to reach effective capacity during the AM peak hour on approach from the west along St. John's Road West (R148) but shall remain within ultimate capacity on all approaches in both peak hour periods.

Table 11.9.1.1 2039 Do Nothing Assessment Results – Junction 1

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S / L	48	88	8	25	5	14	8	31	88	2
	S	36	74	5	17	3	10	5	18	149	22
Military Rd	L	72	89	3	11	3	10	85	76	25	1
	R	107	51	10	5	10	4	270	42	-16	77
R148 West	S	99	75	50	20	23	12	46	23	-9	21

Table 11.9.1.2 2039 Do Nothing Assessment Results – Junction 2

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Military Rd South	S / L	2	5	0	0	n/a	n/a	0	0	4086	1729
HSQ Access	L / R	16	16	0	0	n/a	n/a	1	1	476	448
Military Rd North	S	4	3	0	0	n/a	n/a	0	0	2431	2900
	R	8	5	0	0	n/a	n/a	0	0	973	1660

Table 11.9.1.3 2039 Do Nothing Assessment Results – Junction 3

Junction Approach Arm and Traffic Stream		Degree of Saturation (%)		Mean Maximum Queue (PCU)		Mean End of Red Queue (PCU)		Mean Delay per Vehicle (seconds)		Practical Reserve Capacity (%)	
Arm	**Stream**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
R148 East	S	45	86	14	24	11	20	10	15	99	5
	L	1	2	0	0	n/a	n/a	0	0	6049	3846
HSQ Access	L	20	58	1	4	1	4	47	57	342	54
R148 West	S	87	54	24	7	8	4	12	3	3	66
	R	67	22	4	1	3	1	66	45	34	317

In the design year 2039, without the inclusion of traffic generated by the proposed development, Junction 1 is predicted to experience:

- mean maximum vehicle queues of up to 50 PCU during the AM peak hour and up to 25 PCU during the PM peak hour;
- mean delays per vehicle of up to 270 seconds during the AM peak hour and up to 76 seconds during the PM peak hour.

In the design year 2039, without the inclusion of traffic generated by the proposed development, Junction 2 is predicted to experience:

- no discernible vehicle queueing on average during either the AM peak or the PM peak hour;
- mean delays per vehicle of at most 1 second during both the AM peak hour and the PM peak hour.

In the design year 2039, without the inclusion of traffic generated by the proposed development, Junction 3 is predicted to experience:

- mean maximum vehicle queues of up to 24 PCU during the AM peak hour and up to 24 PCU during the PM peak hour;
- mean delays per vehicle of up to 66 seconds during the AM peak hour and up to 57 seconds during the PM peak hour.

In summary, without improvement works to the existing junction of Military Road with St. John's Road West (R148) and without measures to reduce background traffic growth in the intervening period, this junction is predicted to cease functioning effectively before the design year of 2039. Both existing HSQ access junctions will continue to operate effectively but the northern access junction will approach the limit of its design capacity.

11.9.2 Transport: Do Nothing Scenario

Under a Do Nothing scenario, whereby the proposed development is not constructed, the operation of nearby public transport services and adjacent pedestrian/cyclist facilities will nevertheless be affected by prevailing trends in travel habits, changes in service provision and transport infrastructure, and the influence of other nearby developments. It is however not possible to quantify these effects over the medium or long term.

11.10 Interactions Arising

The vehicular traffic flows that shall be generated by the proposed development may contribute to changes in air quality and noise levels in the vicinity of the surrounding road network. The natures, extents, and consequences of these changes are examined in Chapters 9 and 10 of this EIAR.

11.11 Major Accidents

With respect to traffic and transport matters, the proposed development does not have the potential to result in any major accident or disaster within the meaning of the EIAR Guidelines. Given its proximity to the Camac and Liffey rivers, the development site has the potential to be affected by catastrophic fluvial flooding events, which could potentially obstruct access to the development. However, as described in Chapter 7, the development site is located in the lowest-risk zone for fluvial flooding, deemed likely to be affected by flood events occurring less frequently than once every 1,000 years.

11.12 Monitoring

11.12.1 Construction Phase Monitoring

The lead contractor appointed for the construction of the development will be required to prepare a site-specific Construction Management Plan (CMP) that shall include a plan for the scheduling and management of construction traffic. This CMP shall outline measures for monitoring the impact of construction traffic on the operation and condition of the surrounding street network, including remedial actions to be taken in the event of construction traffic causing damage to road infrastructure.

The lead contractor will also be required to monitor the travel habits of construction personnel and to tailor supports for public and shared transport use accordingly. Surrounding streets will be monitored to ensure that no nuisance parking associated with construction activity takes place.

11.12.2 Operational Phase Monitoring

Post-development monitoring of the surrounding street network's performance is not required or proposed in this case.

Within the scope of the Residential Travel Plan (RTP) to be implemented for the development, however, the Residential Travel Plan Coordinator shall be responsible for monitoring the travel habits of development occupants and visitors. An RTP is a dynamic process whereby a package of measures and campaigns is identified, piloted, and then monitored on an ongoing basis. The RTP will identify specific targets against which the effectiveness of the plan can be assessed at each review; these will typically take the form of target modal splits for journeys to and from a site. The Residential Travel Plan Coordinator shall gather data on travel patterns, for instance by conducting periodic travel surveys of development occupants.

11.13 References

- Environmental Protection Agency (EPA): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2017)
- Transport Infrastructure Ireland (TII): Traffic and Transport Assessment Guidelines (2014)
- Transport Infrastructure Ireland (TII): Project Appraisal Guidelines (2011)
- Dublin City Council (DCC): Dublin City Development Plan 2016–2022 (2016)
- TRICS Consortium: Trip Rate Information Computer System (TRICS) database
- Central Statistics Office (CSO): 2016 Census data

12. MATERIAL ASSETS – WATER SUPPLY, DRAINAGE AND UTILITIES

12.1 Introduction

This section of the EIAR has been prepared by Cronin and Sutton Consulting and describes the existing material assets for the foul drainage & potable water aspects on the proposed development site, (surface water has been assessed in Chapter 8). An assessment is made of the likely impact arising during the demolition, construction and operational phases of the development on these elements.

This chapter was prepared by Robert Fitzmaurice of CS Consulting. Robert is a Chartered Engineering with Engineers Ireland and has been practicing as a consulting engineer for over twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering, an advanced Diploma in Planning and Environmental Law and has a master's degree in Industrial Engineering.

This section of the EIAR includes descriptions of the existing Electrical, Gas and Telecoms Utilities aspects on the proposed development site which have been prepared by IN2 Engineering. An assessment is made of the likely impact arising during the demolition, construction, and operational phases of the development on these elements.

The Electrical, Gas and Telecoms sections of this chapter were prepared by James Redmond of IN2 Engineering. James is a Chartered Engineering with Engineers Ireland, holds an honours degree in Mechanical Engineering and has been practicing as a consulting engineer for over twenty years.

12.2 Assessment Methodology & Legislative Background

This chapter has been set out with reference to the specific criteria set out in the Environmental Protection Agency guidelines:

- Dublin City Councils Development Plan 2016 – 2022,
- EPA (2017), Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR);
- Conservation and Amenity Advice service (CAAS) (2002), Guidelines on the Information to be contained in Environmental Impact statements.
- CAAS (2003), Advice Notes on Current Practice in the Preparation of Environmental Impact statements.
- Good Practice Guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, C532, 2001).
- The Greater Dublin Strategic Drainage Study, (GDSDS), 2005.
- Method outlined in Irish Water's Pre-Connection Enquiry Application,

- Method outlined in Irish Water's Code of Practice for Wastewater Infrastructure,
- Method outlined in Irish Water's Code of Practice for Water Infrastructure,
- Regional Code of Practice For Drainage Works - Version 6.

12.2.1 Legislative Background

The following legislation was referred to in compiling this chapter:

Water Framework Directive 2000/60/EC

The EU Water Framework Directive (WFD) 2000/60/EC came into force on 22nd December 2000, and enacted into Irish legislation through S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003. This legislation and regulation is a significant piece of legislation for water policy, as it provides a co-ordinated approach across Europe for all water policies, establishing a management structure for future water policy. A few key objectives of the Directive are to:

- Protect all waters, including rivers, lakes, groundwater, transitional and coastal waters.
- Achieve "good status" in all waters by 2015 or at the latest 2027, and maintaining "high status" where the status already exists.
- Have water management based on River Basin Districts (RBD).

The strategies and objectives of the Water Framework Directive in Ireland have been influenced by a range of National and European Union legislation and regulation including:

- Local Government (Water Pollution) Acts 1977 – 1990.

In turn the implementation of the Water Framework Directive and its associated policies has necessitated the introduction of new regulations in Ireland including, the European Communities Environmental Objectives (Surface Waters) Regulations 2009, which are discussed further in the following section.

European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No.272 of 2009)

These regulations have been devised as a more complete and stringent set of surface water quality regulations which covers the requirements of the Water Framework Directive and the Dangerous Substances Directive. These regulations came into effect on 30th July 2009 and have been adopted by the Government. These regulations supersede previous water quality regulations (both EU and national). This project is cognisant of previous regulations as they form the basis for a wide range of impact assessment and monitoring methodologies. It is envisaged that a detailed construction management plan which will include the management or disposal of surface water runoff will be prepared in advance of construction commencing on site. The construction & demolition management plan will be cognisant to take into account these new regulations and apply them throughout the construction phase.

European Communities Priority Substances Directive 2008

These regulations have been devised to assign a chemical status assessment for water bodies. Directive 2008/105/EC provides environmental quality standards in the field of water policy.

Local Government (Water Pollution) Acts 1977 – 1990:

The Act is the main legislation for the prevention and control of water pollution, including the general prohibition of polluting matter to waters. While this act has largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

Water Quality Standards for Phosphorus Regulations 1998 (S.I. No. 258 of 1998):

As part of the Water Pollution Acts, these regulations require water quality be maintained or improved, with reference to the biological quality river rating system (Q Rating) as assigned by the Environmental Protection Agency between 1995 to 1997. While this act has also largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

Pollution caused by certain dangerous substances discharged into the aquatic environment 2006 (Directive 2006/11/EC Of The European Parliament And Of The Council):

Directive gives an indication of parameters which have to have their concentration values limited to ensure improvement of the aquatic environment.

European Union – Drinking Water Regulations 2017 (S.I. No. 464/2017)

Regulations pertain to the overall water quality & constituents allowable in potable water.

European Union – Environmental Objectives (groundwater) 2016 (S.I. No. 366/2016)

Regulations pertain to the overall water quality & constituents allowable in potable water.

12.2.2 Desktop & Site Study

A desktop study was carried out on the local and regional surface water and drainage network. Information was obtained from documents including the following sources:

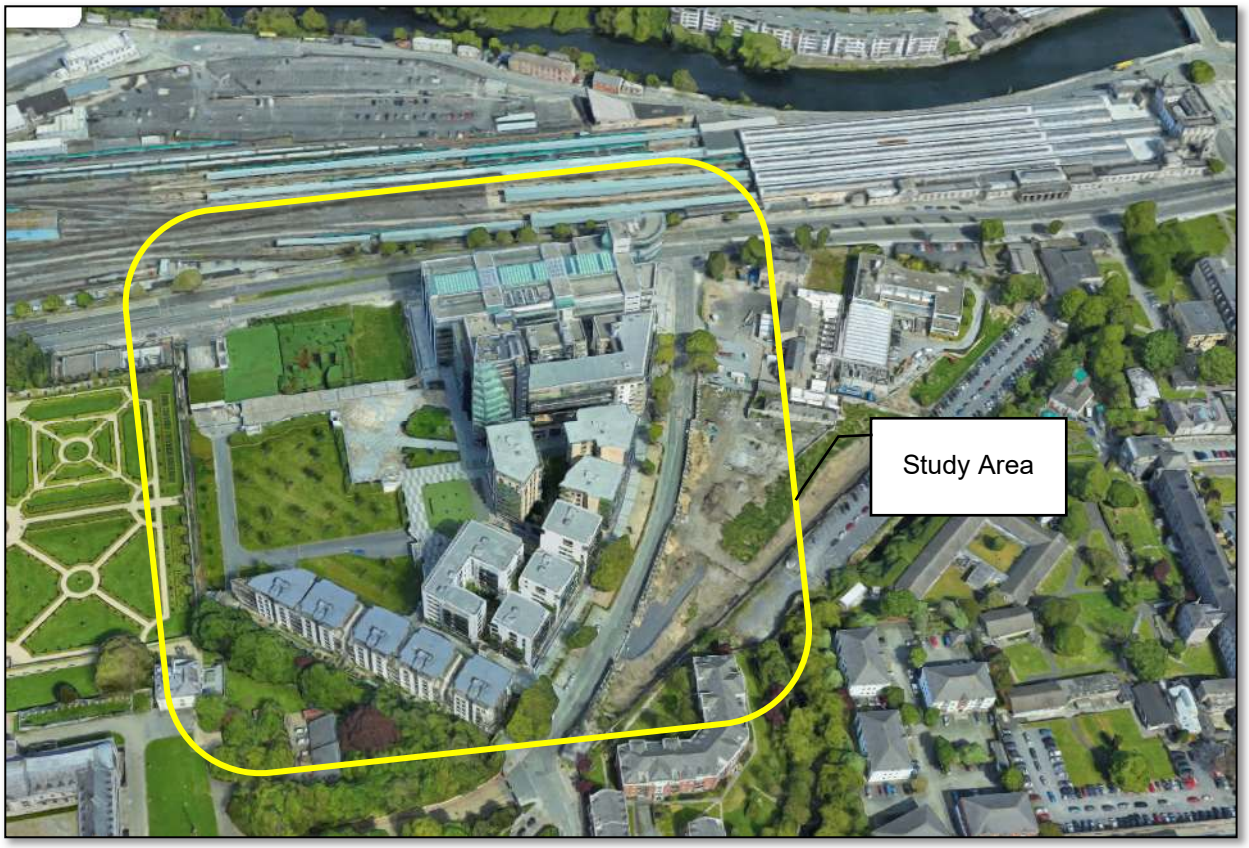
- Liaising with Irish Water;
- Dublin City Council Water and Drainage Department record drawings and discussions with Drainage Division Engineers;
- All available information concerning the development including development plans.
- Site visits were held on numerous occasions between May 2020 – 2021.

A desktop study was carried out on the Electrical, Gas and Telecoms infrastructure based on the following

documentation:

- ESB network utility plans
- Gas Networks Ireland utility plans
- OpenEir utility plans
- Virgin Media utility plans
- Field surveys of the Application Site carried out between April 2020 and May 2021
- Aerial maps of the area

Figure 12.2.2.1 Heuston South Quarter site (source google maps)



12.2.3 Consultation

Discussions were held between Irish Water & Dublin City Council, along with the other members of the design team. As noted above Irish Water require that a submission to be made formally to them so they can review and comment on the required potable & foul water services required to facilitate any development. Following the submission of the Pre-Connection Enquiry to Irish Water the applicant received a request for an off site CCTV survey to be carried out to review the condition of sewers constructed as part of the initial works to the subject lands but which were not yet up-loaded to Irish Waters utility database. This information was obtained and submitted to Irish Water. Upon completion of

the detailed design for the scheme a further submission was made to Irish Water to allow for a letter of Design Acceptance to be issued. Copies of same are included with this application.

IN2 Engineering met with the ESB to review the proposed installations at ESB Networks, South Lotts Road, Dublin 4. The existing site infrastructure was reviewed, and the proposed new infrastructure was discussed. The ESB noted a formal application was required in order to allow them fully assess the implications of the proposed development on the surrounding network. The ESB noted the original Phase 1 development included ESB ducts cast into the podium slab to facilitate future expansion on the site. This enabling infrastructure will facilitate the extension of the ESB ring to pick up new ESB sub-stations as required for the SHD development and any future commercial development.

12.2.4 Policy

At a national level the National Planning Framework (Project Ireland 2040) includes Objective 60, a National Policy to "Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance". As the subject lands are within the jurisdiction of Dublin City Council, their current Development Plan, (2016 – 2022), also contains policy guidance to be adhered too. Specific policies relating to surface water quality within the 2016 – 2022 plan include:

- GI20: To seek continued improvement in water quality, bathing facilities and other recreational opportunities in the coastal, estuarine and surface waters in the city, having regard to the sensitivities of Dublin Bay and to protect the ecology and wildlife of Dublin Bay.

- GI21: To support initiatives to reduce marine pollution in Dublin Bay in partnership with other organisations and to raise awareness by Bay users and the general public and also to have regard to the Marine Strategy Framework Directive (2008/56/EC).

- SI1: Policy to support Irish Water: provision of high quality drinking water and waste water treatment facilities.

- SI2: Policy to support Irish Water in upgrading of wastewater infrastructure and Greater Dublin Regional Wastewater Treatment Plant, and Marine Outfall and orbital sewer.

- SI3: Policy to ensure development is permitted in tandem with available water supply and wastewater treatment.

- SI14: To protect the Dublin City coastline from flooding as far as reasonably practicable, by implementing the recommendations of the Dublin Coastal Flood Protection Project and the Dublin Safer Project.

- SI15: To minimise the risk of pluvial (intense rainfall) flooding in the city as far as is reasonably practicable and not to allow any development which would increase this risk.

- SI16: To minimise the flood risk in Dublin city from all other sources of flooding, including fluvial, reservoirs and dams and the piped water system.

- SI17: To require an environmental assessment of all proposed flood protection or flood alleviation works.

- SI18: To require the use of Sustainable Urban Drainage Systems in all new developments, where appropriate, as set out in the Greater Dublin Regional Code of Practice for Drainage Works. The following measures will apply:
    - The infiltration into the ground through the development of porous pavement such as permeable paving, swales, detention basins.
    - The holding of water in storage areas through the construction of green roofs, rainwater harvesting, detention basins, ponds, wetlands.
    - The slow down of the movement of water.
- SI10: To have regard to the Guidelines for Planning Authorities on the Planning System and Flood Risk Management, and Technical Appendices, November 2009, published by the Department of the Environment, Community, and Local Government as may be revised/ updated when assessing planning applications and in the preparation of plans both statutory and non-statutory.

12.2.5 Assessment of Electrical, Gas and Telecoms Utilities Infrastructure

The extent of existing Electrical, Gas and Telecoms utilities infrastructure to the site has been determined through reference to record drawings from each of the relevant Utilities authorities including ESB, Gas Networks, Eir and Virgin media.

IN2 Engineering have completed site surveys to verify the accuracy of the information received and have met with the ESB on site to review the electrical infrastructure and the proposed modifications required to facilitate the development.

The Electrical services installations have been assessed in accordance with:

- ESB Housing Schemes: Guidebook for ESB Networks Standards for Electrical Services rev5 Jan 2014
- ETCI Wiring Regulations 5th Edition I.S. 10101:2020

The Gas Services installations have been assessed in accordance with:

- IS 813:2014 Domestic gas installations. 3rd edition (+A1:2017)
- I.S. 820:2019 Non-domestic gas installations (Edition 3)
- I.S. 329: 2015+A1:2016 Gas distribution mains (Edition 3) and Amendment No. 1:2016
- S.R. 12007-5:2016 Guidance on the Application of I.S. EN 12007-5:2014, Gas Infrastructure - Pipelines for Maximum Operating Pressure up to and Including 16 Bar - Part 5: Service Lines - Specific Functional Requirements

Telecoms installations have been assessed in accordance with:

- Virgin Media New Build Handbook

- OpenEir Technical Handbook

A desktop study of the Electrical, Gas and Telecoms installations was carried out on the local utilities infrastructure. Information on existing services was determined from the following:

- ESB Networks record drawings
- Gas Networks record drawings
- Virgin Media record drawings
- OpenEir record drawings
- HSQ record drawings and phase 1 Safety File information
- Site inspections were carried out by IN2 to verify the accuracy of the received documentation

12.3 Location

The proposed development is located on St. John's Road at the Heuston South Quarter complex in Dublin 8. The site sits within the established communities of Kilmainham and nestled between The Royal Hospital Kilmainham to the west and the Quays to the north. The site is located in the administrative jurisdiction of Dublin City Council and has a total area of approximately 1ha.

The location of the proposed development site is shown in Figure 12.3.1.

Figure 12.3.1 Location of proposed development site (sources: EPA, OSM Contributors, Google)

The subject site comprises part of the undeveloped area of the site which has been landscaped as an interim measure to improve the aesthetics of the site pending its complete redevelopment. There is already an established road, pedestrian and cycle network in the vicinity of the site so as to allow for a high level of permeability. The site is bounded to the west by The Gardens at the Royal Hospital of Kilmainham, to the north by the St. John's road, to the east by existing buildings from phase 1 of the larger HSQ development fronting, Military Road further to the east and to the south by office and residential buildings.

Access to the site is available from a number of points with the principal vehicular access points being from the existing HSQ / St. Johns Road west junction, north of the development site, and the existing HSQ / Military Road junction, east of the development site. The above access points are interconnected by the development's internal road network. This provides permeability and connectivity through the site for vehicular traffic, as well as for pedestrians and cyclists.

The indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 12.3.2.

Figure 12.3.2 Site extents and surrounding transport infrastructure (sources: NTA, OSM Contributors, Google)

12.4 Characteristics of the Proposed Development

12.4.1 Development Description

The proposed strategic housing development at this site at Heuston South Quarter complex, Kilmainham, Dublin 8, will include 399no. mixed residential units, retail, community facilities and public open space. All associated site development works and services provisions including parking, bin storage, substations, landscaping and all services required to facilitate the proposed development. A full description is provided in the statutory notices and in Chapter 3 of the EIAR. Below is a description of the proposed utilities to serve the residential development. The drainage network for the development will be in accordance with Part H of the Building Regulations and to the requirements and specifications of Irish Water. All foul effluent generated from the proposed development shall be collected in separate foul pipes and flow under gravity, to the existing 300mm diameter sewer on top of the sites existing ramp adjacent to St. Johns Road West. This existing foul sewer drains to the east and ultimately outfalls into the Regional Wastewater Treatment Plant and Ringsend. The proposed drainage infrastructure and routing plan is shown on **HSQ-CSC-XX-BI-DR-C-0102** included with this submission. A *Pre-Connection Enquiry* has been submitted to Irish Water based on the water demand for an initial proposed units. The proposal has been deemed feasible and a *Confirmation of Feasibility* response was issued by Irish Water. A copy of Irish Waters *Confirmation of Feasibility* response and the *letter of Design Acceptance* are in Appendix 12A.

12.4.1.1 Foul Drainage

The proposed development will require a new separate drainage network to collect and convey the effluent generated by the proposed development. The drainage network for the proposed development has been designed in accordance with:

- The Regional Code of Practice Drainage Works,
- The Greater Dublin Strategic Drainage Study,
- Irish Water Code of Practice for Wastewater Infrastructure.

The drainage network for the development will be in accordance with Part H of the Building Regulations and to the requirements and specifications set out in the Irish Water Code of Practice for Wastewater.

The proposed development is to consist of 399 units and based on Irish Water guidelines, the foul effluent generated will be:

- 446l/day per apartment (based on 2.7 persons per apartment x 150l/person/day, + a 10% increase factor).
- 446 l/day/apt x 399 units = 177954 l/day = 177.95m3/day;
- 2.05 l/sec Average flow (1 DWF);
- 12.35l/sec Peak Flow (6 DWF).

All foul effluent generated from the proposed development shall be collected in separate foul pipes and

flow under gravity, to the existing 300mm diameter sewer on top of the sites existing ramp adjacent to St. Johns Road West. This existing foul sewer drains to the east and ultimately outfalls into the Regional Wastewater Treatment Plant and Ringsend. The proposed drainage infrastructure and routing plan is shown in Figure 12.2.1.5 below.

Irish Water have issued a *Confirmation of Feasibility* response for the proposed development. They note that investigation works are required by the applicant of the downstream network to guarantee that foul and stormwater are not interconnected. Irish Water has not indicated any restrictions with the local infrastructure network, and a such the proposed development can be accommodated.

The investigation works note by Irish Water were completed and the information forwarded on. Irish Water reviewed the proposed foul & potable water design and have issued their Letter of Design Acceptance for the development. Please refer to the Appendix 12A for a copy of the Confirmation of Feasibility & Letter of Design Acceptance. Figure12.2.1.5Excerpt from Drawing no. HSQ-CSC-CC-BI-DR-C-0102 showing the proposed drainage infrastructure and routing plan, a full scale copy of the drawing has been submitted as part of this application and are also included in the Appendix to the rear of this chapter.

Figure 12.4.1.5 Excerpt from Drawing no. HSQ-CSC-CC-BI-DR-C-0102 showing the proposed drainage infrastructure and routing plan.

12.4.1.2 Potable Water

The proposed development will require a new separate drainage network to collect and convey the effluent generated by the proposed development. The drainage network for the proposed development has been designed in accordance with:

- The Regional Code of Practice Drainage Works,
- The Greater Dublin Strategic Drainage Study,
- Irish Water Code of Practice for Water Infrastructure.

The drainage network for the development will be in accordance with Part H of the Building Regulations and to the requirements and specifications set out in the Irish Water Code of Practice for Water

Infrastructure.

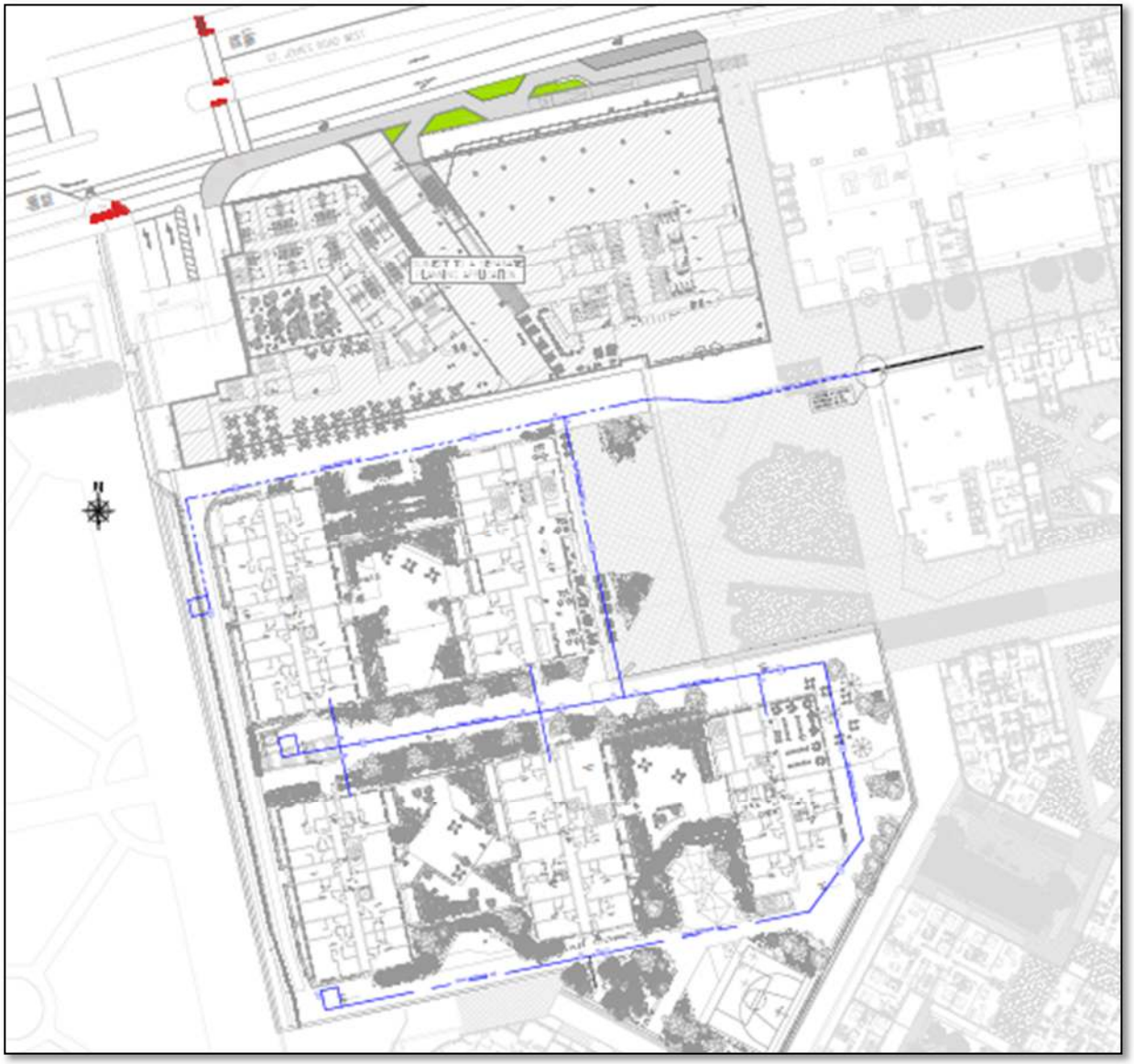
The proposed development is to consist of 399 units and based on Irish Water guidelines, the potable water demand will be:

- 405l/day per apartment (based on 2.7 persons per apartment x 150l/person/day).
- 405 l/day/apt x 399 units = 161595 l/day = 161.595 m3/day;
- 1.87 l/sec Average flow (1 DWF);
- 9.35l/sec Peak Flow (5 DWF).

The proposed development will connect into the existing local potable water system, which is connected into the public network. The proposed potable water system will provide fire fighting and potable water resources for the proposed development. Internal water storge in accordance with the requirements of Irish Water shall be adhered too. The proposed potable water infrastructure and routing plan is shown in Figure 12.4.1.5 below.

Irish Water have issued a *Confirmation of Feasibility* letter pertaining to the scheme. They note that investigation works are required by the applicant of the downstream network to guarantee that foul and stormwater are not interconnected. Irish Water has not indicated any restrictions with the local infrastructure network, and a such the proposed development can be accommodated. The investigation works note by Irish Water were completed and the information forwarded on. Irish Water reviewed the proposed foul & potable water design and have issued their *Letter of Design Acceptance* for the development.

Figure 12.4.1.5 Excerpt from Drawing no. HSQ-CSC-CC-BI-DR-C-0103 showing the proposed potable water infrastructure and routing plan.



12.4.1.3 Electrical Infrastructure

The proposed development will connect to the local ESB MV (Medium Voltage) electrical network. There will be 3no LV substations provided throughout the development. The substations have been sized to supply the full load of the development and to meet the requirements of ESB Networks based on:

- 399no residential apartments
- Amenity areas including retail, community facilities and public open space
- Landlord circulation
- Carpark

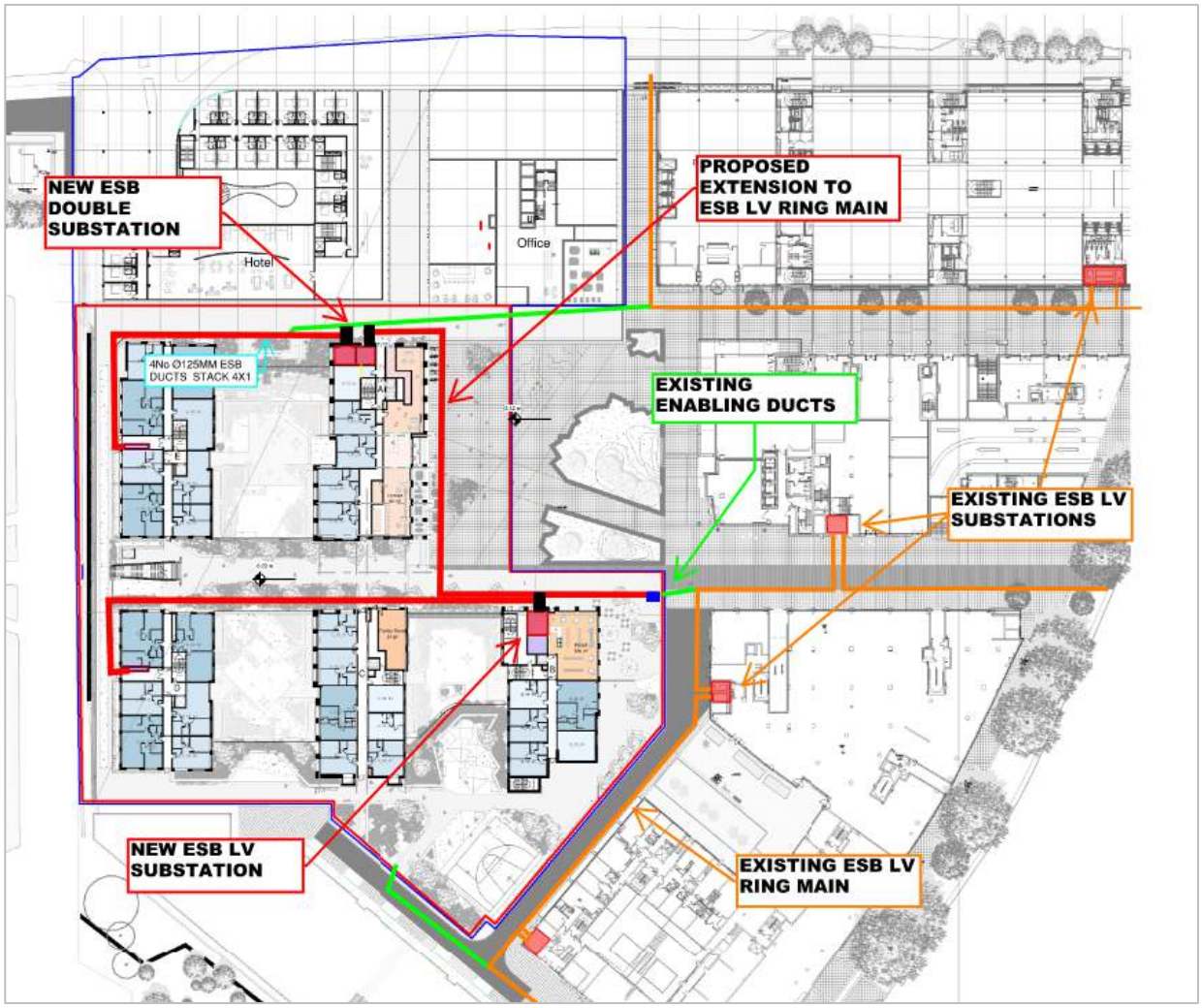
- Site services

A new single LV substation and associated metering switchroom will be located at podium level in block B. This sub-station will serve block B and the landlord services associated with the SHD development.

A new double LV sub-station and associated metering switchroom will be located at podium level in block A. This double substation will serve blocks A, C, D & E. Blocks D & E will include metering switchrooms located at the podium level entrance lobbies in each case.

The electrical infrastructure strategy has been reviewed with the ESB and agreed in principal subject to detailed design by the ESB on receipt of the formal ESB application. The application may only be made once planning is granted and each residence is provided with an address by Dublin City Council.

Figure 12.4.1.3.1 Proposed electrical infrastructure design



12.4.1.4 Gas Infrastructure

The proposed development site will not include a new gas supply connection. The heating and hot water to the SHD development will be provided from a district heating connection to the existing Heuston South Quarter energy centre. This energy centre is powered by existing gas fired boiler plant which has sufficient

spare capacity to serve the SHD development without any additional reinforcement.

The existing gas services infrastructure to the surrounding area will not be affected by the proposed development or the enabling works to facilitate the proposed site development. Measures to ensure any surrounding gas infrastructure is protected is detailed in further sections below.

12.4.1.5 Telecoms Infrastructure

Based on information received from Eir, the site is well serviced from a number of separate tie-in points and there are no supply issues in the area. The scheme allows for an extensive network of in-ground ducting and chambers throughout the site to allow future flexibility of supply. All apartment blocks and retail units are connected to this ducting network.

Virgin Media were also consulted, and the design allows for supply of separate telecoms ducts to all apartment blocks with splitter panels to allow distribution through the electrical risers to each apartment.

The proposed telecoms design allows for tenants to choose their preferred telecoms provider.

12.4.1.6 Telecoms Infrastructure - Major Telecommunication Masts

As part of the design process the impact on the development on major telecommunications links has been considered. There Meteor and Vodafone Telecoms masts within the immediate vicinity of the proposed development 3 Mobile and Vodafone infrastructure within the wider environs of the site approximately 200m from the proposed buildings.

It is unlikely the taller elements of the proposed scheme will impact on local microwave links. If this issue were to arise it is predicted that telecoms providers will be able to reconfigure their equipment to compensate for the proposed structures.

Space shall be included on the roof of Block A for provision to erect a microwave repeater to mitigate any potential impact The full extent of the impact of the proposed development on local microwave links cannot be determined until detailed design stage.

At the detailed design stage, the developer will engage in consultation with the relevant telecoms providers to review the proposed mitigation measure and adjust if necessary. This will be addressed in detail with the service providers at the appropriate time.

12.5 Receiving/Baseline Environment

12.5.1 Foul Water

The Following review of Dublin City Council's & Irish Waters drainage records indicates:

- A 300mm diameter dedicated foul public sewer along St. John's Road, flowing west to east. There is an existing connection from the subject lands to this sewer;

All foul effluent in the region is directed via public drainage infrastructure to Ringsend Regional Waste

Water Treatment Plant for processing before final discharge to Dublin Bay.

Effluent generated in the greater Dublin area is drained to the regional wastewater treatment plant at Ringsend, which is under the operational control of Irish Water. Ringsend WwTP is currently in the process of an up-grade to increase the plants capacity and to enhance the quality of the effluent to be discharged post treatment into Dublin Bay. In accordance with the requirements of an SHD application a pre-connection enquiry submission is made to Irish Water to ensure that the local physical infrastructure and the ultimate pre-disposal treatment has sufficient capacity for the proposed development.

12.5.2 Potable Water

Following review of Dublin City Council's & Irish Waters watermain records indicates that there are:

- A long the eastern boundary of the larger HSQ site, adjacent to military Road, there is a 450mm diameter HPPE public watermain in place. This watermain has an existing connection into the subject lands.

Dublin City is serviced by a public watermain supply under the operational control of Irish Water. All potable water services are drawn from storage and treatment facilities in south Dublin & Wicklow. Post treatment the water is stored and pumped through the public network. There are no groundwater sources or local surface water sources used to supply potable water for Dublin. As with foul water services, in accordance with the requirements of an SHD application a pre-connection enquiry submission is made to Irish Water to ensure that the local physical infrastructure has sufficient capacity for the proposed development.

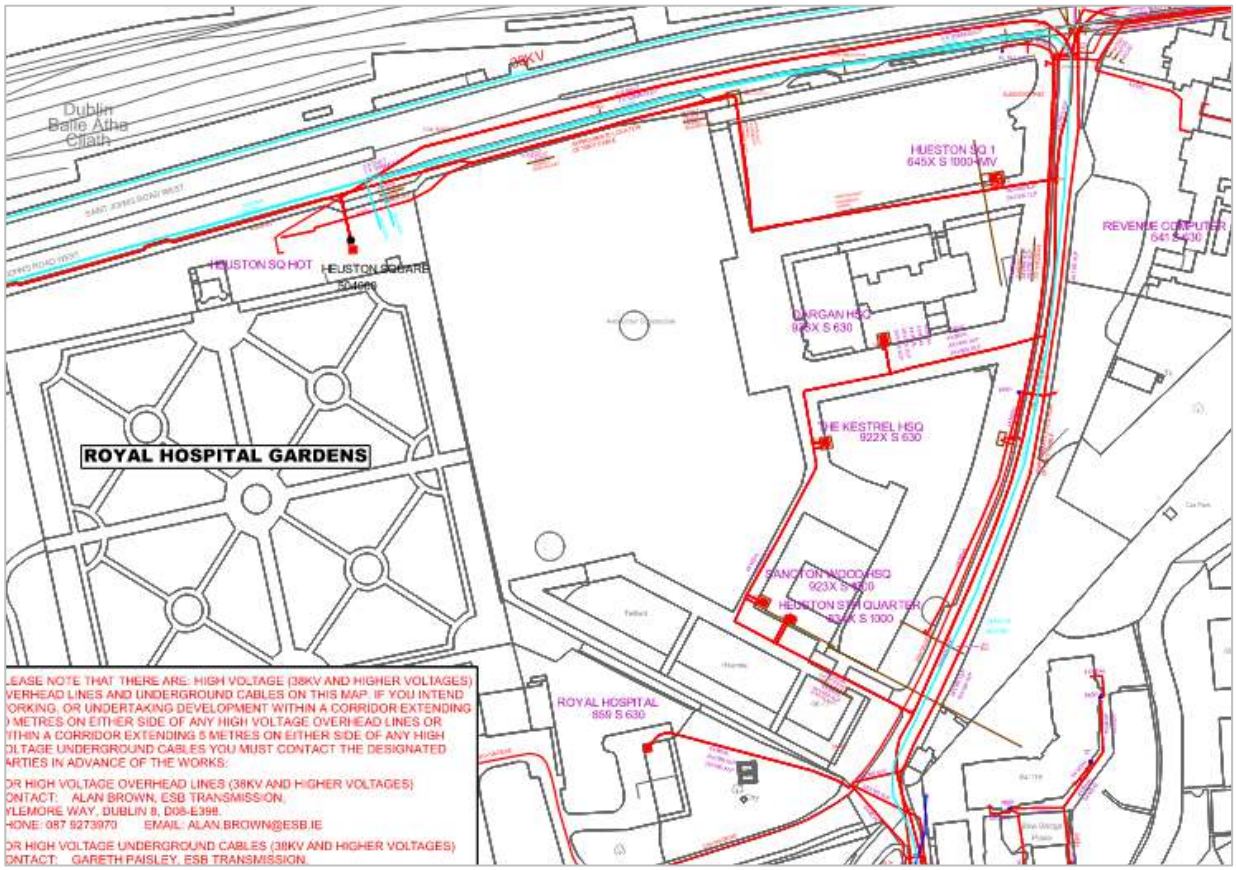
12.5.3 Electricity Supply

When the first phase of the HSQ development was constructed over ten years ago additional ESB ducts were installed to allow for future expansion. These ducts will be made use of in the extension of the ESB infrastructure required to serve the proposed SHD development.

The existing ESB ducts were site inspected by IN2 Engineering and the ESB on 28th August 2020. Ciaran Hanvey of the ESB and Max Yore of IN2 Engineering inspected the existing ducts and confirmed the ducts appeared suitable for extension and reuse. The ESB noted written approval for the use of these existing ducts will be subject to a formal ESB application which may only be lodged on receipt of residential addresses for each apartment post planning.

The electrical infrastructure strategy discussed with the ESB is to connect the new ESB substations with a ring route which will ensure resilience to each sub-station.

Figure 12.5.3.1 ESB record drawing of the HSQ site including the SHD area

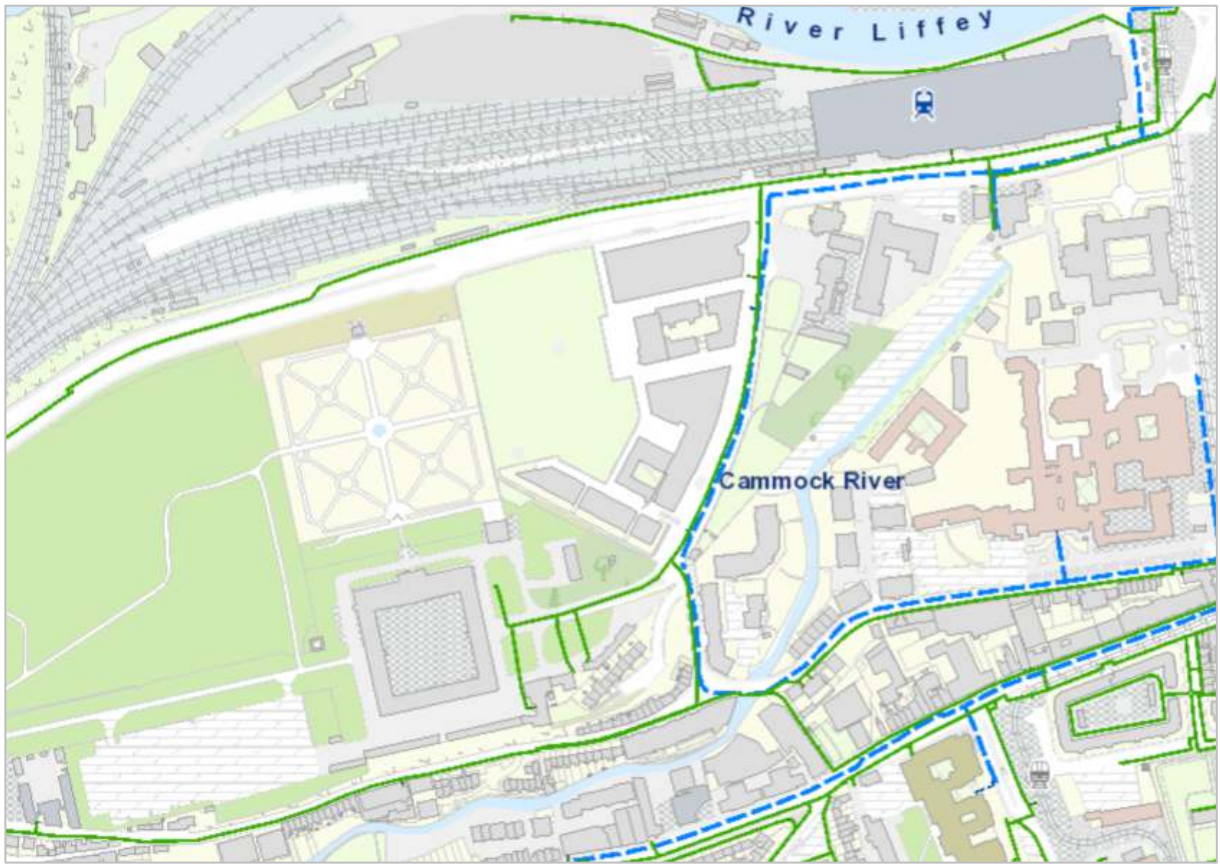


12.5.4 Gas Supply

There is no existing Gas Networks infrastructure located within the boundary of the proposed development site.

IN2 Engineering have reviewed the Gas Networks local utility maps and carried out a site survey on 18th August 2020 to verify the accuracy of the utility layouts. There is no gas utility supply required to the SHD development.

Figure 12.5.4.1 Gas Networks record drawing of the HSQ site including the SHD area



12.5.5 Internet and Telecommunications

There is existing Eir and Virgin Media telecoms infrastructure adjacent to the development site serving the existing HSQ development residential and commercial buildings. IN2 Engineering have reviewed the telecoms infrastructure maps and carried out a site survey on 18th August 2020 to verify the accuracy of the utility layouts.

The site survey identified the Virgin Media record drawings are inaccurate indicating telecoms infrastructure which has not been installed on the Proposed Development site. Further investigation has confirmed the Virgin Media layouts indicate the infrastructure which was designed when the wider HSQ site was initially developed. There are no Virgin Media telecoms infrastructure within the boundary of the Proposed Development site.

Figure 12.5.5.1 Eir record drawing of the HSQ site including the SHD area

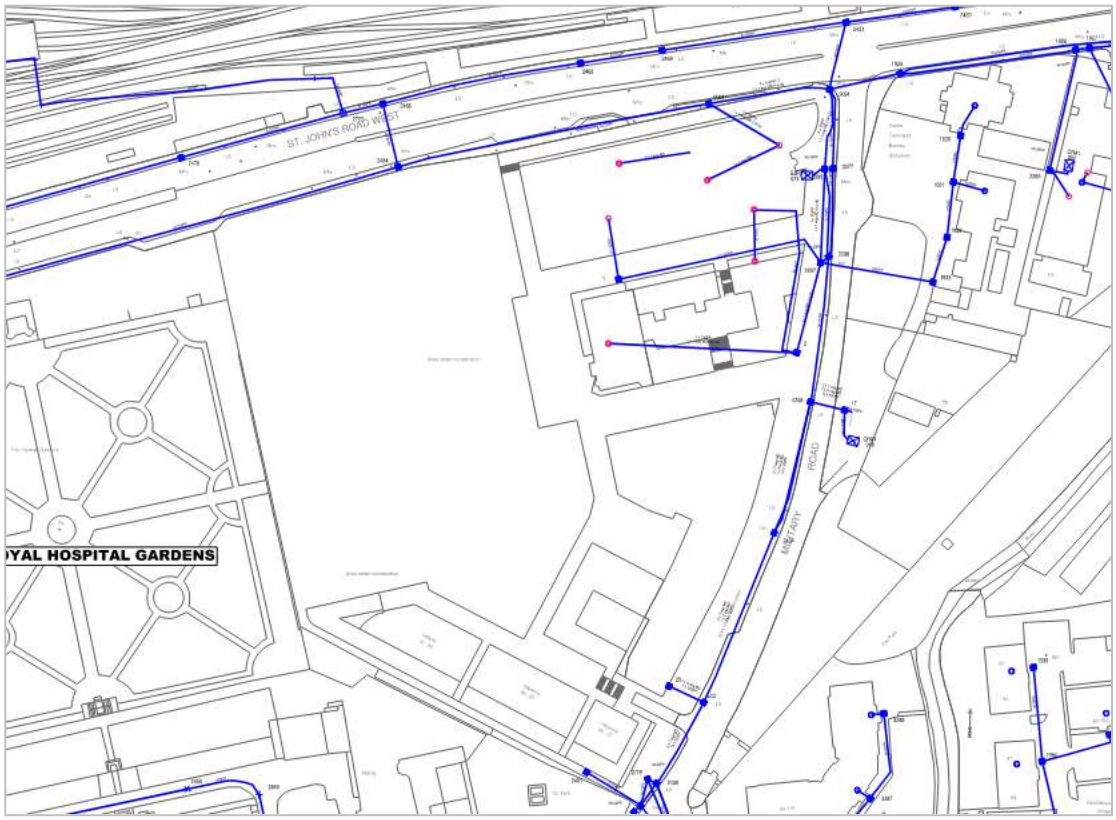
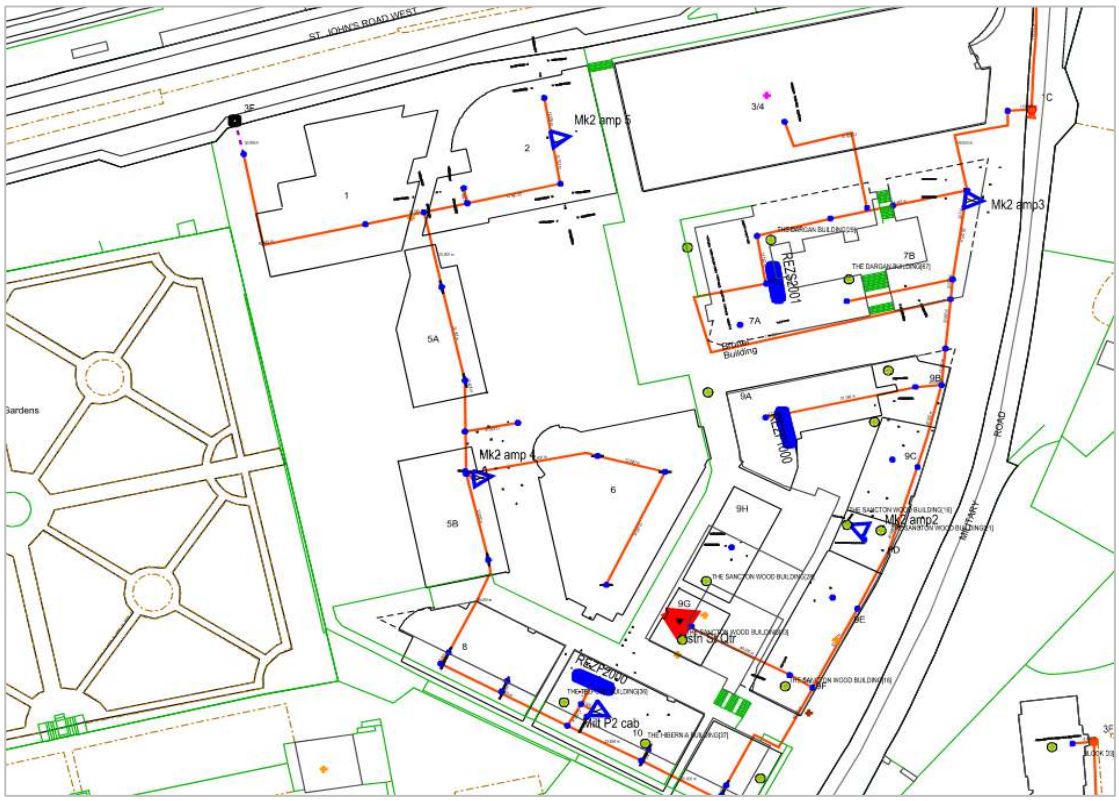


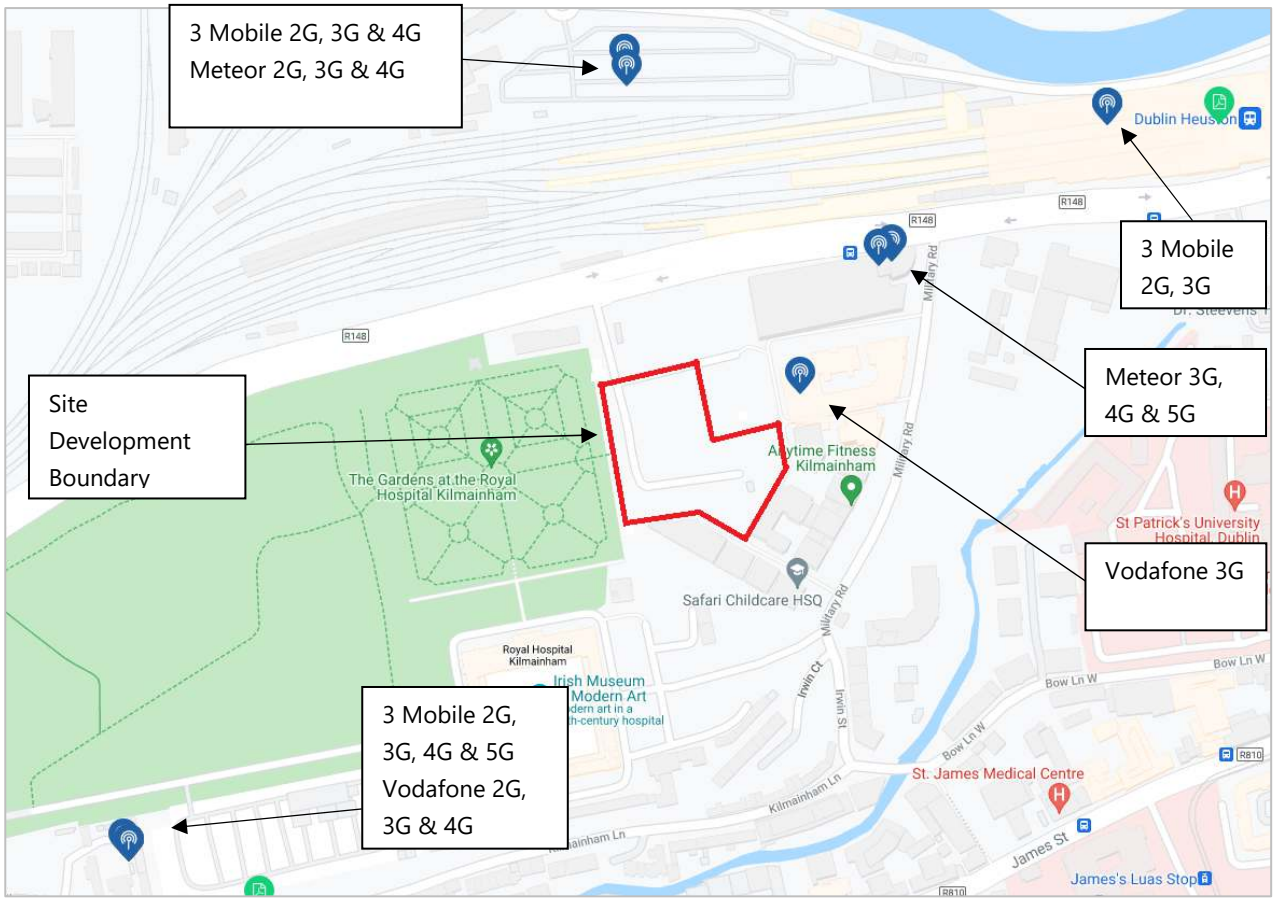
Figure 12.5.5.2 Virgin Media record drawing of the HSQ site including the SHD area



12.5.6 Telecoms Infrastructure - Major Telecommunication Masts

As part of the design process the impact on the development on major telecommunications links has been considered. There are Meteor and Vodafone Telecoms masts within the immediate vicinity of the proposed development 3 Mobile and Vodafone infrastructure within the wider environs of the site approximately 200m from the proposed buildings.

Figure 12.5.6.1 Surrounding telecoms masts



12.6 Assessment of Existing Utilities

In accordance with the requirements of Irish Water, who are the state agency for the provision and potable water and wastewater services a *Pre-Connection Enquiry* was submitted. Irish Water reviewed the submission and reverted back to the applicant following an internal review and adjudicate on whether the required connection is feasible and if any local up-grades are required. Following Irish Waters review of the *Pre-Connection Enquiry* Irish Water issued their *Confirmation of Feasibility* response. Irish Water also review the proposed foul water and potable water drawings and reverted back with a *Letter of Design Acceptance* as the proposals submitted were acceptable to them.

12.7 Identification of Likely Significant Impacts

This section addresses the implications for the proposed development on the existing environment and looks at the possible affects the proposed development may have during the construction & operational phase. Potential issues were identified and assessed. The assessment looked at the time frame and magnitude of the potential issues & mitigation mechanisms to address. The methodology employed in compiling this Chapter of the EIAR incorporates the Draft Guidelines on the Information to be contained in Environmental Impact assessment reports by the Environmental Protection Agency, (EPA 2017). The approach followed to derive effects significance from receptor value and magnitude of impacts is shown in Table 12.7.1. Where Table 12.7.1 includes two significance categories, reasoning is provided in the text if the lower of the two significance categories is selected. A description of the significance categories used is provided in Table 12.7.2.

Table 12.7.1 Significance Matrix

	Magnitude of Impact (Degree of Change)				
Environmental Value (Sensitivity)		**Negligible**	**Low**	**Medium**	**High**
	High	Slight	Slight or moderate	Moderate or Large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate or large	Profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

Table 12.7.2 Significance categories and typical description.

Significance Category	***Typical Description***
Profound	An effect which obliterates sensitive characteristics
Large	An effect which, by its character, magnitude, duration or intensity altered a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the characterises of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An effect capable of measurement but without significant consequences.

12.7.1 Construction Phase

12.7.1.1 Foul Water

The Contractors operations will result in the generation of effluent and sanitary waste from facilities provided for the work force on site. The welfare services will generate only domestic wastewater, (i.e. there will be no industrial effluent generated during the construction process). It is envisaged that the effluent generated by the site operatives will be stored on site and discharged directly into the public foul drainage system on St. Johns Road, and that the appropriate consent for such discharge will be obtained.

The requirement for the Contractor to establish a temporary connection to the existing public foul sewer network will mean that effluent generated on site will be discharged into the public system. The volume of effluent will vary over time as the number of works on site can fluctuate as the works progress. But the volumes of effluent generated will be lower than the final effluent generated on site once the development tis complete. As such the foul loading from the site during the construction period is expected to have a slight negative impact on the existing foul drainage network in the short term for the duration of construction work. As the proposed construction works will discharge the effluent generated on site into the public network, this will reduce, temporarily, the capacity of the existing sewer.

All works will follow best industry practice for the planning, supervision and construction of the works. The proposed works will adhere to the construction management plan for the development. The potential impacts were reached by reviewing the current infrastructure in the environs of the proposed development along with the proposed temporary nature of the construction works. Cognisance's was also giving to Irish Waters acceptance of the effluent generated into the public network. Potential impacts have been assessed as short-term & slight.

12.7.1.2 Potable Water

The contractors will require a separate water supply connection for the works. The impact on the water supply network is likely to be slight negative, and short term for the duration of the construction works.

It is envisaged that the contractor will apply to Irish Water for a temporary connection from the public network on St. Johns Road to provide potable water for site construction purposes and for welfare facilities over the duration of the construction programme.

The proposed connection from the site to the public supply will be done with the agreement of Irish Water and on a temporary basis. The proposed temporary site connection will have little overall affect on the local supplies. The potential impacts were reached by reviewing the current infrastructure in the environs of the proposed development along with the proposed temporary nature of the construction works. Cognisance's was also giving to Irish Waters acceptance of the potable water requirements from the public network.

All works will follow best industry practice for the planning, supervision and construction of the works. The proposed works will adhere to the construction management plan for the development. Potential impacts have been assessed as short-term & slight.

12.7.1.3 Electricity Supply

The Contractors will provide the ducting and enabling works to facilitate the installation of the Electrical infrastructure by the ESB. All ducts and sub-stations will be installed and constructed to ESB technical guidance details and inspected and approved prior to installation.

Once the Electrical infrastructure is built and ready for the ESB to provide power the ESB will take ownership and responsibility for the sub-stations. They will be locked with access only by trained ESB personnel.

All works will follow best industry practice for the planning, supervision and construction of the works. The proposed works will adhere to the construction management plan for the development.

Potential impacts have been assessed as short-term & slight.

12.7.1.4 Gas Supply

There is no Gas supply infrastructure proposed for the SHD development and there are no works proposed within the vicinity of the surrounding gas services infrastructure.

Potential impacts have been assessed as short-term & imperceptible.

12.7.1.5 Telecoms Supply

The Contractors will provide the ducting and enabling works to facilitate the installation of the Telecoms infrastructure by each of the Telecoms providers. All ducts and sub-stations will be installed and constructed to respective Telecoms providers technical guidance details and inspected and approved prior to installation.

Separate telecoms ducts and manholes will be provided for each provider. No shared ducts or manholes will be allowed.

All works will follow best industry practice for the planning, supervision and construction of the works. The proposed works will adhere to the construction management plan for the development.

Potential impacts have been assessed as short-term & slight.

12.7.2 Operational Phase

12.7.2.1 Foul Water

The proposed wastewater network has been designed to cater for the full quantum of the development required for the development. Irish Waters *Confirmation of Feasibility* has been received, indicating that the development can be accommodated. The requirement for Irish Water to vet all applications to ensure that the local and regional infrastructure has adequate capacity for the proposed development has been complied with. A reduction in the overall capacity at the Regional Waste Water Treatment Plant at Ringsend will be an outcome of any proposed development. The predicted effects of the proposed foul effluent generated from the site post construction has been established to be long-term & slight.

12.7.2.2 Potable Water

The proposed potable network has been designed to cater for the full quantum of the development required for the development. Irish Waters *Confirmation of Feasibility* has been received, indicating that the development can be accommodated. As with the foul network the impact of the proposed works post completion during the operational phase are deemed to be long-term and slight. As Irish Water has reviewed the volumes required as part of their assessment procedures they have adjudicated that the requirements can be accommodated without any up-grade works being required. Potential impacts have been assessed as long term & slight.

Table 12.7.1 Gives a Breakdown of Potential Impacts on Water Infrastructure

Potential Impacts – Material Assets						
	Potential Impact	*Attribute Importance*	*Impact Duration*	*Impact Magnitude*	*Impact Significance*	*Stage*
Environmental Management	Uncontrolled spillages, on/off site impacts	High	Short term	Moderate	Sight	Construction & demolition
Damage to Public water supply system	Excessive water usage due to poor connections/leaks	High	Short term	Moderate	Slight	Construction
Site management	On/off site impacts due to miss-connection of temporary site drainage systems into the storm network	High	Short term	Moderate	Slight	Construction
Reduction in Potable water availability	Low water availability may hinder future development	Medium	Long term	Moderate	Slight	Operational
Reduction in foul sewer capacity	Reduced capacity in public system may hinder future development	Medium	Long term	Moderate	Moderate	Operational
Reduction in capacity at Ringsend WwTP	Reduced capacity in public system may hinder future development	Medium	Long Term	Slight	Imperceptible	Operational

12.7.2.3 Electricity Supply

The proposed development will require electricity supplies during the operational phase of the scheme and these will be provided by the installation of new sub-stations in agreement with ESB Networks.

The ESB infrastructure has been designed to cater for the complete SHD development including all apartments, amenity areas, current and future EV charging requirements.

As the new cable services will be located underground, this will result in a permanent but imperceptible effect. The apartment buildings will be NZEB compliant and with the incorporation of renewable technology, the demand on the electrical supply should be further reduced. The likely impact from the operational phase on the electricity supply network is likely to be long term and moderate.

The indirect impact will allow ESB Networks to provide additional resilience in their network through the provision of new Sub-Stations (Assuming agreement with ESB Networks) which in turn should impact positively on the wider area's electrical infrastructure.

A 'worst-case' scenario resulting from the operation of the development would be a breakage on the cable feeding the Sub-Stations possibly caused by a third party leading to downtime of power supplies in the local network.

With the proposed installation of new sub-stations this should allow ESB Networks to cater for any secondary projects that may arise within the vicinity.

The impact from the operational phase of the development on the electricity supply network is likely to be long term, positive and slight.

12.7.2.4 Gas Supply

There is no Gas supply infrastructure proposed for the SHD development. There are no works required to the existing gas supply infrastructure to the Heuston South Quarter Energy Centre serving the district heating network which will supply heat to the proposed site SHD development.

The impact from the operational phase of the development on the electricity supply network is likely to be long term and slight.

12.7.2.5 Telecommunications

The proposed development will require telecommunication connections during the operational phase of the scheme and given the number of telecommunication providers with infrastructure available within the Dublin 8 area this will provide the building users with a greater choice of service and will result in a positive effect for the users. As the new services will be located underground this will result in a permanent but imperceptible effect.

The Telecoms infrastructure has been designed to cater for the complete SHD development. Allowance has been made for multiple telecoms providers with independent infrastructure ductworks and routes for each.

The additional demand on the telecoms network is not deemed to have any material impact on the surrounding area as there is sufficient capacity in the telecoms network system to manage the additional demand created by the development.

The predicted effects of the proposed telecoms supply to the site post construction has been established to be long-term & slight.

12.7.2.6 Telecoms Infrastructure - Major Telecommunication Masts

Any impacts on major telecommunications links will be determined at detailed design stage. Any additional microwave repeaters would reinforce the local telecommunications infrastructure impacting positively on the wider area network coverage.

The predicted effects of the proposed buildings on the surrounding telecoms infrastructure post construction has been established to be long-term & slight.

12.8 Cumulative Impacts

The proposed development was reviewed in consultation with existing & permitted developments in the area. A list of which are noted in Appendix 1B of this submission.

As has been noted while the foul & potable water demands will reduce the available spare capacity in the local system the needs for the site has been allocated by the competent authority and sufficient capacity granted under an earlier, still valid planning permission. Irish Water reviewed the scheme and issued both a letter of Confirmation of Feasibility and a Letter of Design Acceptance. This indicates that the foul effluent loading, and potable water demand can be supplied by the existing Irish Water infrastructure in the area. The proposed development would add in the region of less than 0.1% to the current hydraulic loading to the Ringsend Wastewater Treatment Plant. The permitted 2019 revised upgrade to planning permission (Ref.ABP-301798-18) was for a planned population equivalent of 2.4 million persons. The upgrade works are currently underway with the proposed first phase to include a 400,000 PE extension to the facility, to be completed in 2021. With the full up-grade works to cater for the 2.4 million PE to be completed by 2025. In effect, the impact of the proposed planning permission with regard to capacity issues at Ringsend have been assessed as part of the granted planning permissions noted above.

12.8.1 Foul Water

The proposed foul effluent generated on site during the operational phase of the development has been established to be long-term & slight. The calculated volumes have been deemed by Irish Water to acceptable within the existing local & regional infrastructure without any up-grades.

12.8.2 Potable Water

The proposed potable water requirements on site during the operational phase of the development has been established to be long-term & slight. The calculated volumes have been deemed by Irish Water to acceptable within the existing local & regional infrastructure without any up-grades.

12.8.3 Electricity Supply

The proposed Electrical requirements on site during the operational phase of the development has been established to be long-term & slight. The electrical consumption associated with the development is acceptable within the existing local & regional infrastructure without any up-grades. The cumulative impact on the ESB network is likely to be long term and positive and moderate.

12.8.4 Gas Supply

There is no new Gas infrastructure planned to the proposed development site. The site will however be provided with a district heating connection to the existing Heuston South Quarter energy centre which relies on gas fired boiler plant. The cumulative impact from the operational phase, comprising increased gas consumption to the existing energy centre plant, is acceptable within existing local and regional infrastructure without any up-grades. The cumulative impact is likely to be short term and low.

12.8.5 Internet and Telecommunications

The telecoms connections associated with the development are acceptable within the existing local & regional infrastructure without any up-grades. The cumulative impact on the telecoms network is likely to be long term and low.

12.8.6 Internet and Telecommunications - Major Telecommunication Masts

The cumulative impact on the local telecommunications networks is likely to be long term and low.

12.9 Interactions Arising

The proposed development is not predicted to result in any significant impacts on the environment. Interactions of Material Assets: Water supply, Drainage & utilities and population and health has been considered in this study and it is anticipated that this will result in a slight impact to the current environs.

12.10 Do Nothing Scenario

Under a 'do nothing' scenario, there would be no change in the sites current use and the existing status would remain and the impact would be neutral. In the scenario where the proposed development does not proceed as planned, the existing land-use and material assets in the study area would remain as currently identified in the desktop study, site visit and site-specific investigations. This scenario would not have any likely significant impact on the material assets in the area.

12.11 Mitigation Measures

A works pertaining to the foul system and potable water system will be required to be inspected and authorised by Irish Water prior to final connection to the public system being permitted. This will ensure that the potable water & foul networks have been installed correctly and that no miss connection of leaks are overlooked in the commissioning process.

In respect of electricity and gas supply, the Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with ESB Networks and Gas Networks Ireland.

Table 12.11.1 Table of Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Environmental Management	Temporary discharge utilising the existing, or permitted sewerage network will be in agreement with Dublin City Council & Irish Water. All necessary health and safety measures and best practice will be undertaken to ensure the safety and welfare of construction personnel, the public and road users during construction of the foul infrastructure.
Damage to Public System	The contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water & Dublin City Council. A water meter will be installed to monitor water consumption on the site and to enable early detection of any potential leaks. Inspection and acceptance of connections will be required prior to services being allowed.
Site Management	Good site governance to ensure storm generated on site is disposed into the storm system and foul into the temporary foul system so that no miss connections occur.
Electrical Supply	The contractor will engage with ESB to facilitate the installation of the required infrastructure. Site ductwork and sub-stations will be constructed to ESB technical standards and will remain locked and under full control of the ESB once power is provided to the site. Prior to excavation the Contractor will carry out additional site investigation, including camera survey of existing ducts, in order to determine the exact location of the electricity network in close proximity to the works area. All works in the vicinity of ESB Networks infrastructure will be carried out in ongoing consultation with ESB Networks and will be in compliance with any requirements or guidelines they may have including procedures to ensure safe working practices are implemented when working near live overhead/underground electrical lines

	Where new services are required, the Contractor will apply to ESB Networks for a connection permit where appropriate and will adhere to their requirements
Gas Supply	Prior to any excavation adjacent to gas services the Contractor will carry out additional site investigation to determine the exact location of the gas network in close proximity to the works area. This will ensure that the underground gas network will not be damaged during the construction phase. All works in the vicinity of GNI infrastructure will be carried out in ongoing consultation with GNI and will be in compliance with any requirements or guidelines they may have including procedures to ensure safe working practices are implemented when working near live gas mains.

Character of potential impact	**Mitigation measure**
Operational Phase	
Foul	The proposed foul network when completed will not be vested to Irish Water. As such the management company will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the units maintenance company. Any issues going forward will there for be addressed and mitigation against.
Water Supply	The proposed potable water network when completed will not be vested to Irish Water. As such the management company will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the units maintenance company. Any issues going forward will there for be addressed and mitigation against.
Reduction in Ringsend WwTP.	Ringsend WwTP, is currently the subject of up-grade works to ensure its fitness for purpose. The up-grade works will ensure that future capacity for the greater Dublin region is available.

12.12 Residual Impacts

The post construction residual impacts will consist of a reduction in the overall quantum of potable water available in the area and a reduction in the spare capacity in the foul sewer network. As with all developments this is an expected side effect. Any scheme by its nature will require resources to be absorbed to allow for the development to be completed. Notwithstanding same, the subject lands have

been designated within Dublin City's Development Plan for the type of development proposed and following an assessment by Irish Water, the appropriate authority has deemed that the level of development applied for can be accommodated within its local & regional infrastructure.

The residual impacts for the foul water & potable water have been deemed to be long term and imperceptible. Following the implementation of all mitigation measures, residual impacts on electricity supply, gas supply and telecoms are slight and imperceptible.

12.13 Human Health

The proposed scheme, will during the construction phase, have implications for the current residents of the sections of the overall lands. As would be expected for any development to take place beside an adjacent residential scheme. Notwithstanding, should planning permission be granted the construction of the proposed development will be required to adhere to the planning conditions set upon it by Dublin City Council regarding noise levels, working hours and disturbance. These conditions are enforced by Dublin City Council to ensure that the potential for disturbance to the existing population is reduced to a minimum while the development is completed.

12.14 Unplanned Events, Major Accidents and Hazards

As with any proposed large construction project there is an intrinsic risk of unforeseen events which may have a detrimental affect on the project or its environs. This proposed development is no different. While the impacts of unforeseen events may have significant implications should they occur, the likelihood must be viewed as remote. While the proposed development is located near the River Liffey even if they river was to flood, (refer to Chapter 8, Water, for an assessment of the potential flood implications for the site), the sites elevation and the topographical features adjacent to the site would prevent the site from flooding. Similarly, should a major water main leak or the public foul or storm water system fail, the site's location and the falls around the subject lands would prevent the site being affected.

There is also a residual risk that during the physical construction of the development an accident may occur. To mitigate against the low likelihood of these events occur strict site protocols and procedures will be in place on site in accordance with national best practice and HSE guidelines for safe working on construction sites.

12.15 Monitoring

Ongoing monitoring of the foul & potable water systems to be constructed for the development will be carried out as part of the operational and maintenance set of procedures for the scheme post construction. This will include inspections to ensure that the systems are operational and fit for purpose. Our assessment does not identify any specific monitoring which is required in order to minimise impacts on the environment.

12.16 References

In addition to the sources noted in above the documents listed below were also consulted.

Dublin City Development Plan 2016–2022;

Regional Code of Practice For development works, Version 6;

Irish Waters Code of Practice for Water Infrastructure;

Irish Waters Code of Practice for Wastewater Infrastructure;

Greater Dublin Strategic Drainage Study;

Local Authority/Irish Water Drainage Records.

13 CULTURAL HERITAGE: ARCHAEOLOGY

13.1 Introduction

This chapter describes the archaeological and historical implications of a development site at St John's Road/ Military Road, Kilmainham, Dublin 8., known as Heuston South Quarter. The report consists of both a desk- based archaeological evaluation and the results of archaeological excavation on the site. The excavation report is included as Appendix 13.A. Results of excavations in the immediate vicinity are presented in Appendix 13.B.

The report has been prepared by Claire Walsh, licensed archaeologist, who carried out the original test excavation and subsequent full excavation on the site prior to development. Claire Walsh holds an honours degree in archaeology from UCD, is a partner in Archaeological Projects ltd and has worked for over 35 years primarily in development archaeology.

13.2 Characteristics of the Proposed Development

The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over double basement level / podium level. The application site extends to 1.08 ha (10,825 sqm). It is proposed to provide ancillary indoor and outdoor community facilities and a retail unit as part of the scheme.

The proposed basement car park to serve the scheme is integrated with the existing larger basement car park and will be accessed from the existing vehicular ramped accesses/egresses onto/off St. John's Road West and Military Road to the north and east. This area has been fully excavated as part of the previous development at the site.

13.3 Assessment Methodology

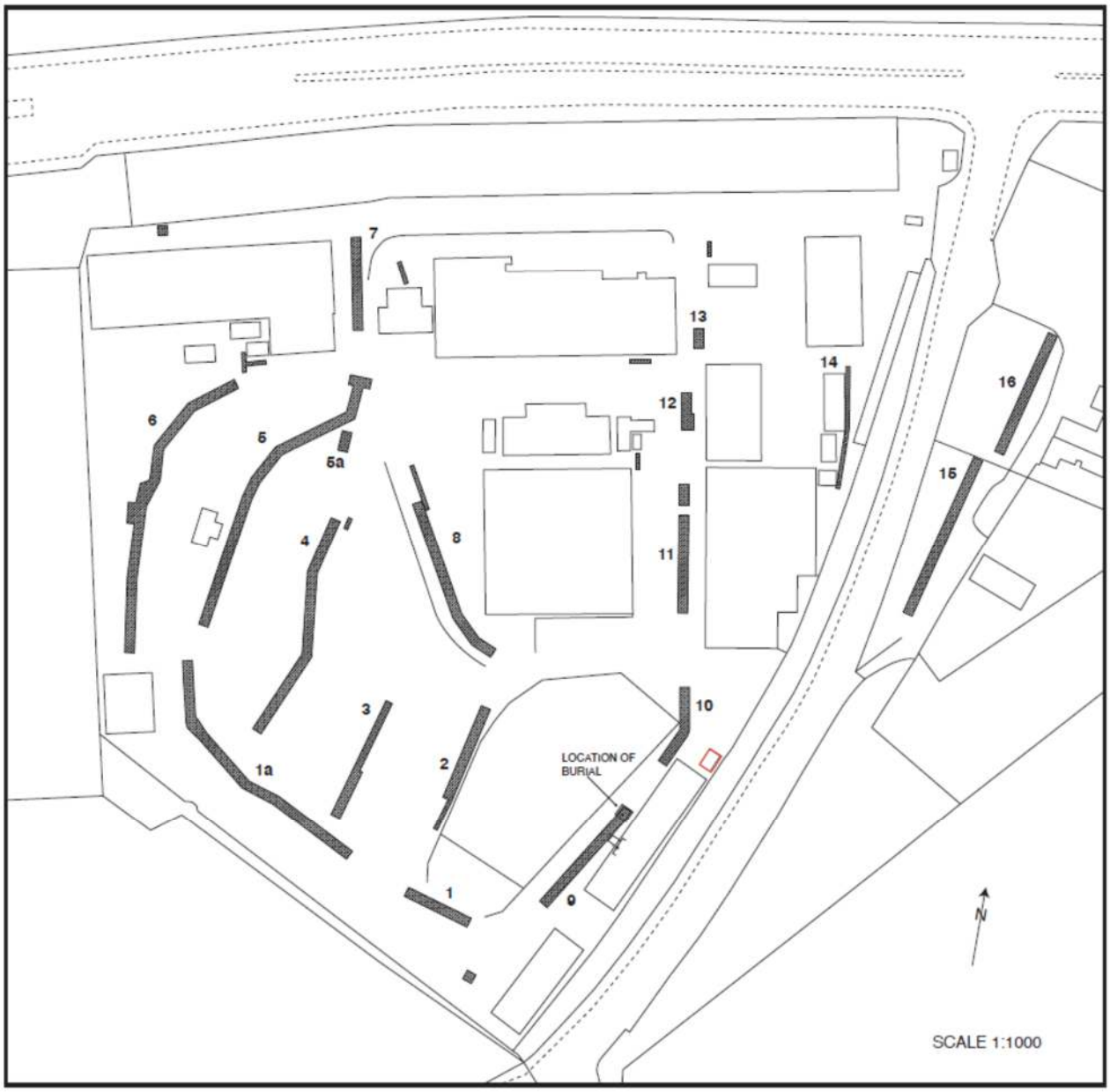
This assessment has been carried out in accordance with the requirements of the European Union (Planning and Development) (Environmental Impact Assessment) regulations 2018-S.I. No 296 of 2018.

1. The chapter has been prepared having regard to the following EPA guidelines and guidance:
2. Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, Draft August 2017);
3. Advice Notes for Preparing Environmental Impact Statements, (Environmental Protection Agency, Draft September 2017);
4. Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);
5. Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

This chapter is based on the following:

- files held in National Monuments (the Record of Monuments and Places listing for the various features on or close to the site is used in this report)
- cartographic sources
- written sources, including archaeological and historical material
- full excavation on site, carried out by the writer, under licence 02E0067 (extension) from National Monuments Service, Department of Culture, Heritage and the Gaeltacht. Licence 02E0067 was initially granted for test excavation on the site, and the extension was granted to continue the full excavation on foot of the grant of permission to develop the site.

Figure 13.3.1 Test Pits from Test Excavation (Licence 02E0067)



The report progresses chronologically through the archaeological and historical accounts of the site and environs. The results of the excavation on this site are detailed in Appendix 13A. A summary list of all known archaeological work in the vicinity of the development site is given in Appendix 13B. A list of sites on the Record of Monuments and Places for Dublin city in the immediate vicinity is given in Table 13.4.10.11. It is considered that none of these sites will be impacted by the proposed development.

No difficulties were encountered in compiling specified information.

Cumulative impacts are assessed in respect of the existing and permitted development in the vicinity of the site, as listed in Appendix 1B of this EIAR, and the future development of adjoining lands. The cumulative impacts of the existing, permitted and future development, in conjunction with the proposed development, on archaeological features are assessed in Section 13.5.1 of this Chapter.

13.4 Receiving Environment

The receiving environment, or subject site, forms an undeveloped section of a much larger site at Heuston Square South, Dublin 8. The larger site is bounded principally by St. John's Road to the north, and Military Road to the east. The formal gardens of the Royal Hospital Kilmainham form the western boundary of the site. The southern boundary is formed by the lands of the Royal Hospital.

The receiving site has frontage to St John's Road and is flanked on the eastern and southern sides by buildings of recent construction. The western part of the site is formed by the boundary wall with the Royal Hospital formal gardens.

The site is presently landscaped as an interim measure, but the entire area of the larger Heuston South Quarter was excavated from 2004 under planning grant ABP ref. PL29S.206528. Development of the previously permitted Blocks 1 and 2 had commenced and was not completed within the life of the relevant permission. Elements of the basement carparks had been constructed. Blocks 5a, 5b and 6 were not commenced. An application to DCC and grant for temporary landscaping DCC 2724/13 was carried out. This comprises of temporary landscaping at basement, podium and ground levels over an area measuring approximately 1.47 ha.

The Residential Scheme site measures approximately 1 ha. The site is presently an infilled basement, with perimeter piling on the north and west sides. The eastern side is composed of the boundary with the completed developments of the 2004 Parent Permission. These have deep basements.

13.4.1 Archaeological and historical context

Prior to development from 2004 onwards, the larger land block was in use as an Eircom depot, and was occupied by modern concrete industrial buildings, and open fenced enclosures. The lands sloped quite sharply northwards and less so eastwards, reflecting the geological influences of the Liffey and Camac rivers. The entire site lies within the lands of the medieval ecclesiastic foundation of Kilmainham, to the west of the river Cammock (Camac) to the north of the high level plateau now occupied by the Royal Hospital. The original topography of the Kilmainham/ Islandbridge triangle, formed by the Liffey- Camac confluence, is a gravel ridge rising to a maximum height of c.23m OD. (O' Brien 1998, 204).

To the north-west of the site, the burial grounds at Kilmainham/ Islandbridge are the location for the richest collection of Norse graves uncovered to date in this country. The Royal Hospital, built between 1680 and 1684, is located close by, or on, the site of the priory of the Knights Hospitallers. This was established in the 12th century, on the site of the early monastery of Cell Maignenn.

Until recently, there have been no certain finds of prehistoric date from the immediate area of Kilmainham. Otherwise, the closest known monuments of prehistoric date were located at Drimnagh, Suffolk St, or at Chapelizod in the Phoenix Park (Stout and Stout 1992, 28; O' Riordain and Waddell 1993). The site at Suffolk St was a cist burial, which contained two flat copper axeheads. Cist and urn burials upriver at Chapelizod are documented by O' Riordain and Waddell (1993, 106). A tumulus which covered a central Neolithic megalithic grave had four small cists inserted into it- these contained pots with cremated bones. Three of the pots are extant.

The Drimnagh burial site was similar to that in Chapelizod, re- using a tumulus over a Neolithic grave. Four secondary burials were uncovered at Drimnagh, including two burials with vessels, one an urn, the other a bowl. The bowl was placed mouth upwards, on a pile of cremated bone (Kilbride -Jones 1939). The location of the Drimnagh tumulus was prominent, with good views over the surrounding countryside. The site at Drimnagh was excavated in 1938 by the OPW with the National Museum of Ireland, as it was threatened by gravel quarrying.

The large corpus of finds of Scandinavian origin, uncovered in the late 19th and early 20th centuries, includes sherds of crude pottery which may well represent disturbed burials of the prehistoric period (information from Dr Stephen Harrison).

The primary source for information on the distribution of these vessels has been O' Riordain and Waddell's corpus of funerary vases of the Irish Bronze age, published in 1993. However, the construction boom altered the distribution map of known sites, particularly skewed towards new infrastructural linear projects. O'Riordain and Waddell's report is of necessity out of date as it does not include all the recent unpublished material, whereas this report has attempted to cover all the more recent findings.

13.4.2 Early medieval Kilmainham

The early seventh century monastic foundation of Cell Maignenn (Kilmainham) is attributed to St Magnenn (Gwynn and Hadcock 1988). Nothing remains of this foundation, and its precise location is speculative. Recently, a timber structure close to the south shore of the Liffey at Clancy Barracks was uncovered, and a dendrochronological analysis for a part of the structure gave a date of 595AD. This suggests that it may have been part of the settlement of Kylmehanok.

A granite cross shaft in Bully's Acre probably dates to this foundation, comparing with other 9th- 11th century crosses (Kenny 1995, 27). The monastery may have occupied the high level ground where the Royal Hospital is sited although the cross shaft and a well, St John's well, to the west of the hospital, also contend for the site of the earlier foundation. Harrison and O' Floinn (2014, 236, Ill 140) have outlined the potential monastic enclosure as aligning very closely with the topography and skirting the subject site to the south. No evidence for any embankment or ditch was uncovered on the subject site. Unfortunately, the escarpment suggested from Rocque's map for the eastern boundary by Harrison and O' Floinn (2014, 148) was formed largely by a late 17th or early 18th century stone revetment with steps, part of the later landscaping associated with the Royal Hospital.

Burials which are probably associated with this early foundation were uncovered by construction work in the 19th and early 20th centuries (O' Brien 1998, 35), while a second cemetery lay approx. 800m west of this, in the region of the War Memorial Park. These burials represent two distinct cemeteries, and significantly suggest the proximity of a 9th century Norse settlement in the vicinity. The location of this settlement is unknown and is the subject of some dispute (O' Floinn 1998). The supposed location of burials and other Norse finds is given in O'Brien's fig. 7.3, reproduced here, but many finds uncovered in the 19th and early 20th century cannot be precisely located. However, the confirmed locations appear to be in the vicinity of the War Memorial Gardens, some distance west of the development site.

13.4.3 Norse Kilmainham

The early medieval cemeteries were reused by pagan Vikings, and the triangular area of land between the Camac and the Liffey confluence is considered by some scholars to be the site of the Viking "longphort", recorded as established in Dubhlinn in 841A.D. Scholars hold this longphort to be the pre- urban Viking settlement of Dublin, which was abandoned in 902A.D. following the expulsion to England of the Viking ruling elite. Others (such as Clarke 1998, 348) strongly refute this suggestion, preferring a site at Usher's Island as a location for the ninth century longphort.

Following the former theory, the town proper was refounded at the Poddle/ Liffey confluence further down river (whose topography mirrors somewhat that of the Camac/ Liffey confluence), when the Viking rulers returned in 917. Recent excavations in Essex St West and elsewhere south of the medieval town of Dublin however have shown conclusively that the site of Dubhlinn was settled from at least the mid- ninth century onwards.

O'Brien (1998, 217) interprets the ninth century Norse burials at Kilmainham/ Islandbridge as those of a settled community of Vikings who were living in a defended longphort settlement close by, or at, the monastery of Kilmainham, and suggests that the original Ath Cliath may have been in this area.

The weapons recovered from the Viking graves reflect the presence of warriors, but other artefacts such as sickles, shears, tongs, pincers, weighing scales, weights, spindle whorls and needle cases also indicate a range of activities from farming to trading to cloth and garment making.

The scattered distribution of Viking burials, with at least four Viking graveyards in the Dublin area as discussed by O'Floinn (1998,133) may reflect a dispersed ninth century settlement, with several nuclei along the Liffey estuary. It is apparent that such a settlement, or settlements, of uncertain form and location, existed at Kilmainham. An early settlement spanning the period of the Norse burials a short distance upriver at Chapelizod was excavated in 2002 by the writer under licence 00E0873 extension.

Limited archaeological excavations in 1999 along the rerouting of Con Colbert Road in Inchicore uncovered no further burials, but pits in the vicinity of the War Memorial Park which contained artefacts which date from the 9th- 10th centuries, are consistent with the Viking Age burials uncovered in the 19th-20th century (Healy 1990, 20). That excavation noted that extensive quarrying of the natural gravel ridge in the modern period had truncated the archaeological remains, which survived to a maximum depth of 0.80m below subsoil.

13.4.4 Medieval Kilmainham

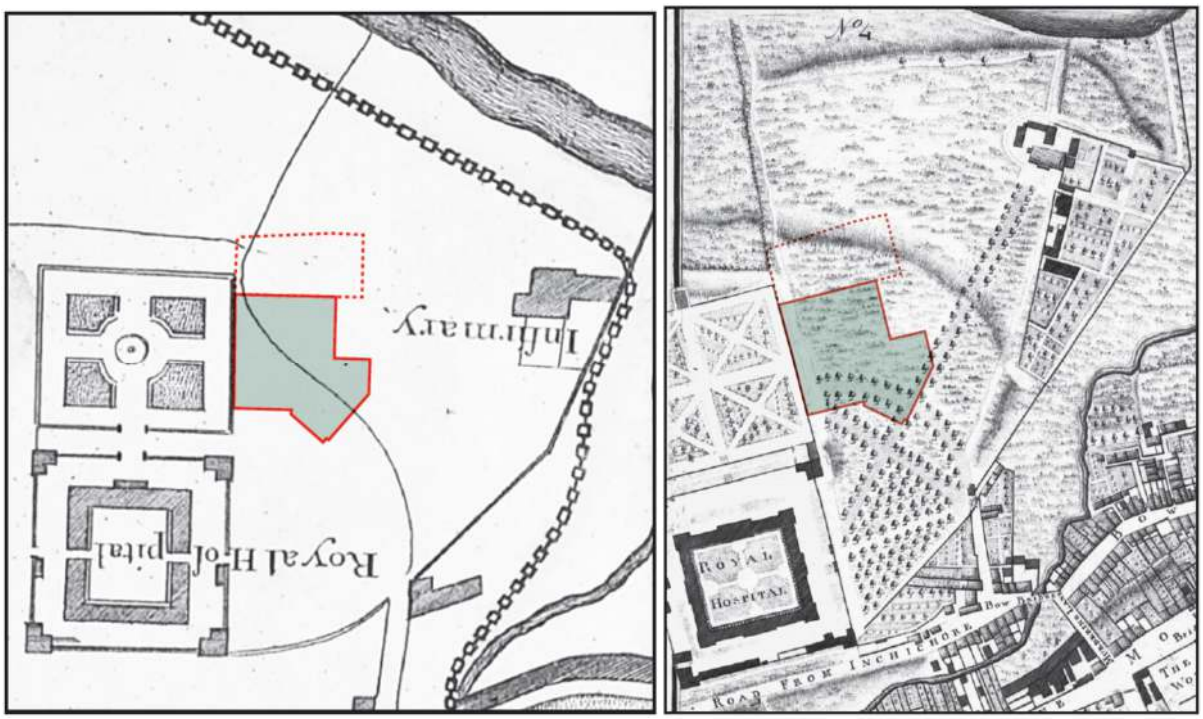
The priory of St John the Baptist (RMP DU 018- 020 285/286) was founded for the Knights Hospitallers at Kilmainham in 1174 by Richard Fitz Gilbert (Strongbow) on the site of the church of St Maignenn (Gwynn and Hadcock 1988, 334). The priory became the chief house of the hospital of St John of Jeruselem in Ireland and received many grants and endowments. It was exempt from all ordinary jurisdiction and was also a hospital and almshouse for the sick. The priory occupied a strategic position on an elevated site to the west of the city.

On dissolution, the buildings at Kilmainham were considered to be among the best in the kingdom. The house, mansion and buildings, church gardens and orchard, were surrounded by stone walls with four towers, and there was a fortified gatehouse with other buildings. The priory also held over 10,000 acres of land throughout the country, with manors, castles, mills and other possessions. The priory held many mills on the Liffey, including that on Mill Island, Kilmainham, Chapelizod, and several on the river Camac. The foundation and mill sites are indicated on Girdler's (1654) map of the Kilmainham area. Girdler depicts an almost square walled and gated enclosure, with a church marked in the north- east corner. A tall structure marked a "castle" is placed in the centre of the enclosure. The foundation was described as follows: an inner and outer enclosure. The inner one held a castle, which had a great hall, surrounded by a quadrangle with towers and an outer ditch. Detached buildings within the quadrangle were used as dormitories. The outer enclosure had gardens, with hay barns and granaries. The church of St John stood near the ancient cross in the cemetery to the west of the buildings described (Kenny 1995, 32-3). A well, known as St John's well, located to the north of Bully's Acre, was venerated throughout the 18th century (Kenny 1995, 45). The old graveyard at Bully's Acre was still in use in the mid- 17th century.

13.4.5 The Deer Park

Following the Restoration in 1660, the Duke of Ormonde, then Lord Lieutenant, initiated the Deere or Phoenix Park on the north side of the Liffey. The park originally included most of the former lands of the Knights Hospitallers, and the enclosing wall of the park, south of the Liffey, is depicted on Thomas Taylor's (1671) map of the park. The wall is depicted on Brooking's map of 1728, and on Rocque's (1756) map of the Royal Hospital. Part of what is probably this late 17th century wall still stands on the east side of Military Rd (RMP DU018- 020409).

Figure 13.4.5.1 Excerpt from Brooking's Map (Left) and Rocque's Map (right)



13.4.6 The Royal Hospital

In 1670-80, Charles II consented to the erection of a retirement home for old soldiers of the Irish forces, to be modelled on the Hotel des Invalides in Paris. The Royal Hospital is probably the finest and best sited building of that period in the city.

In 1679, the site of Kilmainham priory, by then unused and in decay, was chosen as the location for the new hospital. At the time, these lands were part of the Phoenix Park. The new buildings, designed by William Robinson, do not visibly incorporate any of the buildings of the medieval foundation, although some stonework from the medieval foundation was exposed during recent restoration work of the complex (Kenny 1995, 43). The Royal Hospital appears to have been built on a site to the east of the older complex, and much of the stone from the medieval foundation was reused in the late 17th century building. By 1698, there were no visible remains of the medieval foundation. Indeed, the letters patent of Charles II in relation to the Royal Hospital declare that the medieval chapel was the source of stone for the chapel of the Royal Hospital. The Robinson work was completed in 1701, and the building was used as a hospital until 1927. In 1798, the hospital was converted to a temporary citadel for transacting government business, reflecting once again its strategic location on the western flank of the city.

13.4.7 Infirmary

Brooking's (1728) map shows a building (annotated Infirmary) on the east side of Military Road. The Infirmary buildings are depicted in better detail on Roque's map of 1756 along with several other buildings and enclosures to its south. Most of these walls, yards and outbuildings appear to be still standing.

The building complex is mentioned in a description of 1698 (by John Dunton) and was the infirmary of the Royal Hospital. The steward of the hospital and his family a dwelt here. The Infirmary was extended in

1701. The original fabric of this structure is probably incorporated in the present complex of buildings on this site; certainly the outline of the buildings on the modern OS map mirror those on Rocque. The building complex is included in the Record of Monuments and Places (Du 018- 020- 292, 293; infirmary and dwelling). This site is presently undergoing redevelopment.

13.4.8 The Royal Hospital Garden (RMP 018-020528)

The Royal Hospital garden has been recently restored and approximates its early 18th century cartographic rendering. The formal garden was designed as an integral part of the Royal Hospital, and reflects the building in scale. The garden is depicted on Brooking (1728) and Rocque (1756). It is enclosed by limestone walls, with entrances/exits to Hospital lands at its east and west side. There are two original entrances into the subject site. The garden has is a limestone- built gatehouse with brick dressing, centrally placed on the north wall, which is probably late 17th century in date (RMP DU 018-020- 255) and is shown on Rocque. A vaulted passageway leads to the Hospital: a similar brick arched passage was uncovered in recent refurbishment works at the Deputy Master's house. There is a monument over the grave of a Victorian horse in the south- west wall.

The west side of Military Road is shown as open ground/ informal gardens on Rocque's map. This terrain was uncovered in the monitoring, part- excavation and recording carried out under licence 02E067 (extension), see Appendix 13.A. Rocque's map shows several tree-lined avenues, which lead to the formal gardens, and to the Infirmary. The line of St John's Road extended only as far as the Infirmary, and is early 19th century in date. The main entrance to the Hospital was close to Bow Bridge.

13.4.9 The Camac River

The Camac flows through a steep sided valley below the site of the former Priory of St John (now the Royal Hospital) to join the Liffey upstream of Sean Heuston bridge. Prior to the construction of Heuston Station, the confluence of the two rivers was a broad expanse of water at high tide (de Courcy 1996, 63). In 1603, it was necessary for the mayor's party to "take boat to pass over the waters of Cammocke" while riding the franchises of the city. The lower reaches of the river are probably artificially coursed, and a mill race of uncertain antiquity led eastwards to form Usher's Island. The width of the original floodplain of the Liffey/ Camac confluence is uncertain.

There were two mills of medieval date at Kilmainham village. The waters of the Cammock were extensively utilised in the later period for industrial purposes. There are no significant industrial features known in the immediate vicinity of the site.

13.4.10 19th century Kilmainham

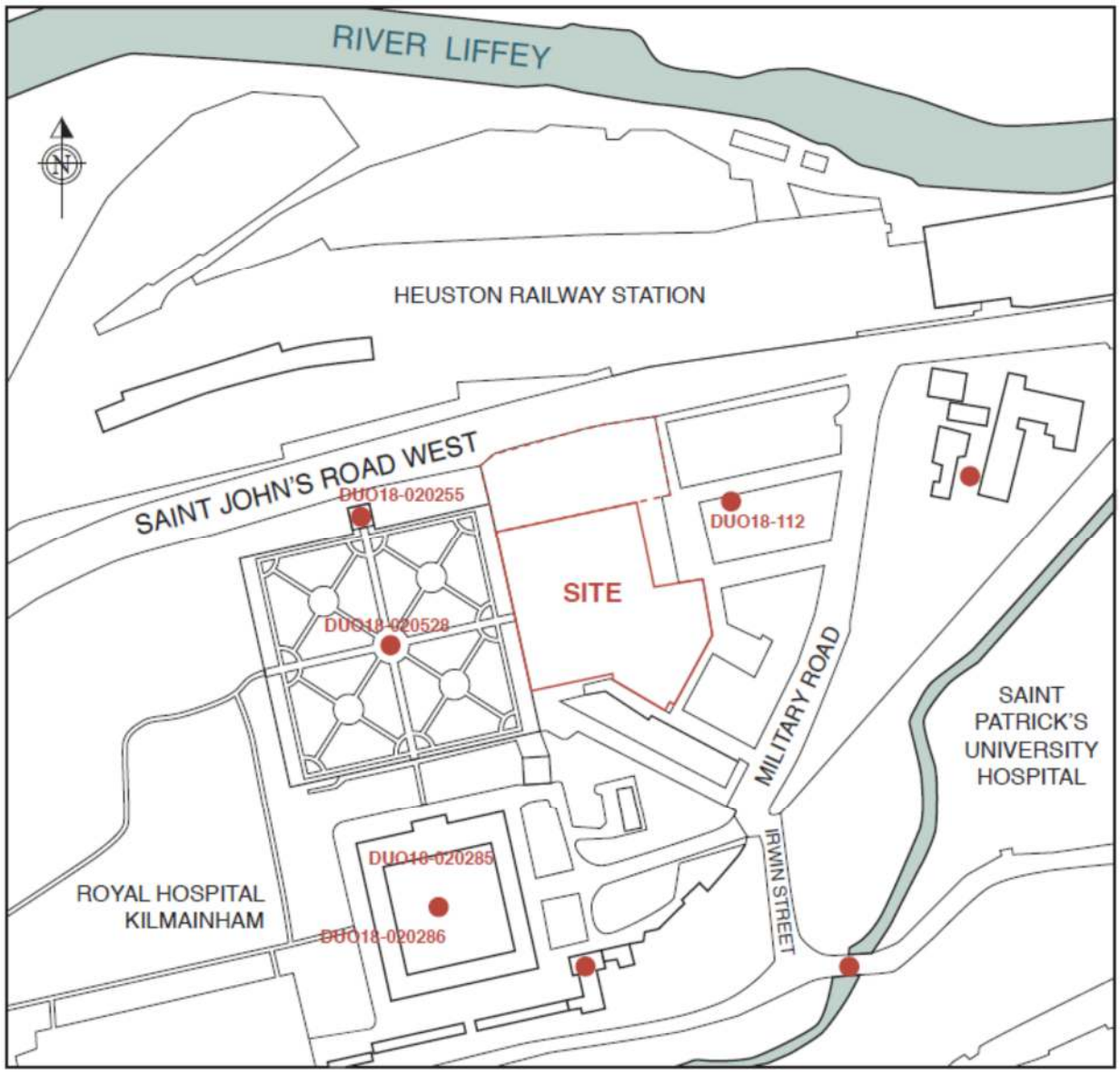
There are no buildings shown on the site on the 1837 OS map. A gravel pit is indicated towards the east side of the site. Evidence for this quarry was uncovered in the course of the test trenching and subsequent monitoring of groundworks.

13.4.10.11 Record of Monuments and Places

The site lies within the zone of notification of DU018-112 and DU018-020528, the garden of the Royal Hospital, see table 13.4.10.11 below. Sites which are entered on the Record of Monuments and Places are

afforded protective status, by virtue of being included on the list and maps of these monuments. Most of the monuments below are scheduled for inclusion in the next revision of the Record of Monuments and Places. Where works are intended to be carried out at or within the zoned of notification of a Recorded or Registered Monument, they are required to give notice to the Minister two months before commencing that work.

Table 13.4.10.11 Sites and Monuments in immediate vicinity of the site



SMR	Classification	Distance from site	Statutory Protection	Excavation
DU018-112	**Pit-burial**	**On site**	**Scheduled for inclusion in next revision of RMP**	**02E067**
DU018-	House, 18th-19th	100m	Scheduled for inclusion	Yes

020255	century		in next revision of RMP	
DU018-020528	Designed landscape	50m	Scheduled for inclusion in next revision of RMP	Yes
DU018-020528	**Hospital**	**100m**	**Scheduled for inclusion in next revision of RMP**	**Yes**
DU018-020286	Religious house-Knights Templars	100m	Scheduled for inclusion in next revision of RMP	Yes
DU018-020254	House, 18th-19th century	150m	Scheduled for inclusion in next revision of RMP	No
DU018-020287	Bridge	200m	Scheduled for inclusion in next revision of RMP	No
DU018-020292	Hospital	150m	Scheduled for inclusion in next revision of RMP	No
DU018-020477	Mill, unclassified	300m	Scheduled for inclusion in next revision of RMP	No
DU018-020341	Hospital	400m	Scheduled for inclusion in next revision of RMP	No

13.5 Identification of Likely Significant Impacts

As the area of the site has been reduced several metres below the archaeological/ subsoil level, and consists now of a basement, there can be no impact on archaeological material by completion of the development. Any features of archaeological significance were excavated under Licence 02E0067 in 2004 and the following year. All development of this application will take place within the developed footprint which has been subject to archaeological monitoring and excavation, where necessary. All features have been preserved by record.

Redevelopment of the site over the existing basement will have no impact, significant or otherwise, on archaeological features.

There will be no impact on DU018-112, the pit-burials of late Neolithic date, as these have been preserved by record, having been excavated in advance of the development in 2004-5. There will be no impact on DU018-020528, as the basement wall has been inserted along the outside of the garden boundary wall in construction following archaeological excavation in 2004-2005.

13.5.1 Cumulative Impacts

There will be no cumulative impacts as a result of existing, permitted or future development on DU018-112, the pit-burials of late Neolithic date, as these have been preserved by record, having been excavated in advance of the development in 2004-5. There will be no impact on DU018-020528, as the basement wall has been inserted along the outside of the garden boundary wall in construction following archaeological excavation in 2004-2005. This applies also to any further development of the site, and the future development of the HSQ commercial site.

13.6 Do Nothing Scenario

There would be no impact on archaeological material if the proposed development were not to take place.

13.7 Hazards or Accidents

No risks to archaeological heritage have been identified arising from hazards or accidents at the site or caused by the proposed development.

13.8 Mitigation Measures

As a deep basement with perimeter piling has been already constructed on the site, there are no mitigation measures required in respect of further development over the footprint of the basements. All mitigation measures in respect of archaeology have been previously undertaken, in the form of test excavation, monitoring, recording and planning of archaeological features uncovered through this process. The results are presented in Appendix 13.A.

The site lies within the zone of notification of DU018-112 and DU018-020528, the garden of the Royal Hospital. Where works are intended to be carried out at or within the zoned of notification of a Recorded or Registered Monument, they are required to give notice to the Minister two months before commencing that work. This is a regulatory requirement.

No mitigation measures are required during the operational phase.

Table 13.8.1 Table of Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Recorded Monuments DU018-112 and DU018-	Give notice to the Minister for Housing, Local Government and Heritage two months before commencing work at the site.

020528.	

13.9 Residual Impacts

There are no anticipated residual impacts from the development.

13.10 Interactions Arising

Interactions are neutral, and imperceptible. There are no interactions with other aspects of the environment in terms of the archaeological heritage.

13.11 Monitoring

No monitoring is required in relation to archaeological heritage in respect of this proposed development.

13.12 References

Clarke, H. (1998) Proto- towns and towns in Ireland and Britain in the ninth and tenth centuries in eds Clarke et al Ireland and Scandinavia in the early Viking age.

de Courcy, J. (1996) The Liffey in Dublin.

Excavations 1989- 1999 ed I. Bennett. Also www.excavations.ie

Gwynn, A. and Hadcock, R.N. (1988) Medieval religious houses Ireland.

Harrison, S. and O' FLoinn, R. (2014) Viking Graves and Grave-Goods in Ireland. Medieval Dublin Excavations, 1962-81, Ser. B, vol. 11 (2014).

Kenny, C. (1995) Kilmainham the history of a settlement older than Dublin

O' Brien, E. (1998) The location and context of Viking burials at Kilmainham and Islandbridge, Dublin in (eds Clarke et al) Ireland and Scandinavia in the early Viking age.

O' Brien, E (1998) A reconsideration of the location and context of Viking burials at Kilmainham/ Islandbridge, Dublin in ed C. Manning Dublin and beyond the Pale: essays in honour of Patrick Healy

O' Floinn, R. (1988) The archaeology of the early Viking age in Ireland in (eds) Clarke et al Ireland and Scandinavia in the early Viking age.

O' Riordain, B. and Waddell, J. (1993) The funerary bowls and vases of the Irish Bronze Age. Galway University Press.

Stout, G. and M. (1992) Patterns in the past: county Dublin 5000BC- 1000BC in F.H.A. Aalen and K. Whelan (eds) Dublin City and County: from prehistory to present.

14. CULTURAL HERITAGE: ARCHITECTURAL HERITAGE

14.1 Introduction

This chapter of the EIAR focuses on the architectural heritage of the subject site and surrounding areas, including designated and non-designated architectural heritage of merit in the vicinity. The purpose of this study is to appraise the and to assess the potential and predicted impacts on architectural heritage arising from the proposed development and to describe the proposed mitigation measures.

This chapter has been prepared by James Howley, FRIAI, SCA, Director of Howley Hayes Architects, and Dr Niamh Marnham of Howley Hayes Architects, based in Blackrock, Co. Dublin. James Howley has over thirty years' experience in architectural practice and is an RIAI Conservation Architect Grade I Architect. Dr Niamh Marnham is a historic buildings consultant. Niamh has a PhD in Architectural History and Conservation, a PgDip in Conservation and over eighteen years' of experience working in architectural and multi-disciplinary design practices in Dublin and London. She is the author of *An Introduction to the Architectural Heritage of Dublin South Cit*y (Dublin: DoEHLG,2017).

The application sites form part of a larger development site known as Heuston South Quarter (HSQ). This existing mixed-use development consists of 403 apartments, office space and retail. The HSQ site is bounded by St. John's Road West, to the north, Military Road to the east, and by the formal gardens of the Royal Hospital Kilmainham (RHK), to the west and south.

The HSQ lands are in close proximity to Heuston Rail Station and the LUAS Red Line service and are within easy reach of the City Centre. The HSQ site is immediately adjacent to the classical formal garden setting of the internationally significant Royal Hospital Kilmainham complex (RHK) (RPS 5244/NIAH 50080072), and within the vicinity of a number of nationally or regionally significant cultural or historic complexes or protected structures, including Kilmainham Gaol (NIAH 50080047) and Kilmainham Courthouse (RPS 4232 /NIAH 50080050), St. Patrick's Hospital (RPS 856/NIAH 50080086), Heuston Station (RPS 7576/ NIAH 50080035), the Guinness Brewery and Dr Steevens Hospital (RPS 7840 / NIAH 50080083) (See Fig. 14.1.1).

Table 14.1.1 Structures or groups of structures potentially impacted by the proposed development related to the map (Figure 14.1.1) above.

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
1	5244	50080072 / International	Military Road, Dublin 8	The RPS entry includes: the former Adjutant General's office, former Deputy Master's offices, steel house, tower at western gate, garden house in formal gardens, garden features, entrance, gates and walls. The principal range of the RHK is considered to be one – if not the – finest public buildings in Ireland. The NIAH ascribes an 'international' rating to this principal range. and its wider complex comprises a variety of structures and places that have been ascribed a variety of

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
				ratings (set out below this table). Its historic setting has been comprehensively altered over the years by the advent of the railways, incremental development of variable quality, and by the construction of phase 1 of the HSQ development which stands asymmetrically at odds with the RHK and its formal garden setting.
2	4256	50080065/ Regional	Kilmainham Lane, Dublin 8	Garda Station: All buildings. The broader RHK grounds provide the principal – and highly significant - setting of this historic complex.
3	N/A	59980052/ Regional	Bully's Acre Graveyard, off SCR	Graveyard bounded by historic stone wall that incorporated part of St. John's Priory. The broader RHK grounds provide the principal –- setting of this historic complex. The construction of the South Circular Road has compromised the approach to the Bully's Acre but the large boundary walls largely screen this.
4	N/A	50080053	Off St. John's Road West, Dublin 8	Military cemetery for RHK established c.1680 (incorporating earlier graves associated with St. John's Priory). The broader RHK grounds provide the principal –- setting of this historic complex. The construction of St. John's Road has somewhat compromised the approach to it but the large boundary walls largely screen this.
5	1851	NIAH Multiple Entries / Regional	Former Clancy Barracks, South Circular Road, Islandbridge, Dublin 8	Multiple former barracks buildings, warehouses etc, now incorporated into a new mixed use development which integrates a number of large scale blocks which have altered the historic scale and grain of the setting of the designated architectural heritage of the complex.
6	7576	50080033 / National	St. John's Road West, Islandbridge, Dublin 8	Heuston Station. A number of more recent infrastructural and large scale commercial developments have altered the setting of the principal edifice of the complex, which is a protected structure.

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
7	3993	50080082 / Regional	Infirmary Road, Dublin 7	Department of Defence (formerly Gandon's Royal Infirmary): stone wall and 3-storey brick & stone building. A large 1930s pastiche extension has compromised the composition of Gandon's building and is now the most prominent form to be seen in views from the RHK, which have been altered considerably in the last 150 years by the advent of the railway and more recent development of variable quality.
8	6760	50060115 / National	Military Road, Phoenix park, Dublin 7	Magazine Fort. Views to and from the fort have been comprehensively altered in the intervening years since it was constructed by the arrival of the railway and associated infrastructure, and more recent development variable quality. Mature tree growth also screens this view.
9	6762	50060116 / National	Wellington Road, Phoenix Park, Dublin 7	Wellington Monument. The Phoenix Park provides the principal setting for the monument but views towards the RKH have been altered and encroached upon by more recent development such as phase 1 of the HSQ development and the redevelopment of Clancy barracks. The top of the WMis now just visible above a screen of mature trees.
10	7840	50080083 / Regional	Steevens' Lane, Dublin 8	Dr Steevens' Hospital (original building). Building fronts onto St. John's Road West. The historic setting of Dr. Steevens' Hospital has been considerably compromised over the years by the advent of the railways, the construction of St. John's Road West, Phase 1 of the HSQ development together with the car park in front of it.
11	856	50080086 / National	Bow Lane West, Dublin 8	St. Patrick's Hospital: original building, original wall & gates and gatehouse. The setting of St. Patrick's Hospital has been compromised by the addition of poor quality later additions, the car park and its view towards the RHK altered by the construction of phase 1 of the HSQ

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
				development.

Figure 14.1.1 Architectural Heritage potentially impacted by the proposed development

Note: the numbers on the map relate to structures or groups of structures – such as the RHK – potentially impacted by the proposed development. Some of these are on DCC's RPS, some are on the NIAH, and some are on both and they are described in the Table. The proposed site boundary is outlined in red.

14.2 Characteristics of the Proposed Development

The proposed development will consist of a residential development of 399 no. 'Build To Rent' residential units and all ancillary and associated uses, development and works, and a retail unit of 120 sq m, on a site of 1.08 ha. The proposed development consists of:

- Site clearance and localised demolitions to remove part of the podium and Basement Level -1 reinforced concrete slabs at the interface of the proposed Blocks A and B, together with the incorporation of part of the existing double basement level structure extending to approximately 7,613 sq.m over two levels (excluding an area of 3,318 sq.m that will be backfilled at Basement Level -1) within the proposed development.

- The construction of 5 no. buildings (Blocks A to E) ranging in height between 3- to 18-storeys over double basement level / podium level to provide a residential / mixed use development to provide 399 Specific BTR (Build to Rent) units with a total gross floor area of 29,391 sq.m, comprising 46 no. studios, 250 no. one bedroom units, and 90 no. 2 bedroom / 3 person units; internal communal ancillary residential services / amenities to include a shared co-working area / lounge (178 sq.m) and gym (102 sq.m) at lower ground floor level, and lounges on either side of a residential foyer at ground floor / podium level within Block A (196 sq.m), and a TV Room / lounge (57 sq.m) at ground floor / podium level within Block C.

- An independent retail unit (120 sq.m) is proposed at ground floor / podium level within Block B.

- A double basement is provided that will be integrated within the existing basement levels serving the wider HSQ development and will be accessed from the existing vehicular ramped accesses/egresses onto/off St. John's Road West and Military Road to the north and east, respectively. Basement level -1 provides: a refuse store; 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces); 4 no. motorcycle parking spaces; secure bicycle parking / storage in the form of 251 no. double stacked cycle parking spaces providing capacity for 502 no. secure bicycle storage spaces for residents. An additional 49 no. Sheffield type bicycle stands are provided at basement level -1 to provide 98 no. visitor cycle spaces (inclusive of 8 no. designated cargo bike spaces, that will also be available for the shared use with residents of the scheme) and a further 55 no. Sheffield type bicycle stands are provided at podium level to provide 110 no. cycle parking spaces (108 no. visitor cycle parking spaces (inclusive of 6 no. designated cargo bike spaces) and 2 no. cycle parking spaces in connection with the retail unit). All bicycle parking at basement level is accessed via a dedicated cycle lift from podium to basement level -1 that is situated to the south of Block B.

- Works proposed along the St John's Road West frontage include the omission of the existing left-turn filter lane to the vehicular ramped access to the HSQ development and re-configuration of the pedestrian crossings at the existing junction together with the re-configuration of the existing pedestrian crossing over the westbound lanes of St. John's Road West leading to an existing pedestrian refuge island. Re-alignment of the existing footpath along the site frontage onto St John's Road West to tie into the reconfigured junction arrangement and provision of a link to a new lift to provide wheelchair access from St John's Road West to the HSQ podium.

- Communal Outdoor Amenity space is provided for residents in the form of rooftop terraces (totalling 1,179sqm), and lower-level communal courtyards between blocks (totalling 960sqm).

- Hard and soft landscaping works are proposed at podium level which includes the extension and completion of the public plaza to the east of Block A; the provision of footpaths; a MUGA (Multi Use Games Area) and informal play areas for children (totalling 1,670sqm).

- A double ESB substation/switch room at ground / podium level within Block A, and a single substation/switch room at ground / podium level within Block B together with associated site development works, which , which includes the realignment / reprofiling of an existing vehicular access ramp at the southern end of the site between basement levels -1 and -2 and the closure / removal of a second vehicular access ramp between the subject site at basement level -1 and the raised basement level -1 under the Telford building.

14.2.1 Critical Aspects of the Proposed Development

The following are the key facets of the proposed development that will have an impact on the setting of the RHK and its formal gardens and potentially on other architectural heritage in the wider vicinity.

- The height, massing, rhythm and architectural detailing of the proposed scheme which ranges between 3 and 18 storeys;

- The proximity of the proposed development to the historic boundary wall of the formal gardens of the RHK and the RHK itself;
- The chosen palette of materials;
- The associated planting, landscaping and public realm / place-making.
- Signage - both temporary and permanent;
- Lighting – both temporary and permanent.

14.3 Assessment Methodology

14.3.1 Desktop Study

A desktop study of the Dublin City Development Plan (2016-2022) and the Record of Protected Structures (RPS), as set out therein, and the National Inventory of Architectural Heritage (NIAH) was carried out to identify structures and places of architectural heritage value in the vicinity of the proposed development, and relevant national policies and specific policies relating to the protection of Dublin's historic environment. Howley Hayes Cooney Architecture conducted extensive research of relevant primary and secondary source material to understand the history and significance of these structures and places including:

- Historic mapping (from 1685 to the present) including Brooking (1728), Rocque (1756) and the first and revised editions of the Ordnance Survey from the Glucksman Map Library, TCD, and www.map.geohive.ie;
- Historic paintings and topographical views relevant to the site and its wider context;
- Historic architectural drawings, photographs and ephemera (National Library of Ireland, Irish Architectural Archive, Dictionary of Irish Architects);
- Casey, Christine (Ed.), *The Buildings of Ireland: Dublin* (London: Yale, 2005).
- Craig, Maurice, *Dublin 1600-1860* (London: 1992);
- Lewis, Samuel, Topographical Dictionary of Ireland (London, 1837);
- Marnham, Niamh, An Introduction to the Architectural Heritage of Dublin South City (Dublin: DoEHLG, 2017)
- McParland, Edward, Public Architecture in Ireland 1680-1760 (London: Yale, 2005).

The study referenced the following legislation and guidance documents:

- the Planning and Development Act 2000 (as amended);
- The Architectural Heritage Protection Guidelines for Planning Authorities' (DoEHLG, 2011);

- Advice Notes for Preparing Environmental Impact Statements Draft (EPA, 2015);
- Guidelines on the Information to be contained In Environmental Impact Assessment Reports Draft (EPA, August 2017).

14.3.2 Site Visits

Three site visits were undertaken, in July and October 2020 and March 2021, to ascertain the location, character and significance of architectural heritage within the receiving environment, to determine the likely impact of the proposed development on it.

14.3.3 Identification of Impacts

There are no protected structures or structures recorded on the NIAH within the proposed development site so the principal potential impacts on built heritage standing outside the site will be visual. Views of the proposed development to and from surrounding locations of architectural heritage have been considered through assessment of verified three dimensional views.

Computer Generated Images have been prepared by Modelworks from 24 locations in the area surrounding the proposed development but only views relevant to the architectural heritage have been assessed. These provide an indication of the likely visual impact of the proposed development both individually and within the wider urban context. Views 1-3 are more distant views, whereas 4-13 are near views taken within the immediate setting of the Royal Hospital and its garden. Views 14-18 are taken from the wider grounds of the RHK and views 19-24 are longer distance views, mostly taken from the north side of the Liffey and the Phoenix Park.

There are, however, no potential visual impacts in proposed views 2, 3,16 and 24, and therefore these views do not form part of the assessment.

As the photomontages showing the cumulative impact are only rendered as an undesigned outline of a single commercial building, and not a finalised expression of what the scale, massing and materiality will be, the assessment of impact is therefore limited to what is outlined at this stage by the blue line. The commercial building will be the subject of a separate application, therefore a separate EIAR will accompany it and will assess the impact finalised form.

The cumulative impact was assessed with reference to existing and permitted development as set out in Appendix 1B.

Figure 14.3.3.1 Photomontages: Site boundary outlined approximately in red.

Table 14.3.3.1 Description of Views Assessed[1]

View	Description	Location in relation to site:
View 01	View westwards from St. John's Road west with Heuston Station to the north and Dr Steevens' Hospital to the south.	North-East
View 04	View from the west of the former Deputy Master's House	South-West
View 05	View from the north-east of the former Deputy Master's House	South-West
View 06	View from the central path in front of the northern elevation of the RHK looking north	South-West
View 07	View from road in front of the northern elevation of the RHK looking towards the proposed site to the north-east	South-West
View 08	View from the steps to the formal garden of the RHK looking towards the proposed site to the north-east	South-West
View 09	View from the central axis of the formal garden of the RHK	West

[1] There are no potential visual impacts in proposed views 2, 3,16 and 24, and therefore these views do not form part of the assessment.

	looking east	
View 10	View from the garden pavilion in the RHK formal gardens looking east	West
View 11	View from west of the garden pavilion looking towards the proposed site	West
View 12	View from the extreme north-west of the formal garden looking towards the site	West
View 13	View from the extreme west of the formal garden looking along the formal axis towards the proposed site to the east	West
View 14	View from the centre of Bully's Acre looking east towards the proposed site	West
View 15	View from the south-west of Bully's Acre looking east	South-West
View 17	View from St. John's Road West looking towards the proposed development	North-West
View 18	View from the junction of St. john's Road West and South Circular Road (SCR)	North-West
View 19	View from the west of the Magazine Fort, Phoenix Park, towards the proposed development site.	North-West
View 20	View from the eastern side of Chesterfield Avenue, Phoenix Park	North
View 21	View from the western side of Chesterfield Avenue, Phoenix Park, towards the proposed development site.	North
View 22	View from the car park to the north-west of the Courts of Criminal Justice, Parkgate Street	North-East
View 23	View from Small Park, Wolfe Tone Quay	North-East

14.3.4 Description of Impacts

Significant impacts arising from the proposed development have been described using the methodology in the Environmental Protection Agency's (EPA's) Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports Draft, August 2017. Cumulative impacts have been assessed in respect of existing and planned development in the area, in particular the future development on the site to the immediate north of the subject site (as set out in Appendix 1B). However, as already stated, this

assessment of the future commercial site, is limited to and assessment of its blueline as it as yet unfinalised. When the commercial application is lodged, an EIAR will accompany it and assess its finalised scale, massing and materiality.

Whenever appropriate the following terms are used to describe the degree, quality and duration of an impact: (Note this is based on the EPA Advice Notes and Guidelines) and provided in table 14.3.3.1 below.

Table 14.3.3.1 Terms use to describe potential impacts.

Impact Significance Criteria Impact Criteria	Description
Profound	An impact which obliterates sensitive characteristics;
Significant	An impact which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment;
Moderate	An impact that alters the character of the environment in a manner that is consistent with the existing and emerging trends;
Slight	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities;
Imperceptible	An impact capable of measurement but without noticeable consequences.

The following terms are used to describe the quality of change:

- Positive impact: A change that improved the quality of the environment;
- Neutral impact: A change that does not affect the quality of the environment;
- Negative impact: A change that reduces the quality of the environment;

The follow terms are used to describe the duration of impacts as described in the EPA Guidelines are as follows:

- Temporary impact: lasting one year or less;
- Short-term impact: lasting one to seven years;
- Medium-term impact: lasting seven to fifteen years;
- Long-term impact: lasting fifteen to sixty years;
- Permanent impact: lasting over sixty years.

14.4 Receiving Environment

14.4.1 Planning Policy Context

The site is zoned as part of a Strategic Development and Regeneration Area (SDRA), which commenced in 2005, with a mix of residential, commercial and retail. In the Dublin City Development Plan, 2016–2022, the Heuston South Quarter site is zoned Z5: *'to consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity.'* This zoning objective applies throughout the city centre area, while the Heuston Quarter South site and the RHK are also included within SDRA 7: *Heuston Station and Environs Area,* and is designated as a Conservation Area, containing a number of highly significant protected structures, including the internationally important Royal Hospital complex (RPS 5244) and its setting.

Further points relevant to SDRA 7 in the Dublin City Development Plan 2016-2022 include:

2: To incorporate sustainable densities in a quality contemporary architecture and urban form which forges dynamic relationships with the national cultural institutions in the Heuston environs;

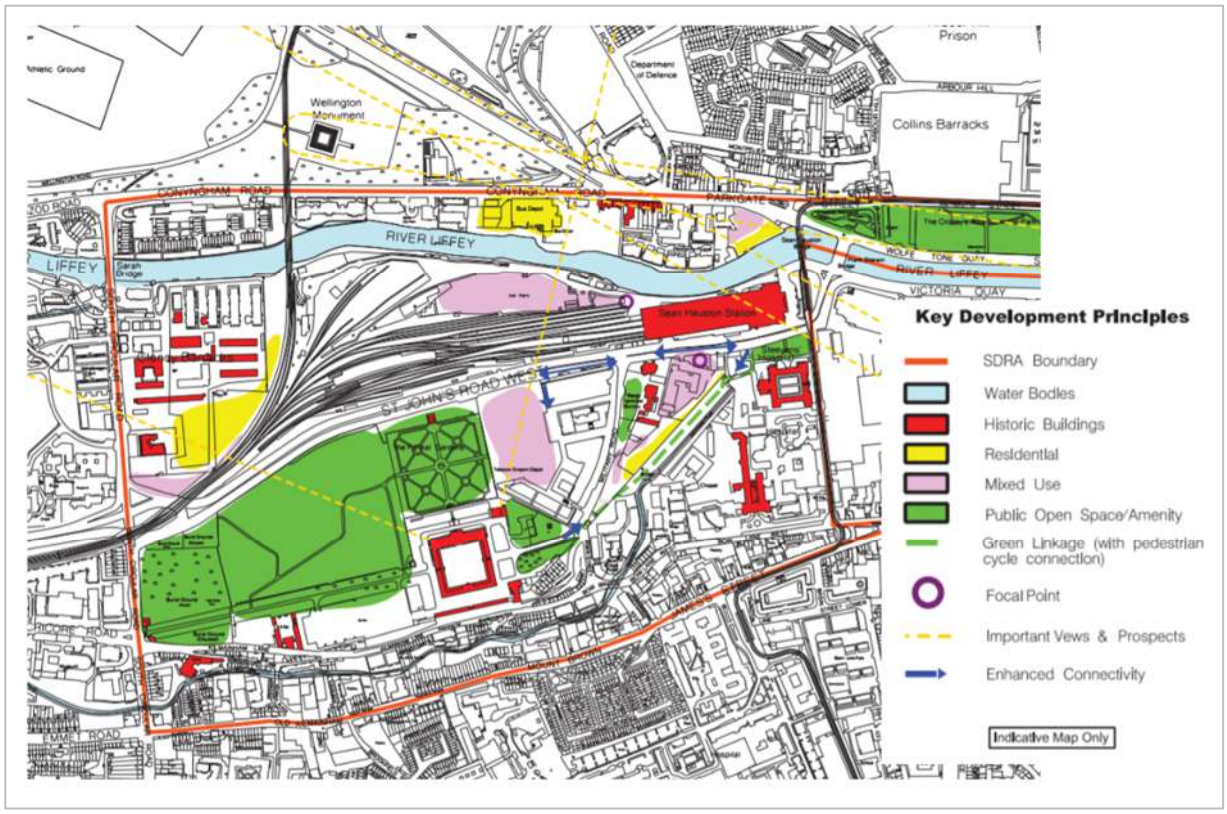
4: To protect the fabric and setting of the numerous protected structures and national monuments, many of which are major national cultural institutions;

7: As a western counterpoint to the Docklands, the Heuston Gateway potentially meritsbuildings above 50m (16-storeys) in height in terms of civic hierarchy.

Point 8 of the guiding principle for SDRA 7 states that:

…the 'cone of vision,' as set out in the 2003 Heuston Framework Plan represents a significant view between, the Royal Hospital Kilmainham and the Phoenix Park, extending from the west corner of the north range of the Royal Hospital Kilmainham and the north-east corner of the Deputy Master's House to the western side of the Magazine Fort and east edge of the main elevation of the Irish Army Headquarters [the former Royal Military Infirmary] respectively. Any new developments within this 'cone' shall not adversely affect this view…

Figure 14.4.1.2 SDRA 7's Key Development Principles, including DCC's 'Cone of Vision'.



Chapter 11: Built Heritage and Culture of the Dublin City Development Plan 2016-2022 sets out the Planning Authority's policies with regard to architectural heritage. Policy CHC1 provides that it is a policy of the Planning Authority;

'to seek the preservation of the built heritage of the city that makes a positive contribution to the character, appearance and quality of local streetscapes and the sustainable development of the city.'

Further to this, Policy CHC4 states the following;

It is the policy of Dublin City Council to protect the special interest and character of all Dublin's Conservation Areas. Development within or affecting a conservation area must contribute positively to its character and distinctiveness, and take opportunities to protect and enhance the character and appearance of the area and its setting, wherever possible. Development will not:

1. Harm buildings, spaces, original street patterns or other features which contribute positively to the special interest of the Conservation Area;

2. Involve the loss of traditional, historic or important building forms, features, and detailing including roofscapes, shop-fronts, doors, windows and other decorative detail;

3. Introduce design details and materials, such as uPVC, aluminium and inappropriately designed or dimensioned timber windows and doors;

4. Harm the setting of a Conservation Area;

5. Constitute a visually obtrusive or dominant form.

[Relevant]Enhancement opportunities may include:

1. Replacement or improvement of any building, feature or element which detracts from the character of the area or its setting;

2. Re-instatement of missing architectural detail or other important features;

3. Improvement of open spaces and the wider public realm, and re-instatement of historic routes and characteristic plot patterns;

4. Contemporary architecture of exceptional design quality, which is in harmony with the Conservation Area

14.4.2 Site Description

The St. John's Road West frontage of the proposed site area is characterised as an urban road, with the approach to Heuston station on the opposite side of the road. This transportation corridor is the main road and rail artery to the west of the country. The HSQ site provides a transition from the functional urban transportation character, to the north, to the high amenity value of the RHK and its formal gardens to the west. The RHK and its gardens to the south and west, and the curved tree-lined avenue along Military Road to the east - which terminates at the entrance to the Hospital - provide for an urban character of exceptional quality to the east, west and south.

The proposed site area, which is at the lower car park level within the HSQ development, was temporarily landscaped as an open grass area with tree planting. There was tree-planting at the edges of the open car park edge pending further development. A large, more recent, retaining wall abuts the site to the west, which in turn abuts the taller nineteenth century (replacement) boundary wall of the formal RHK gardens.

The site of the proposed development and its context are the product of centuries of history and many hands and influencing forces. The RHK (RPS 5244/NIAH 50080072) played a key part in the subsequent development of both the area but also the manner in which Dublin evolved subsequently as a modern city. The section below sets out the historic development of the site, focusing on the RHK and how it and its broader setting has changed in the intervening years, before then detailing the architectural heritage in the vicinity that is likely to be affected by the proposed development.

Figure 14.4.2.1 View from the HSQ site of the temporary landscaping and modern retaining wall, with the wall to the RHK gardens behind, to the west.

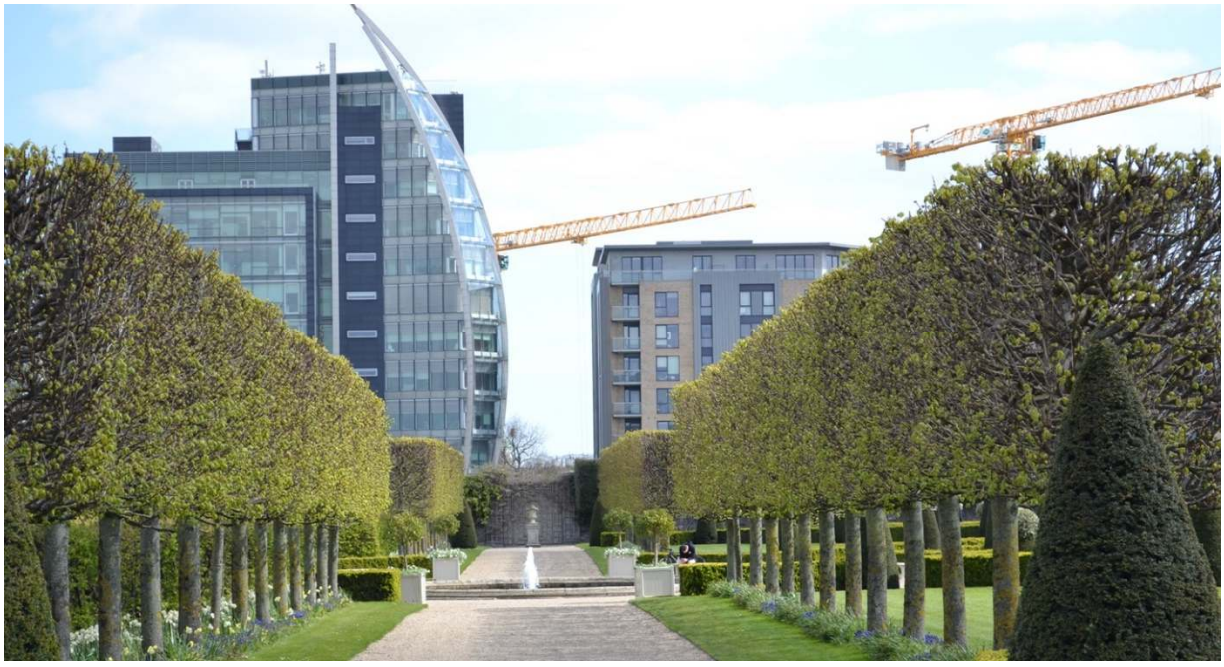
Figure 14.4.2.2 View towards the boundary wall of the RHK gardens from the decked area of the HSQ site above the car park.

Figure 14.4.2.3 Phase 1 of the HSQ development viewed from 'Bully's Acre', with the RHK to the south (right).

Figure 14.4.2.4 View from the north (principal) elevation of the RHK towards its formal gardens, more recent development along Conyngham Road and the Wellington Monument beyond.

Figure 14.4.2.4 View from the north (principal) elevation of the RHK towards the north-east and phase 1 of HSQ and the more recent Criminal Courts at Parkgate Street (at centre).

Figure 14.4.2.6 View from the central avenue of the RHK's formal garden towards the existing HSQ site, to the east.



14.4.2.1 Early History

The name 'Kilmainham' derives from the Gaelic Cill Maignenn, which means the church of Maignenn, an early seventh-century Irish saint. According to Samuel Lewis's *Topographical Dictionary of Ireland* (1837):

> *'…on or near the site of this monastery was erected the ancient priory of Kilmainham, founded in 1174 for Knights Templars by Richard Strongbow, Earl of Pembroke, which was dedicated to St. John the Baptist.'*

Lewis tells us that the buildings were '*..spacious and very elegant of design; it was frequently the residence of the lords-deputies…'* and, according to Christine Casey in *The Buildings of Ireland: Dublin,* they remained in occupation until the Dissolution of the Monasteries (1536-1541), at which point it was regarded as one of the finest buildings in the country. Fragmentary ruins of the Priory survived until the 1680s, when stone from the church was reused in the building of the Royal Hospital, the building that was to become the focal point of the area and subsequent development in and around it.

Figure 14.4.2.1.1The principal (north) elevation of the RHK addressing its formal gardens today.

Following the Restoration in 1660 of King Charles II, the civic-minded James Butler (1610-88), First Duke of Ormonde, was appointed as Viceroy of Ireland. Driven by Ormonde's desire to make Dublin a splendid capital - and spearheaded by the Lord Mayor- there began a re-ordering and expansion of the existing medieval city, on the model of a 'classical' European capital. Without doubt, the finest public building of Ormonde's tenure as Viceroy is the RHK. Founded in 1684 as a home for 300 pensioners and army veterans, the building was financed by a small deduction on the pay of the regular serving army.

The Royal Hospital was sited to the east of the ruins of the Priory of the Knights Hospitallers, which, according to Maurice Craig in Dublin 1660-1860 was *'…a magnificent situation, dominating the whole district…*' It was removed from the fumes of the city, on high ground in - according to Thomas Wilson's 1713 Account of the Foundation of the Royal Hospital - a '*countrified neighbourhood*,' above the south bank of the River Liffey.

At that time, the Royal Hospital enjoyed commanding views across to the recently laid out Royal Hunting

Park, now known as the Phoenix Park, of 1662 that extended to the north. This relationship can be clearly seen on An Exact Survey of the City of Dublin and Part of the Harbour of 1685, which shows the Royal Hospital enclosed behind walls with its principal, north elevation addressing a formal garden of geometrical parterres, with northerly views across to the 'Deer Park' beyond. The area that today forms the HSQ site was then part of the Royal Hospital grounds but was undeveloped.

Figure 14.4.2.1.2 An Exact Survey of the City of Dublin and Part of the Harbour of 1685.

The Duke of Ormonde - who had just begun his second term as Viceroy - is credited with *'…obtaining royal favour for the endeavour…'*, and construction began in 1680, to the designs of William Robinson (1645-1712), an engineer and later Surveyor General. Ormonde laid the foundation stone at the north-west corner of the hospital site in 1680 and presided over its completion four years later.

14.4.2.2 Les Invalides & The Royal Hospital, Chelsea

Built on an audacious scale, the vast Renaissance form of the hospital was unlike anything the late medieval Dublin had witnessed, and it would become the most illustrated building in early views of it. The principal architectural inspiration was found in Hôtel Les Invalides in Paris (1670-1676), the first building of its type ever constructed. Completed just eight years later, the Royal Hospital Kilmainham (RHK) was the second, predating Christopher Wren's redbrick and Portland stone Royal Hospital, Chelsea, by two years. Designed as a military hospital *cum* retirement home for aged and disabled veterans the building included *'collegiate lodgings, including the master's lodgings, hall, chapel and domestic quarters,'* completed in 1684, at the cost of a little under £24,000.

Consisting of four ranges of 306ft by 288 ft, constructed similar to Les Invalides, around an arcaded courtyard, the Royal Hospital also incorporated a tower and spire that rose above the plastered and pedimented centrepiece of the principal north (entrance) front. The north range contains the hall, chapel and governor's lodgings, the chapel having been completed in 1687, while the other three ranges, to the east, south and west contained the rooms for the men. These were arranged as thirty-one bays wide externally, and seventeen within the courtyard, of two storeys with a further attic storey under a dormer roof.

Robert Bate's 1699 view is one of the earliest representative illustrations of the building, and shows it standing prominently on high ground above the Liffey, outside the western fringes of the city. Portland stone was used for most of the architectural features and dressings to the doors and windows openings, the walls were for the most part coated in lime, with some Irish calp limestone ashlar to the central breakfront of the principal garden façade.

Figure 14.4.2.2.1 Thomas Bate's 1699 view from the Phoenix Park towards the Royal Hospital, to the centre right of the image.

Figure 14.4.2.2.2 Prospect from Charles Brooking's map of 1728 showing the RHK on the western fringes of the city

14.4.2.3 The Eighteenth Century

In 1705 the tower was added to the north front of the hospital by Robinson's successor, Thomas Burgh (1670-1730). It is clear that by the time of Charles Brooking's map of Dublin of 1728, the city has extended westwards, along St. James's Street, Dr Steevens' Hospital has been built, and an infirmary erected to the north-east of the RHK. The land that today forms the HSQ site was otherwise undeveloped at this point. The position of the north-eastern flanker was later occupied by the later Deputy Master's House (1762-3). At this time, the only other development was to the north-west of the RHK, clustered around Islandbridge.

By the time of Rocque's map of 1756, formally laid out avenues of trees have been planted on axis with the Royal Hospital, to east and north east of the site leading to the infirmary and the other secondary structures had been erected and the gardens planted. The Magazine Fort (1738) on the prominent site of St. Thomas's Hill as - '*a retreat from disturbance*' - on the southern edge of the Phoenix Park would have been visible from the Royal Hospital at this point, as would the adjoining star-like Fortification to the north-east, just off the Military Road. Rocque's 1757 map shows a path extending from the main avenue of trees around the north-eastern edge of the Royal Hospital's garden, all the way out to the main Islandbridge Road, the site of the future Royal [and later Clancy] Artillery Barracks that was built in 1798. The elegant brick garden lodge at the central axis and northern edge of the formal Royal Hospital garden, which is attributed to Edward Lovett Pearce, is also visible on Rocque's map.

The Deputy Master's House was erected 1762-3 on the north-eastern corner of the site overlooking the gardens. A map of 1797 shows the house was extended, just as it shows the principal, tree-lined, carriageway to the west of the Royal Hospital, with the secondary entrance added to the east and the formal axial route to the infirmary and its associated buildings, to the north-east.

Figure 14.4.2.3.1 Rocque's 1757 Survey of Dublin showing the broader context of the Royal Hospital and the subject site marked in red.

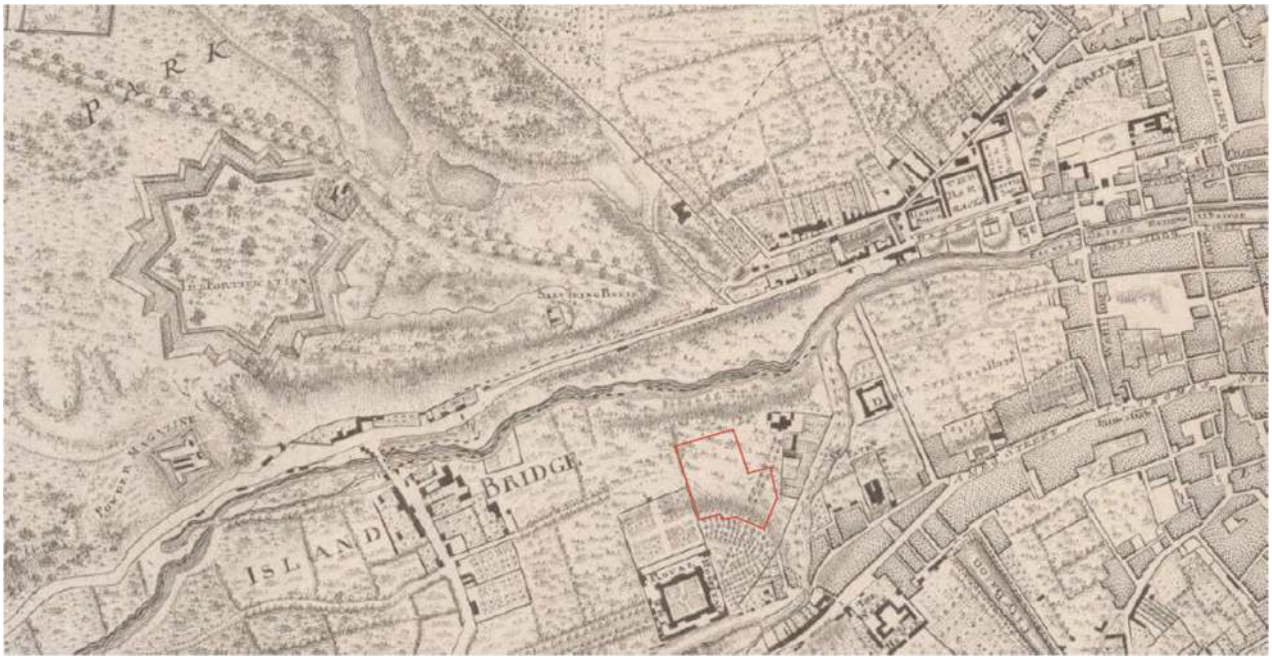
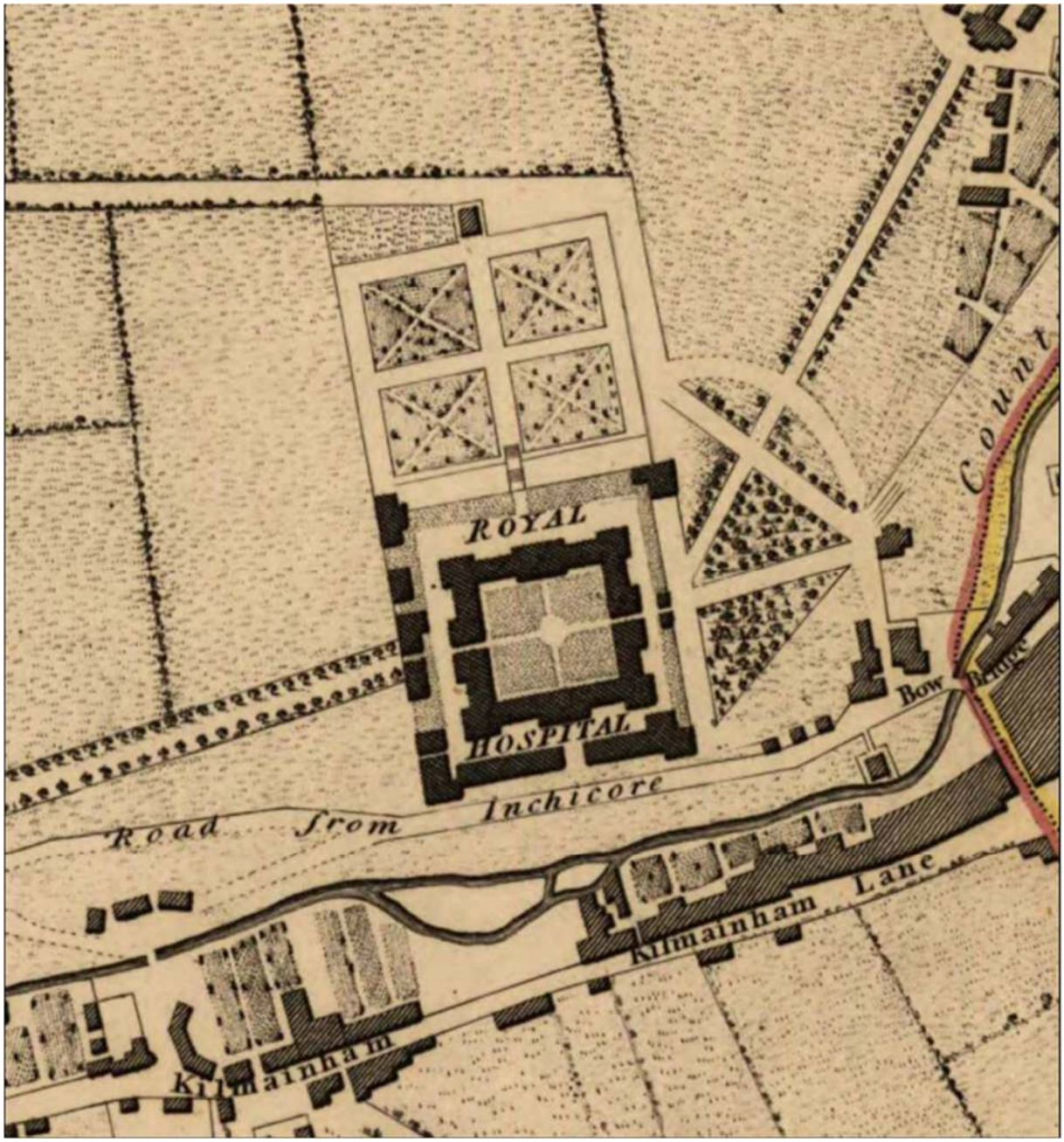


Figure 14.4.2.3.2 James Malton's 1799 distant view towards the RHK from the Magazine Fort in the Phoenix Park.

Figure 14.4.2.3.3 1797 map of the RHK and its immediate setting. Its formal relationship with its garden to the north is clearly established by this time.



14.4.2.4 The Nineteenth Century

The 1837-1842 Ordnance Survey map shows the extension to the Deputy Master's House, with it being square at this point and with a further extension projecting out to the north-west. This map is also the first to make clear how a large interdependent network of military and medical related buildings and infrastructure had evolved within the vicinity of the Royal Hospital. These included the Royal Hospital Infirmary and Medical Officers Residence beyond a gravel pit to the north-east, with to the east of the site of the Heuston South Quarter, a pathway running between the edge of the Royal Hospital's Gardens and the Royal Artillery Barracks to the west has been established by that time.

This map is also the first to show the Royal Military Infirmary, constructed across the valley to the north, between 1786-88, to designs by James Gandon. In the late-eighteenth century this building would have been intervisible with the Royal Hospital. Today only the cupola of the original building can be seen as a small distant form rising above the tree line. Robert Smirke's Wellington Monument, completed in 1861, is the tallest obelisk in Europe, and still provides a prominent landmark in the northerly view from the Royal Hospital, towards the Phoenix Park.

Figure 14.4.2.4.1 1837-1842 Ordnance Survey map with the subject site outlined in red.

The essentially pastoral setting of the Royal Hospital remained more or less intact until the advent of the railways in the 1840, which brought the first of many wholesale changes to the riverine landscape of the Liffey Valley, between the Royal Hospital and the Phoenix Park. The railways cut a swathe through the landscape on its way into Kingsbridge (Heuston) Station, with the newly formed St. John's road closely following its alignment. The layout of the RHK garden appeared to have been laid out in an asymmetrical pattern at this point, with a variety of paths leading off from its centre, just as there appears to be a number of structures standing within it.

A significant addition to the hospital complex came in 1847, when the mock-Tudor Richmond Gatehouse designed by Francis Johnston was moved from Watling Street, to create a grand ceremonial entrance on the west side of the site. This impressive structure is faced with calp limestone and now provides a grand arched entrance to the site from the west. During the nineteenth century the complex had gradually grown in military significance, becoming the residence and headquarters of the Commander in Chief of the army.

Figure 14.4.2.4.2 Francis Johnston's Gatehouse to the west of the RHK site.

14.4.2.5 The Twentieth Century

The 1887-1913 Ordnance Survey map shows how the setting of the RHK had been irrevocably altered by the arrival and subsequent growth of related rail infrastructure to its north, and how development around it naturally followed. The area bordering Conyngham Road became quite developed. The road that led to the barracks from the area to the east of the gardens had by this time disappeared, and the garden itself appeared to be simply laid out, with a pond at its centre and two structures flanking the principal path from the north front to the lodge near of the hospital to Lovett Pearce's lodge. At this time, the footprint of the Deputy Master's House was the same as shown on the first edition map, and the land to the east remained undeveloped.

A survey drawing of 1919 by the OPW, and retraced in 1929, shows the Deputy Master's House as consisting of the same footprint as before, but by this point a large rectangular structure has been erected adjacent to the wall bordering St. John's Road, on what is the HSQ site today.

Figure 14.4.2.5.1 1887-1913 Ordnance Survey map (subject site outlined in red)

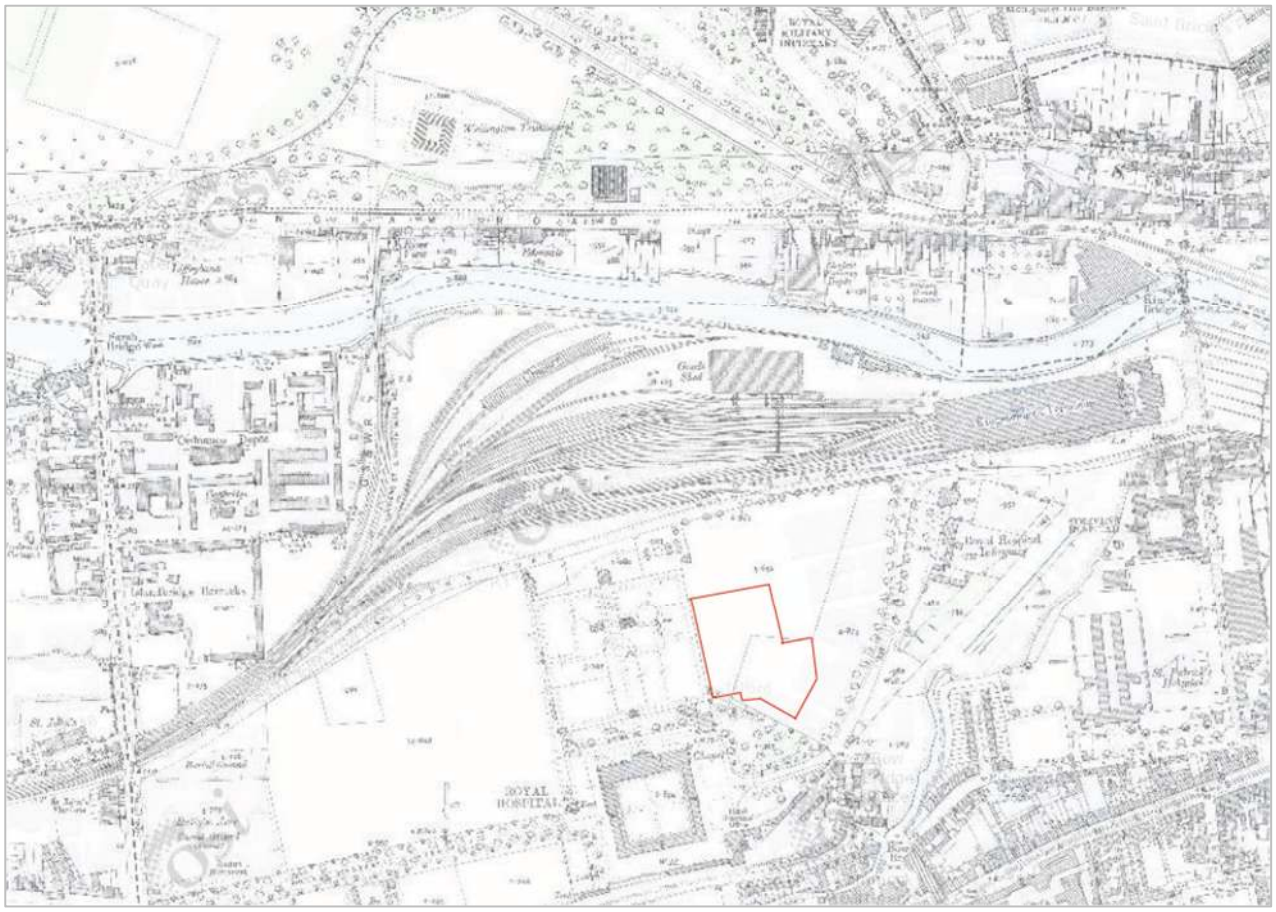
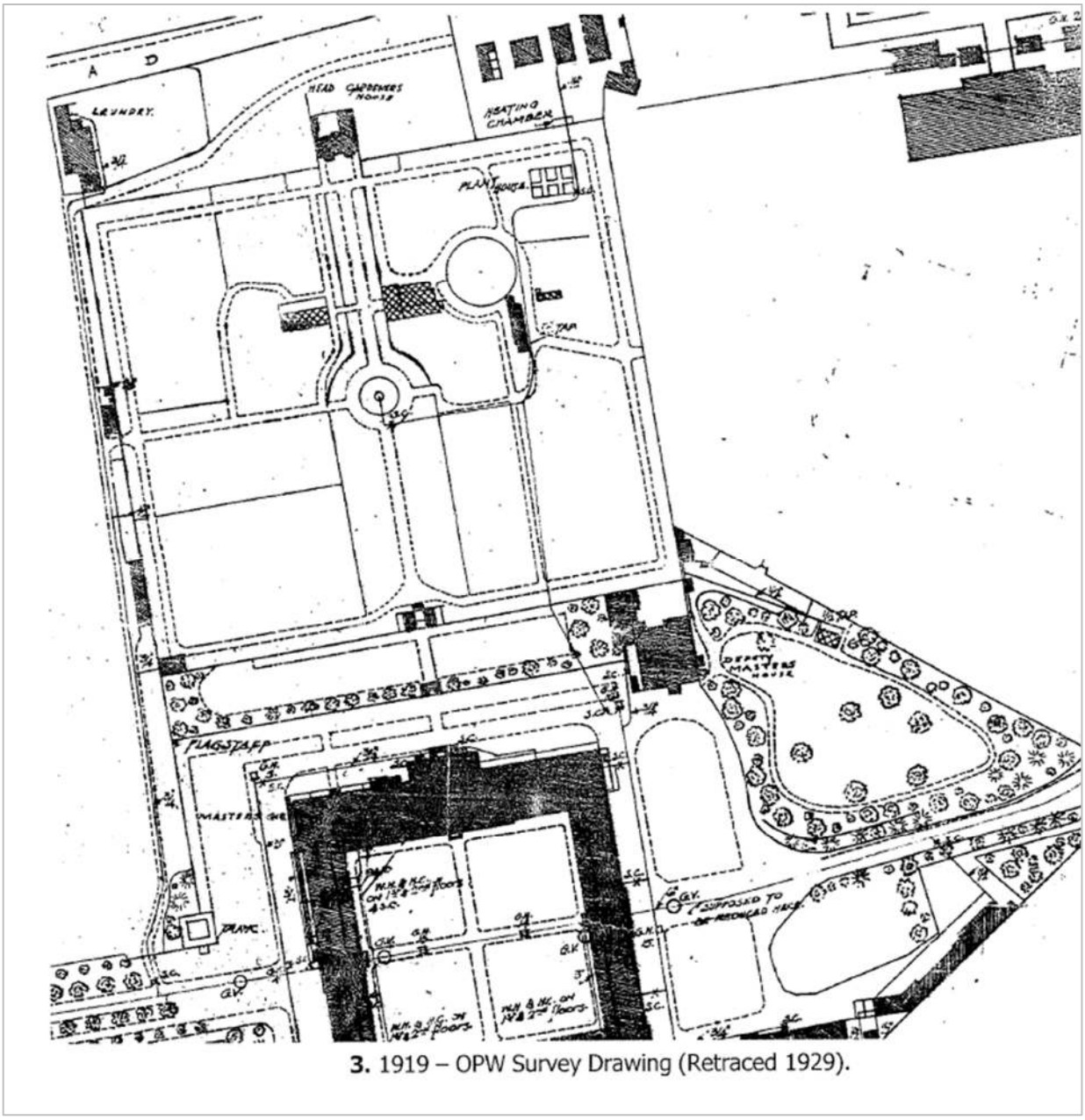


Figure 14.4.2.5.2 A survey drawing of 1919 by the OPW, retraced in 1929, that shows the Deputy Master's House



3. 1919 – OPW Survey Drawing (Retraced 1929).

The Royal Hospital was given over to the Free State in 1922 but remained an old soldiers' home until 1927, before serving as the Garda HQ from 1930-50 and a store for the National Museum for much of the twentieth century. From 1979-85, Costello, Murray & Beaumont undertook extensive restoration at a cost of IR£3 million and, in 1991, following extensive remodelling work by Shay Cleary Architects, the Royal Hospital became home to the Irish Museum of Modern Art (IMMA).

14.4.2.6 The Twenty First Century

The principal change to the RHK and its setting was the granting of planning permission for phase 1 of HSQ in 2004, which included a mixture of office, retail and residential development constructed between 2005 and 2008 (see Figure 14.4.2.5.3 above). This scheme fronted onto Military Road to the east and St. John's Road to the north, while presenting a splayed range of structures, facing south and west onto the Royal Hospital site. The site comprises six buildings ranging from six to twelve storeys in height, and there are over 345 apartments and 300,000 sq ft of office space and 80,000 sq ft of commercial accommodation. The rest of the site, adjacent to the Royal Hospital gardens, has remained undeveloped since then with the lower deck temporarily landscaped. Site visits have made apparent just how much the broader context of the site has altered. Notable more recent development include the large Clancy Quay scheme, to the north west of the site, and, to the east of Heuston South Quarter, along Military Road, the OPW has now almost completed a six-storey new Garda Command Centre.

Figure 14.4.2.6.1 View from the RHK towards the Clancy Quay Development

Figure 14.4.2.6.2 View north along Military Road. The site of the Garda Command Centre (formerly part of the Royal Military Infirmary) is to the right of the image. The HSQ site is to the left with the new Criminal Courts on Parkgate Street visible just to its right.

14.4.2.7 Protected Structures and the National Inventory of Architectural Heritage

There are no statutorily protected structures on the proposed site and neither are there any structures include in the NIAH. Though the Royal Hospital is indisputably the most significant historic structure or complex (RPS 5244) in the broader vicinity of the proposed site, there are a number of designated structures / places either on DCC's RPS and/or the NIAH, the settings of which we consider could potentially be affected by the proposed development. Only buildings deemed to be of 'regional' interest and above are considered for inclusion on DCC's RPS.

The following are the principal structures - of 'international', 'national' or 'regional' interest - in the vicinity of the site or in views to and from it that could potentially be affected by the proposed development

Table 14.4.2.7.1 Structures or groups of structures potentially impacted by the proposed development.

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
1	5244	50080072 / International	Military Road, Dublin 8	The RPS entry includes: the former Adjutant General's office, former Deputy Master's offices, steel house, tower at western gate, garden house in formal gardens, garden features, entrance, gates and walls. The principal range of the RHK is

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
				considered to be one – if not the – finest public buildings in Ireland. The NIAH ascribes an 'international' rating to this principal range. and its wider complex comprises a variety of structures and places that have been ascribed a variety of ratings (set out below this table). Its historic setting has been comprehensively altered over the years by the advent of the railways, incremental development of variable quality, and by the construction of phase 1 of the HSQ development which stands asymmetrically at odds with the RHK and its formal garden setting.
2	4256	50080065/ Regional	Kilmainham Lane, Dublin 8	Garda Station: All buildings. The broader RHK grounds provide the principal – and highly significant - setting of this historic complex.
3	N/A	59980052/ Regional	Bully's Acre Graveyard, off SCR	Graveyard bounded by historic stone wall that incorporated part of St. John's Priory. The broader RHK grounds provide the principal – and highly significant - setting of this historic complex. The construction of the SCR has somewhat compromised the approach to the Bully's Acre but the large boundary walls largely screen this.
4	N/A	50080053 / Regional	Off St. John's Road West, Dublin 8	Military cemetery for RHK established c.1680 (incorporating earlier graves associated with St. John's Priory). The broader RHK grounds provide the principal – and highly significant - setting of this historic complex. The construction of St. John's Road has somewhat compromised the

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
				approach to it but the large boundary walls largely screen this.
5	1851	NIAH Multiple Entries / Regional	Former Clancy Barracks, South Circular Road, Islandbridge, Dublin 8	Multiple former barracks buildings, warehouses etc, now incorporated into a new mixed use development which integrates a number of large scale blocks which have altered the historic scale and grain of the setting of the designated architectural heritage of the complex.
6	7576	50080033 / National	St. John's Road West, Islandbridge, Dublin 8	Heuston Station. A number of more recent infrastructural and large scale commercial developments of variable quality have altered the setting of the principal edifice of the protected structure.
7	3993	50080082 / Regional	Infirmary Road, Dublin 7	Department of Defence (former Royal Infirmary, Phoenix Park). A large 1930s pastiche extension has compromised the purity and significance of Gandon's original and is the most prominent aspect in views from the RHK, which have been altered considerably in the last 150 years by the advent of the railway and more recent development of variable quality.
8	6760	50060115 / National	Military Road, Phoenix park, Dublin 7	Magazine Fort. Views to and from the fort have been comprehensively altered in the intervening years since it was constructed by the advent of the railways and associated infrastructure, and more recent development variable quality. Mature tree growth also partially screens views.

Key	RPS No.	NIAH Reg. No/Rating	Address	Description
9	6762	50060116 / National	Wellington Road, Phoenix Park, Dublin 7	Wellington Monument. The Phoenix Park provides the principal setting for the Monument but views towards the RKH have been altered and encroached upon by more recent development such as phase 1 of the HSQ development and Clancy barracks which is visible just above the mature trees.
10	7840	50080083 / Regional	Steevens' Lane, Dublin 8	Dr Steevens' Hospital (original building). Building fronts onto St. John's Road West. The historic setting of Dr. Steevens' Hospital has been considerably compromised over the years by the advent of the railways, the construction of St. John's Road West, Phase 1 of the HSQ development and the car park in front of it.
11	856	50080086 / National	Bow Lane West, Dublin 8	St. Patrick's Hospital: original building, original wall & gates and gatehouse. The setting of St. Patrick's Hospital has been compromised by the addition of poor quality later additions, the car park and its view towards the RHK altered by the construction of phase 1 of the HSQ development.

The Royal Hospital Kilmainham: The RHK complex - number 1 in the table and as described above - is both listed on Dublin City Council's Record of Protected Structures (RPS 5244) and the National Inventory of Architectural Heritage (NIAH 50080072). Its listing on the RPS Royal Hospital (Kilmainham) includes: *'…former Adjutant General's office, former Deputy Master's offices, steel house, tower at western gate, garden house in formal gardens, garden features, entrance, gates and walls'*, and it is given an international rating by the NIAH.

The NIAH description of the principal building in the RHK complex includes the following:

Detached former hospital, comprising four equal-length ranges enclosing central square cloistered

courtyard, built c.1680. Thirteen-bay double-height single-storey front (north) elevation with central pedimented breakfront forming three-bay entrance porch, with clock tower above. Former chapel to north-east corner, having five-bay nave elevation, and chancel to east end. Thirty-bay east elevation to east range, thirty-three-bay (south) elevation to south range, and thirty-two-bay west elevation to west range, each two-storey over basement with dormer attic, and having central pedimented breakfront and central integral carriage arch, and terminating breakfronts…

Its categories of special interest are listed as: archaeological, architectural, artistic, historical, social, technical, and collectively are the reasons for its 'international' rating. The RHK is considered to be one of – if not the – finest public buildings in Ireland. Its setting has been considerably compromised over the years by the advent of the railways, incremental development of variable quality and by the construction of phase 1 of the HSQ development which stands asymmetrically at odds with the RHK and its formal garden setting.

Figure 14.4.2.7.1 The principal (north) elevation of the RHK (RPS 5244 / NIAH 50080072).

The Former Deputy Master's House: The former Deputy Master's House has been much altered and added to over the years. It is described as follows by the NIAH:

Detached four-bay two-storey over part-raised basement former deputy master's house with dormer attic, built 1762-3, extended 1797. Now in use as art gallery. Hipped slate roofs, rendered chimneystacks, clay chimney pots, aluminium ridge tiles, carved projecting granite eaves course, cast-iron rainwater goods and flat-roofed dormer windows. Central pediment to north elevation, on fluted consoles. Roughcast rendered walls, render plinth course to front elevation forming string course to other elevations. Square-headed window openings, cut granite surrounds and sills, timber sash windows, six-over-three pane to first floor, nine-over-six pane to ground floor. Some carved granite architrave surrounds to ground floor north and rear (west) elevation, those to rear pedimented. Segmental-headed window openings at basement level, cut and carved granite surrounds, sills and keystones, now blocked. Square-headed door opening to front, carved granite architrave surround, fluted consoles supporting triangular pediment, double-leaf glazed timber panelled door. Square-headed door opening at basement level to south elevation, carved granite architrave surround, fluted consoles supporting carved cornice over timber

panelled door.

It is given a 'regional' rating for its special interest which are listed as architectural, artistic, historical, social by the NIAH. Its immediate setting was fundamentally changed by the construction of Phase 1 of the HSQ development, whereas its broader setting has altered due to the advent of the railways and more recent development of variable quality to the north.

Figure 14.4.2.7.2 Western elevation of the former Deputy Master's House (RPS 5244 / NIAH 50080072)

The Garden Lodge: Built c.1740 and attributed to the high-regarded Irish Architect, Edward Lovett Pearce, the three-bay, two-storey symmetrical and aesthetically-pleasing stone and brick pavilion is an important and eye-catching element of the formal garden setting of the RHK. From the late-nineteenth century, this building was occupied by the head gardener of the Royal Hospital, Jack Rawlins, and his family. According to the NIAH: *During recent restoration work, excavation in the area revealed a selection of clay pipes and nineteenth-century pottery, and it is surmised that this pavilion may have been used for dinner parties and entertaining, as it is sited so as to obtain sunlight and gives a good view towards the Royal Hospital.*

Figure 14.4.2.7.3 The garden lodge (RPS 5244/ NIAH 50080068) to the north of the RHK gardens, possibly to a design by Edward Lovett Pearce

The NIAH includes the following in respect of the Garden Lodge:

> *Detached three-bay two-storey over basement garden pavilion, built c.1740, having full-height circular-plan corner towers to front (south) elevation…Rubble limestone walls with plinth course. Red brick, laid in Flemish bond, to centre bay to first floor to front. Square-headed window openings to towers, calp limestone voussoirs, limestone sills and timber sash windows, four-over-four pane to first floor, four-over-two pane to ground floor. Venetian window to centre of first floor to front, central round-arched window opening with timber sash window flanked by square-headed sidelights, red brick surround, shared limestone sill. Square-headed window openings to other elevations, red brick surrounds, limestone sills and four-over-four pane timber sash windows. Elliptical-arched opening to front, red brick voussoirs and keystone, recent double-leaf gates. Rubble limestone and red brick walls to interior, round-arched red brick lined niches. Square-headed opening to basement level to west elevation, blocked, accessed via limestone steps to rear.*

The Garden lodge is given a *'regional'* rating *Architectural, Historical, Social* special interest. Its historic setting has been comprehensively altered over the years by the construction of phase 1 of the HSQ development which stands asymmetrically at odds with it.

The Kilmainham Garda Station Complex: The Kilmainham Garda Station Complex, Kilmainham Lane is given RPS number 4256 / NIAH 50080065/6. This structure is described by the NIAH as follows:

> *'…these buildings once formed part of the stable court of the Royal Hospital. This part of the complex was designed by R.J. Stirling in 1866 and formed an integral part of the associated buildings of the Hospital…Well designed, with highly skilled stone masonry evident in the execution of the walls, these buildings form part of an interesting group of related buildings. Although they have been extended, the quality of the original construction remains evident. A variety of timber sash windows are retained, lending a patina of age.'*

They are given a 'regional' rating in the NIAH for their architectural, historic and social special interest. The broader RHK grounds provide the principal – and highly significant - setting of this historic complex, aspects of which have been compromised by more recent development in the broader area.

Figure 14.4.2.7.4 Kilmainham Garda Station Complex, Kilmainham Lane (RPS 4256 / NIAH 50080065 / 50080066)

The Bully's Acre grounds: This sylvan graveyard is not on the RPS but is given a 'regional' rating on the NIAH for its Archaeological, Artistic, Historical, Social special interest. Also known as 'Hospital Fields', Bully's Acre is sited on the former grounds of the Priory of Saint John, which was established by the Knights Hospitallers in the twelfth century and remained in use until the dissolution of the monasteries by Henry VIII between 1536 and 1541. According to the NIAH, the graveyard incorporates burials from the twelfth century on and today there are around 70 headstones dating from between 1764 and 1832. It is enclosed by a handsome rubble limestone boundary wall, rebuilt more recently in parts. There are gateways to the southern boundary wall, one having square-profile tooled limestone piers with pointed caps and double-leaf wrought-iron gates, the other has a square-profile tooled limestone piers and double-leaf timber battened gates. The broader RHK grounds provide the principal – and highly significant - setting of this ancient graveyard The construction of phase 1 of the HSQ and more recent development of variable quality has altered this historic setting in more recent years.

Figure 14.4.2.7.5 Bully's Acre grounds of RHK (NIAH 50080054)

The Cemetery: Standing to the south-west of the grounds of the RHK, adjacent to the Kilmainham Lane Garda Station, the cemetery is not on the RPS but is listed in the NIAH as being of 'regional' significance for its Architectural, Artistic, Historical and Social special interest. A part of the Royal Hospital Kilmainham, this cemetery is sited on the former grounds of Saint John's Priory, which was, like the cemetery opposite, established by the Knights Hospitallers in the twelfth century. According to the NIAH it was:

> *Initially established for the burial of all residents of the Royal Hospital Kilmainham, it was later reserved for officers. There are sixty-seven extant tombstones in this burial ground, with the oldest legible headstone dated 1652, pre-dating the hospital by some thirty years. Several staff members of the Hospital, including Dr George Renny, who resided in the Deputy Master's House, and two former adjutants of the Royal Hospital are buried here, as is William Proby, who was a veteran of the Battle of the Boyne and one of the earliest inmates of the hospital. His headstone is dated 1700. This site is important in the social and military history of the area, attesting to the long-standing ecclesiastical presence in the locality.*

The broader RHK grounds provide the principal – and highly significant - setting of this historic cemetery The construction of phase 1 of the HSQ and more recent development of variable quality has altered this historic setting in more recent years.

Figure 14.4.2.7.6 Military Cemetery, grounds of RHK (50080053)

The Former Clancy Barracks: The first phase of the former Clancy Barracks (originally the Royal Artillery Barracks) was completed in 1798 and was, according to Christine Casey in *Dublin*, subsequently extended northwards in the mid-nineteenth century with the addition of a cavalry barracks. The redbrick officers' quarters were added in 1889. The whole historic complex has been recently adapted, reused and enveloped by large blocks as part of a mixed use – ostensibly - residential scheme. It is listed on the RPS 1851 and has multiple NIAH entries, written before its redevelopment, all of which were given a 'regional' rating. Its historic structures are no longer visible from the RHK because of the height and massing of the new development.

Figure 14.4.2.7.7 Aerial view of the former Clancy Barracks (RPS 1851 / Multiple NIAH entries) now reused to form the Clancy Quay development.

Hueston Station: Heuston station (formerly Kingsbridge) was built to designs by the railway engineer, Sancton Wood, in 1845-7, as the terminus for the Great Southern & Western Railway Co. Stylistically, its multi-columned principal facade is an elaborately detailed palazzo-like structure that incorporates a dazzling display of engineered iron, with acanthus-leaf detailed pillars supporting open work spandrels and slender trusses. The listing includes the station building and associated offices and the NIAH gives it a 'national' rating for its Architectural, Artistic, Historical and Social special interest. A number of more recent infrastructural and large scale commercial developments of variable quality have altered the setting of the principal edifice of the protected structure.

Figure 14.4.2.7.8 Front elevation of Heuston Railway Terminus (RPS 7576 / NIAH 50080033)

The Former Royal Military Infirmary: The former Royal Infirmary, Infirmary Road, Dublin 7 is listed in DCC's RPS (3993) and on the NIAH 50080082) as being of 'regional' significance. It was constructed between 1786-8, to designs of James Gandon - a leading architects of the day - with William Gibson as executant architect but has been much altered over the years. Christine Casey describes it as follows in Dublin (pp.304-5):

Figures 14.4.2.7.9 The Former Royal Military Infirmary, constructed between 1786-88, to designs by James Gandon. The image to the right shows the original extent of the principal elevation of the building, whereas that beside it shows the less sympathetic twentieth century addition to it, viewed from Infirmary Road.

'The original plan (without extensions) is a broad U-shape, composed of a central three-storey entrance block, two-storey three-bay links and a deep gabled ward range at each end. Though the central block has been much altered, the entrance front still displays the basic components of the original shallow-relief composition… At some stage in the late-nineteenth or early-twentieth century the façade was re-jigged in a souped up Gandonian idiom…Adjoining the s end of the eighteenth century building is a three-storey office extension of 1935-40…"

In the late-eighteenth century this building would have been intervisible with the Royal Hospital, however, today only the cupola of the original building can be seen as a small distant form rising above the tree line. The large 1930s pastiche extension has compromised the purity and significance of Gandon's original and is the most prominent aspect in views from the RHK, which have been altered considerably in the last 150 years by the advent of the railway and more recent development of variable quality.

Magazine Fort: The NIAH gives the star-like shaped structure a 'national' rating for its *architectural, historical* and t*echnical* special interest, and describes it as follows:

A mid-eighteenth-century magazine fort constructed in phases from 1734 to 1801, also containing twentieth-century structures. As such, the fort is representative of two centuries of military architecture, having originally been built to designs by John Corneille, on the orders of the Duke of Dorset, as a powder magazine located at a convenient distance from Dublin Castle and the Royal Barracks. Subsequently modified to designs by Francis Johnston, it continued in use until the mid-twentieth century. Although no longer in use, the structure retains a wealth of evidence attesting to its technical functions, including the original eighteenth-century magazine chambers. Surrounded by a dry moat in open land at the southern portion of Phoenix Park, the fort is a striking feature among a number of high-quality buildings in this historic urban park.

It is no longer visible in views from the RHK because it is screened by mature tree growth at the edge of the Phoenix Park.

Figure 14.4.2.7.10 Magazine Fort, Military Road, Phoenix Park, Dublin 7 (RPS 6769 / 50060116).

The Wellington Monument: The Wellington Monument (RPS 6762) is also given a 'national' rating on the NIAH for its architectural, artistic, historical and technical special interest. This monumental granite obelisk was designed by the highly regarded and prolific English architect, Robert Smirke, and constructed between 1817 and 1861, as a testimonial to Arthur Wellesley, Duke of Wellington, following his success at the Battle of Waterloo in 1815. At 62 metres tall it is the tallest obelisk in Europe, and still provides a prominent landmark in the northerly view from the Royal Hospital, towards the Phoenix Park. Other more recent development of variable quality are evident in views to and from it.

Figure 14.4.2.7.11 The Wellington Monument, Phoenix Park, Dublin 8

Dr. Steevens' Hospital: Only the original building, facing onto St. John's Road West, is included on the RPS (7840) and it is included on the NIAH (50060116) as being of 'national' interest architectural, artistic, historical and social special interest. According to the NIAH, 'Construction of the hospital began in 1718, when Richard Steevens' bequeathed his property to his twin sister Grizel with instructions to found a hospital for the poor and sick of Dublin.' It goes on to describe it as:

> *Detached nineteen-bay two-storey former hospital with dormer attic, dated 1720, opened 1733, comprising four ranges surrounding central courtyard, projecting end-bays to front (east), north and south elevations, shallow pedimented central breakfronts to front and north elevations and shallow central breakfronts to south elevation and end-bays to front, half-basement to front and north elevations. Recent extension to rear (west) elevation. Now in use as [HSE] offices.*

The historic setting of Dr. Steevens' Hospital has been considerably compromised over the years by the advent of the railways, the construction of St. John's Road West, Phase 1 of the HSQ development and the car park in front of it.

Figure 14.4.2.7.12 Dr Steevens's Hospital, St. John's Road West, Dublin 8

St. Patrick's Hospital: Like Dr Steevens, St. Patrick's Hospital is listed on both the RPS (856) and the NIAH, where is rated as 'national' for its architectural, artistic, historical and social special interest.

Founded by Dr Jonathan Swift, Dean of Saint Patrick's Cathedral and celebrated author, the formal façade of St. Patrick's was designed to resemble a Palladian villa, with a regular fenestration arrangement and central pedimented breakfront contributing to a strong sense of symmetry. According to the NIAH:

> *Its architect, George Semple, based his design on London's Bethlem Asylum, with the hospital accommodation contained primarily in the symmetrical wings to the rear. Cells were laid out side by side in order to facilitate supervision of patients. The wings to the front were designed by Thomas Cooley in the late eighteenth century. The long ranges to the rear were extended at the same time, first to designs by Thomas Cooley and subsequently by Davis Whitmore. Due to recent additions, the east range can no longer be accessed, however the front and west range retain much of their original form and character…It was, for practical purposes, intentionally located adjacent to Dr Steevens Hospital, and built on a parcel of land acquired from the trustees of the latter, making it part of the institutional heritage of the city.*

The historic setting of St. Patrick's Hospital has been compromised by the addition of poor quality later additions, the car park and its view towards the RHK altered by the construction of phase 1 of the HSQ development.

Figure 14.4.2.7.13 St. Patrick's Hospital

14.4.2.8 Cone of Vision

The Royal Hospital Kilmainham (RHK) was deliberately sited on high ground away from the noise and pollution of the city, which lay to the east. When constructed in 1684, it was enclosed behind walls with the principal, north elevation, addressing a formal garden laid out with geometric parterres. The building and garden enjoyed unfettered pastoral views, northwards across the Liffey Valley to the Phoenix Park, which was laid out some twenty years earlier, and originally extended

The cone of vision set out on the north side of the Royal Hospital Kilmainham, in the DCC development plan, describes a north-facing view from the central axis of the main entrance front and formal garden over the Phoenix Park. At the eastern edge of the cone, across the valley, is the distant view of James Gandon's former Royal Military Infirmary. Of this building a small part of the pediment and the cupola are visible above the tree line. On the western edge of the cone is the former Magazine Fort, which is no longer visible due to mature trees and more recent development, including the recent large scale development at Clancy Barracks. While there is no formal planned arrangement between these three structures, the view towards the park, and the Gandon cupola, is at its best from the central axis. When moving eastwards, towards the eastern splay of the cone, the visual relationship between the Royal Hospital and the view becomes less significant, and by the time the viewer reaches the Deputy Master's House, the Gandon cupola of the former Military Hospital is no longer visible, while the visual impact of recent development along the north bank of the Liffey is much more prominent.

When considering the impact of development on the cone of vision, it should be recognised that the most significant view is from the central axis and not the extremities, where the views are compromised with the distant landmarks unseen. Viewpoints to either side of the central axis are therefore less significant as they are effectively creating new and different cones of vision. Of greater relevance in these locations is the way the form, composition and materiality of any adjoining development relates to the existing context and geometrical formality of the Royal Hospital and its splendid garden setting.

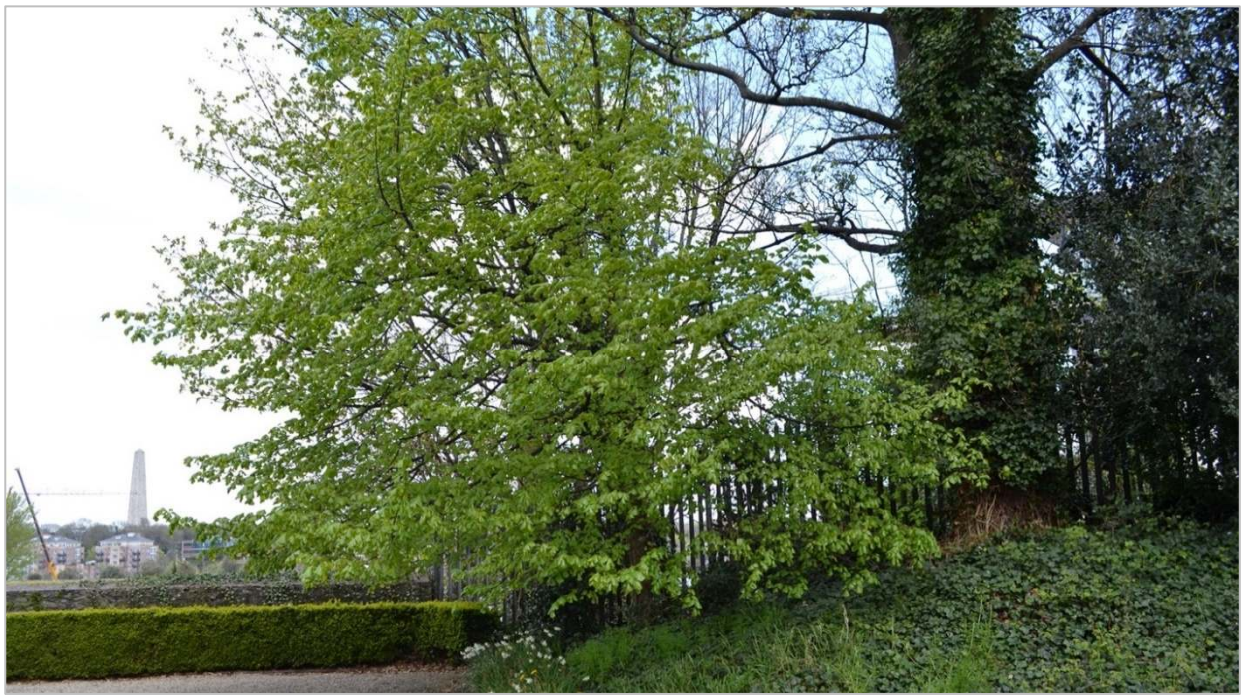
Figure 14.4.2.8.1 The Clancy Quay Development viewed from the north-western elevation of the RHK (March 2021)

Figure 14.4.2.8.2 The distant cupola and pastiche extension to Gandon's former Royal Infirmary (at centre), with the new Criminal Courts to the right of the view taken from the terrace of the RHK (March 2021)

Figure 14.4.2.8.3 View from the (north) terrace of the RHK across the formal gardens towards the Magazine Fort which is obscured by mature trees and more recent development along Conygham Road (March 2021)

Figure 14.4.2.8.4 View from the steps of the RHK to its gardens looking north towards the Wellington Monument (March 2021)

Figure 14.4.2.8.5 Spring view showing that there is no formal view from the north-eastern edge of the Deputy Master's House towards the Gandon building (April, 2021)



14.5 Identification of Likely Significant Impacts

As stated above in Section 14.3 the impacts identified are classified from Profound: An impact which obliterates sensitive characteristics, Significant: An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment, Moderate: An impact that alters the character of the environment in a manner that is consistent with the existing and emerging trends, Slight: An impact which causes noticeable changes in the character of the environment without affecting its sensitivities and Imperceptible: An impact capable of measurement but without noticeable consequences.

In this assessment, the impacts fall mainly into the significant to moderate category at the construction stage to slight and imperceptible for the operational stage.

The quality of the change is further described as:

- Positive Effect: a change which improves the quality of the environment;
- Neutral Effect: no effects or effects which are imperceptible, within normal bounds of variation or within the margin of forecasting error or;
- Negative/adverse Effects: a change which reduces the quality of the environment.

This section has been arranged to assess the impact of the proposed development on the following aspects of architectural heritage:

- Physical Impacts (Section 14.5.1)

- Visual Impacts/Cone of Vision (Section 14.5.2)

14.5.1 Physical Impacts

14.5.1.1 Construction Phase

The construction stage impact is usually greatest at the outset of a project when there is ground disturbance during the 'breaking ground' stage. In this regard, the demolition or removal of the existing deck level of the proposed site and insertion of piled foundations may cause disturbance or damage to the historic foundations or fabric of the boundary wall to the RHK, which is protected as part of the curtilage of the RHK. There is also potential to discover further elements of architectural or archaeological note during this stage. It is likely that these disturbance impacts could be significant but temporary, and should be mitigated by appropriate protection and monitoring in line with best conservation practice.

14.5.1.2 Operational Impacts

During the operational phase it is not anticipated that the proposed residential development will impact upon the structural integrity of features of architectural heritage significance. The proposed development will not be a source of significant noise or vibration.

The reinstatement of a future physical link between the gardens of the RHK and the subject site, possibly including proposed stairs and lift, will have a permanent impact on the historic fabric of the boundary wall. However, this change would be mitigated by potential gains provided by improved access and connectivity. Structural impacts on other features in the RHK are not anticipated.

14.5.1.3 Cumulative Impacts

As the photomontages showing the cumulative impact are only rendered as an undesigned outline of a single commercial building, and not a finalised expression of what the scale, massing and materiality will be, the assessment of impact is therefore limited to what is outlined at this stage by the blue line. The commercial building will be the subject of a separate application, therefore a separate EIAR will accompany it and will assess the impact finalised form. The cumulative impacts have been assessed with reference to existing and permitted development as set out in Appendix 1B.

14.5.2 Visual Impacts/Cone of Vision

Generally speaking, views eastwards from the terraces and formal gardens of the RHK will be impacted by the proposed new development. The existing buildings that form Phase 1 of the HSQ development are, however, currently clearly visible from these vantage points, and the proposed new development will largely screen these buildings, creating a more formal and contextual backdrop. A three metre high limestone wall [replaced in the nineteenth century] forms the current boundary between the formal gardens of the RHK and the site. Beyond this wall the ground drops steeply into the site, and there is currently a temporary landscape treatment. Formally clipped evergreen oak trees line the boundary on the RHK garden side and protrude just above the wall. The existing phase 1 HSQ buildings are visible above this boundary wall and from most parts of the garden. Views north-eastwards from the principal (northern) elevation of the RHK will also be impacted by the proposed development.

The 12 and 18 storey elements of the proposed design will be visible from a range of locations around the vicinity but not from within the courtyard of the RHK. The 'Cone of Vision' view northwards from the north (principal) elevation of the RHK to the Magazine Fort, Wellington Monument and Gandon's former Royal Military Infirmary, as described in the Development Plan, will also be impacted by the proposals. However, this development will not adversely affect the cone of vision views the most important of which is from the central axis. The proposed SHD scheme will present a more formal and responsive composition to the symmetry of the gardens and will screen the less successful irregular forms of the first phase of development HSQ1 on the eastern part of the site, so will not therefore adversely affect the Cone of Vision.

14.5.2.1 Construction Phase

It is not proposed to provide a link between the formal garden of the RHK and the HSQ site as part of this application. This proposed development facilitates a future link. Any future proposed works to this wall as part of the separate will be undertaken in close liaison with DCC, and will be informed by a Method Statement, in line with best conservation practice.

There are no protected structures, monuments or structures of historic note within the site area, therefore the construction phase of the development will likely have an imperceptible impact on the historic structures within the vicinity. However the construction site for the development is in close proximity to the boundary wall of the Royal Kilmainham Hospital, within eight metres of this stone wall in some locations. The construction management plan will need to take account of the following to mitigate impact on this wall; protection of the wall during the construction phase; monitoring of vibration impact on the wall during the construction phase; and a full record of the wall should be undertaken prior to the commencement of works (rectified photograph and stone accurate survey drawings) to enable repairs and rebuilding to be accurately executed should any unforeseen damage occur during the construction phase.

The erection of cranes, scaffolding and site lighting columns will be the initial visible elements of the development works and more of the development will become visible as it is constructed. The visual impact of the construction phase on the architectural heritage of this area will short-term in nature.

14.5.2.2 Operational Phase and Cumulative Impacts

The height of the proposed SHD development rises from 5 storeys addressing the formal gardens, to 12 and 17 storeys respectively. The proposed buildings will be visible from a range of near and far locations.

24 computer generated photomontages (provided in Appendix 14A) have been prepared to illustrate the character of the proposed residential scheme within both its immediate setting and in more distant views. The current or existing view is rendered together with that of the proposed for comparative purposes and include both relevant winter and summer views.

As the photomontages showing the cumulative impact are only rendered as an undesigned outline of a single commercial building, and not a finalised expression of what the scale, massing and materiality will be, the assessment of impact is therefore limited to what is outlined at this stage by the blue line. The commercial building will be the subject of a separate application, therefore a separate EIAR will accompany it and will assess the impact finalised form.

The assessment of the cumulative impact on views includes the SHD scheme alongside the unfinalised blueline for the adjoining commercial site and the (Phase 1) HSQ block, which has already significantly altered the setting of the RHK and its formal gardens. It also considers the large scale Clancy Barracks development which has altered views to and from the Phoenix Park and the RHK. The cumulative impacts have been assessed with reference to existing and proposed development set out in Appendix 1B.

Table 14.5.2.2.1 Description of View with Assessment of Impacts on Architectural Heritage [2]

Photomontage View 01	**View west Heuston Station & St. John's Road West**
Existing View	This viewpoint is 500M northeast of the site with the protected principal Heuston Station building on the right and the protected Dr Steevens' Hospital, behind the trees in leaf, on the left. Phase 1 of the HSQ buildings – particularly the EIR building – are prominent in the centre of the image. St John's Road West runs between the station and the HSQ buildings and dominates the view. The cranes of the new Garda headquarter buildings currently under construction on Military Road are visible above the trees on the left.
Proposed View	The upper floors of the tower element of the proposed development are partially visible above the earlier phase of the HSQ buildings.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structures Heuston Station and Dr. Steevens' Hospital as they are both a good distance away from the construction site. The impact is considered to be slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	Although the proposed tower element of the development will be partially visible most of the scheme is concealed from this view by phase 1 of the (HSQ) development so it would have a limited impact. The impact is considered to be slight neutral long term visual impact on the views from the protected historic structures Heuston Station and Dr. Steevens' Hospital
Cumulative Impacts	Although phase 1 of the HSQ development screens part of the outline of the proposed commercial element, its scale

[2] There are no potential visual impacts in proposed views 2, 3,16 and 24, and therefore these views do not form part of the assessment.

	and mass is considerably larger than the existing development and protected structures in this sensitive view, and it is considered that this impact would have a significant negative long term visual impact on the setting of Heuston Station.

Photomontage View 04	**View north from western edge of Deputy Master's House**
Existing View	Taken from the western edge of the former Deputy Master's House looking north, the centre foreground of this summer view contains a contemporary concrete sculptural arrangement. Beyond this lies a hedge that borders the top of the garden wall behind it and to north, in the centre ground, the upper level of the garden pavilion, attributed to Edward Lovett Pearce, is visible. To the north-east of this, behind the trees in leaf and poor quality late-twentieth century development, the upper section of the Wellington Monument can be seen, and to the east of this large more recent poor-quality structures can be clearly seen.
Proposed View	In this proposed summer view the lower (pavilion) blocks are visible to the centre right (east) of the view and respond to the formal layout of the garden. The scale, modulation and proportions of the lower front blocks are complementary to the setting. The proposed green roof terraces to these blocks as they step away from the gardens soften the impact and create a visual link it to the RHK's formal gardens below.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on this protected structure - garden pavilion, as it is approximately eighty metres away from the closest proposed new tower. The impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	Aspects of the view, and the settings of the protected structures within it have already been changed by the incremental addition of poor quality more recent development along Conyngham Road and the first phase of development on the site completed in 2004. The proposed lower pavilion blocks use the height differential on the site to address the formal gardens, stepping down to double storey height, and incorporating a green terrace to soften the impact. The new blocks will be noticeable from the

	gardens but the formal composition will be an improvement on the current informal forms of the phase 1 development. This impact is considered to be a moderate neutral long term visual impact on the views from and setting of the Deputy Master's House
Cumulative Impacts	The outlined proposed development is largely screened by the proposed lower pavilion blocks of the SHD development. It would also screen the easternmost section of the view already altered along Conyngham Road by more recent development of variable quality. Only a small section of the proposed commercial tower element would be visible above the SHD tower element in this already altered view. This impact is considered to be a moderate neutral visual impact long term on the views from and setting of the Deputy Master's House

Photomontage View 05	**View north from Deputy Master's House**
Existing View	This summer view is taken from in front of the garden wall in front of the former Deputy Master's House looking northwards towards the formal garden setting of the hospital. In the near view the formal paths and planting are evident, with tall trees lining the boundary wall to the east, adjacent to the HSQ site. To the left of the garden, in the centre ground, the garden pavilion is visible above the treeline. To the north of this, behind the trees in leaf and poor quality late-20th century development, the upper section of the Wellington Monument can be seen, and to the east of this are large more recent poor-quality structures. In the distance to the east, the cupola of James Gandon's former infirmary building, is just discernible, with the less sympathetic mid-20th century extension, more visible to its east. Just discernible to the east of this is an untidy collection of warehouses, temporary buildings, a poor 1960s building and a large section of the Criminal Courts of Justice building. Critically, there is no publicly accessible view from this location.
Proposed View	The proposed new buildings adjoining the formal gardens would screen out some of the unsightly rail infrastructure, the poor quality assembly of warehouses and the courts of criminal justice, the poor quality extension to Gandon's building and the

	very distant view of its cupola.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on this protected structure however the boundary wall of the Royal Kilmainham Hospital is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden, stepping up in height as it meets the phase 1 development, while screening out unsightly development in the distance. The modulation, proportions and materiality of the lower blocks give way to the taller blocks behind, while the green roof terraces create a green edge that relates to the garden and softens the impact. The already much compromised distant view to the cupola of Gandon's former Royal Infirmary will be screened in this view, but is still visible from the main axial view (view 6). This is considered to be a moderate negative long term impact on the views to the formal gardens from the Deputy Master's House.
Cumulative Impacts	The outlined proposed development is largely screened at lower level by the proposed lower pavilion blocks of the SHD development. It would also screen the easternmost section of the view already altered along Conyngham Road by more recent development of variable quality. Only a relatively small section of the proposed commercial tower element would be visible above and beside the SHD tower element. This impact is considered to be a moderate neutral visual impact long term on the views from and setting of the Deputy Master's House

Photomontage View 06	**View northeast from the central axis of the Royal Hospital**
Existing View	This view across the formal gardens from the top terrace on the

	central axis of the RHK and is one of the primary views. The Central Criminal Courts building and the former Royal Infirmary cupola visible on the right background with the apartment buildings and rail infrastructure centre background. The Wellington Monument in the Phoenix Park is partially screened by trees.
Proposed View	The proposed new buildings address the formal gardens and screen out some of the rail infrastructure and the Central Criminal Court building, while retaining the distant view of Gandon's cupola on the former Royal Infirmary in the background.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden, stepping up in height as it meets the phase 1 development, while screening out unsightly development in the distance. The modulation, proportions and materiality of the lower blocks give way to the taller blocks behind, while the green roof terraces create a green edge that relates to the garden and softens the impact. This impact is considered to be a slight negative long term visual impact on the views from the main axis through the RHK gardens.
Cumulative Impacts	The view is already altered by the line of more recent development of variable quality along Conyngham in the centre ground. The outlined proposed development is partially screened at lower level by the proposed lower pavilion blocks of the SHD development. The plinth of the proposed commercial development would project into the view but it would also screen the easternmost section of the view already altered and would retain the distant view to the cupola of Gandon's former Infirmary. This impact is considered to be a moderate neutral long term visual impact on the views from and setting of the Deputy

	Master's House

Photomontage View 07	**View northeast from in front of Royal Hospital**
Existing View	This view from the road in front of the north elevation of the Royal Hospital looking north-east, shows the top of the wall that bounds the formal garden and, to the left (west) of the view. The large late-20th century buildings that front onto Conyngham Road are visible. The cupola of Gandon's former infirmary can be seen above the trees, as can the large mid-20th century extension. The recent Central Courts of Criminal Justice stands prominently in the centre of the view as does the most northerly block from the first phase of the HSQ development, neither of which respond in any way visually to the hospital and gardens. To the right (east) of this stands the former Deputy Master's House partially screened by mature trees.
Proposed View	The design of the proposed development is arranged orthogonally to address the RHK and its gardens, and steps back in height to the east, towards the higher buildings of the HSQ phase 1. This creates a strong dialogue between the proposed development and the formal gardens and the RHK. The light tones of the cladding panels and the garden roof terraces respond to the planting of the gardens. Lower blocks are sized to create a similar formal relationship to the gardens as the hospital, before stepping up in height to meet the scale of the existing buildings to the east. The taller blocks behind include a bridge-like structure partially obscured by a mature Yew tree and a taller tower.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds formally to its historic setting and obscures the less regular composition of the first phase buildings to the east. It also screens much of the Central Courts of Criminal Justice, while retaining the distant view of Gandon's cupola. This impact is considered to be a moderate neutral long term

	visual impact on the views to the north-east from the RHK.
Cumulative Impacts	The view is already altered by the line of more recent railways infrastructure and development of variable quality along the easternmost section of Conyngham, the Criminal Courts of Justice building and the visible elements of phase 1 of the HSQ development . The outlined proposed development is partially screened at lower level by the proposed lower pavilion blocks of the SHD development. The plinth of the proposed commercial development would project into the view but it would also screen the easternmost section of the view already altered and would retain the distant view to the cupola of Gandon's former Infirmary. Taken cumulatively with the proposed SHD development, the unrefined outline massing and scale of the commercial tower would read as a large mass of development in a significant view. This impact is considered to be significant negative long term.

Photomontage View 08	**View northeast from top of RHK garden access steps**
Existing View	This highly significant view is from the top of the garden access steps is dominated by Criminal Courts of Justice and the irregular composition of the 1st phase of the HSQ development. The cupola of the Gandon building and its twentieth-century extension are visible, while the irregular profile of the tall buildings to the east has no formal relationship to the gardens.
Proposed View	The proposed buildings screen out the earlier HSQ phase and most of the Criminal Courts of Justice, but retain the distant view to Gandon's cupola. The lower pavilion blocks of the proposed development orthogonally address the formal gardens and help mediate the height and massing of the taller, 12 and 18 storey buildings.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on this protected structure however the boundary wall of the Royal Kilmainham Hospital is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and

	construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds formally to its historic setting and obscures the less regular composition of the first phase buildings to the east. It also screens much of the Central Courts of Criminal Justice, while retaining the distant view of Gandon's cupola. This impact is considered to be moderate negative long term visual impact on the views to the north-east from the RHK formal gardens. This would be considered a significant negative long term visual impact if the view was not already impacted by previous phase 1 development.
Cumulative Impacts	The view is already altered by development of variable quality along the easternmost section of Conyngham, the Criminal Courts of Justice building and the visible elements of phase 1 of the HSQ development. The outlined proposed development is partially screened at lower level by the proposed lower pavilion blocks of the SHD development. The plinth of the proposed commercial development would project into the view but it would also screen the easternmost section of the view already altered and would retain the distant view to the cupola of Gandon's former Infirmary. Taken cumulatively with the proposed SHD development, the unrefined outline massing and scale of the commercial tower would read as a large mass of development in a significant view. This impact is considered to be a significant negative long term impact.

Photomontage View 09	**View east from the central focal point of the RHK formal gardens**
Existing View	The view shows the avenue of pleached limes on the main east-west axis of the gardens, which frame the view of the irregular forms of the phase one buildings, which have no formal relationship with the gardens. These are particularly visible in winter months. A blank limestone rubble wall closes the view as the focal point at the eastern edge of the formal gardens.
Proposed View	The view shows the tallest elements of the proposed development rising above the trees. The lower (pavilion) blocks, which can just be glimpsed, and the taller arch-like blocks behind are designed to respond positively with the formal, axial

	design of the garden. The proposal largely screens the earlier, irregular phases of the development with the exception of a glimpse of the Brunel and Kestrel building through the arch.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. The boundary wall of the RHK is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the garden of the RHK by creating a formal, orthogonal and axial relationship to the garden, stepping up in height as it meets the phase 1 development, while screening out the irregular development in the distance. The modulation, proportions and materiality of the lower blocks give way to the taller blocks behind. This impact is considered to be moderate negative tending towards significant long term impact on the views from the RHK gardens
Cumulative Impacts	The outline commercial tower element will be visible to the left of the view but the view is already altered by the visible irregular forms of elements of the phase 1 of the HSQ development. This impact is considered to be moderate negative long term visual impact.

Photomontage View 10	**View east from the pavilion in the formal garden RHK**
Existing View	Taken from the western edge of the formal garden of the Royal Hospital looking east along a formally planted axis, the phase 1 HSQ development stands prominently in the centre of this view above the trees. In the centre foreground is a gravel path that runs all the way to the boundary wall of the gardens. This axial path is bounded by lawns with formal conical trees, box hedging and, in the middle ground, taller trees which draw the eye

	eastwards, towards the more irregular forms and materiality of the first phase of the HSQ development. The former Eir building is visible to the north-east of the view, and the sail-like silhouette of the Brunel building stands prominently in the distant centre ground, and to the right (south) of it the slightly lower block frames the axial view from the garden
Proposed View	The proposed development screens most of the earlier HSQ phase with the lower elements rising slightly above the boundary of the formal gardens. The lower pavilion blocks formally address the garden and mediate the height of the taller, more stylistically and materially regular blocks behind.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. The boundary wall of the Royal Kilmainham Hospital is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. The impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden, stepping up in height as it meets the phase 1 development, while screening the irregular forms of the earlier development in the distance. The modulation, proportions and materiality of the lower blocks give way to the taller blocks behind, while he green roof terraces create a green edge that relates to the garden and softens the impact. The impact is considered to be a moderate negative long term impact on the views from the RHK formal gardens. This would be considered a significant negative long term visual impact if the view was not already impacted by previous phase 1 development.
Cumulative Impacts	Though sections of the irregular form of phase 1 of the HSQ development will be screened by the SHD, the scale of outline commercial tower element will be very prominent the left of the view and will cumulatively read as a mass of development in a sensitive view.

	The impact is considered to be significant negative long term impact

Photomontage View 11	**View east from north of RHK formal gardens**
Existing View	To the left of this summer view the clipped hedging borders the boundary wall of the formal gardens to the north and trees in leaf rise above it. Clipped hedging is visible to the right of an area of lawn bordered by an area of gravel path to the north. Pleached lime trees are visible in the centre of the view on what is the garden's central formal axis. The earlier phase of the HSQ development with the white stone-clad former Eir building on the left and the other, more irregular, forms (and materials) of the complex stepping down to the right of the view, addressing the gardens in an oddly informal way. The former Deputy Master's House is visible to the right of the view among the mature (in leaf) trees.
Proposed View	The proposed view shows the more visually unified blocks in large part screening the earlier HSQ buildings, and stepping up in height from the existing southern residential block of HSQ Phase 1. The lower pavilion blocks can just be glimpsed and help mediate the height of the taller elements behind and formally address the RHK gardens.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. The boundary wall of the Royal Kilmainham Hospital is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. The impact is considered to be slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden, stepping up in height as it meets the phase 1 development, while screening the irregular forms of the earlier development in the distance. The modulation, proportions and materiality of the lower blocks give way to the taller blocks

	behind, while he green roof terraces create a green edge that relates to the garden and softens the impact. The impact is considered to be moderate negative long term impact on the views from the Kilmainham Hospital formal gardens. This would be considered a significant negative long term visual impact if the view was not already impacted by previous phase 1 development.
Cumulative Impacts	Though sections of the irregular form of phase 1 of the HSQ development will be screened by the SHD, the scale of outline commercial tower element will be very prominent the left of the view and will cumulatively read as a mass of development in a sensitive view. The impact is considered to be significant negative long term impact

Photomontage View 12	**View east from north-west corner of the formal garden RHK.**
Existing View	This view from the north west corner of the gardens shows an area of lawn with a semi mature tree, from which gravel paths radiate towards the RHK and Deputy Master's House on the right, and the first phase of the HSQ development to the left. The irregular forms and varied materiality of phase 1 of the HSQ development dominates the centre ground and contrasts with the formality of the RHK and its garden setting.
Proposed View	The proposed view shows the more visually unified blocks in large part screening the earlier HSQ buildings, and steeping up in height from the existing southern residential block of HSQ Phase 1. The lower pavilion blocks mediate the height of the taller elements behind and formally address the RHK gardens.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. The boundary wall of the Royal Kilmainham Hospital is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. There will be a slight short-term visual impact due to the

	presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden, stepping up in height as it meets the phase 1 development, while screening the irregular forms of the earlier development in the distance. The modulation, proportions and materiality of the lower blocks give way to the taller blocks behind, while he green roof terraces create a green edge that relates to the garden and softens the impact. This impact is considered to be a moderate negative long term impact on the views from the RHK, its formal gardens and on the views to the Deputy Master's House and RHK. This would be considered a significant negative long term visual impact if the view was not already impacted by the previous phase 1 development.
Cumulative Impacts	Though sections of the irregular form of phase 1 of the HSQ development will be screened by the SHD, the scale of outline commercial tower element will be very prominent the left of the sensitive view This impact is considred to be a significant negative long term impact

Photomontage View 13	**View east from western edge of RHK formal gardens**
Existing View	This is the principal axial east-west view within the formal gardens of the RHK, with conical trees and clipped hedges, in the foreground and a strong avenue of pleached limes framing the easterly view. This view is dominated by the sail-like Brunel building that stands just off this important axis.
Proposed View	The proposed development has been designed to respect the geometrical formality of the gardens with a large arch-like structure marking this important axial route while screening out the earlier irregular forms of the development and framing an important view back towards the city.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. The boundary wall of the Royal Kilmainham Hospital is within eight metres of this

	stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. This is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden, stepping up in height as it meets the phase 1 development. This screens the irregular forms of the earlier development beyond while creating a prominent eye-catcher in the form of the monumental arch located on the main cross axis of the gardens. This is considered to be a moderate negative long term impact on the views from the RHK's formal gardens. This would be considered a significant negative long term visual impact if the view was not already impacted by previous phase 1 development.
Cumulative Impacts	Though much of the irregular form of phase 1 of the HSQ development will be screened by the SHD, the scale of outline commercial tower element will be very prominent the left of the view and will collectively read as a mass of development in a highly sensitive view. This impact is considered to be a significant negative long term impact

Photomontage View 14	**View east from centre of Bully's Acre.**
Existing View	This distant summer view, taken from the western end of the RHK grounds, in the centre of Bully's Acre, looks east towards the RHK, which is partially obscured by mature trees. The impact of the first phase of the HSQ development is significant consisting of a collection of high structures with an irregular profile that are very distinctive but have no formal relationship with the gardens or the RHK.
Proposed View	The proposed development creates a more formal relationship

	with the RHK and will obscure most of the irregular first phase of the HSQ development. The lower pavilion-like blocks, just glimpsed over the boundary wall of the formal gardens in the near ground respond to the geometry of the gardens and mediate the height of the taller blocks that step up behind.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. The boundary wall of the Royal Kilmainham Hospital is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden setting of the RHK, stepping up in height as it meets the phase 1 development. This screens the irregular forms of the earlier development beyond while creating a prominent eye-catcher in the form of the monumental arch located on the main cross axis of the gardens. Moderate negative long term impact on the views of the RHK from the western end of the grounds. This would be considered a significant negative long term visual impact if the view was not already impacted by previous phase 1 development.
Cumulative Impacts	Though much of the irregular form of phase 1 of the HSQ development will be screened by the SHD, the scale of outline commercial tower element will be very prominent the left of the view and will collectively read as a mass of development in this highly sensitive distant view. This impact would be considered to be a significant negative long term impact

Photomontage View 15	**View northeast from Bully's Acre**
Existing View	This distant summer view across the open grassland of Bully's Acre, to the west of the site, looks east towards the RHK, which

	is partially obscured by a belt of mature trees. The impact of the first phase of the HSQ development is significant in this view, consisting of a collection of high, structures with an irregular profile that very distinctive but have no formal relationship with the gardens or the RHK itself which has fundamentally changed the character and appearance of its historic setting.
Proposed View	The proposed development creates a more formal relationship with the RHK and will obscure most of the irregular first phase of the HSQ development. The lower pavilion-like blocks in the near ground respond to the geometry of the gardens and mediate the height of the taller blocks that step up behind.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. The boundary wall of the Royal Kilmainham Hospital is within eight metres of this stone wall in some locations. This could result in significant impact if the wall is not adequately protected, recorded and monitored during the construction phase. Impact on this wall will be mitigated during the construction phase. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development responds to the historic setting of the RHK by creating a formal, orthogonal relationship to the garden setting of the RHK, stepping up in height as it meets the phase 1 development. This screens the irregular forms of the earlier development beyond. This impact is considered to be a moderate negative long term impact on the views of the RHK from the western end of the grounds. This would be considered a significant negative long term visual impact if the view was not already impacted by the previous phase 1 development.
Cumulative Impacts	Though much of the irregular form of phase 1 of the HSQ development will be screened by the SHD, the scale of outline commercial tower element will be very prominent the left of the view and will collectively read as a mass of development in a highly sensitive view. This impact is considered to be a significant negative long term impact

Photomontage View 17	**View east from St John's Road West.**
Existing View	To the left (north) of this view is a more recent limestone boundary wall, above which the upper floors of the Criminal Courts of Justice are visible and more recent development can be seen in the distance. This location in the middle of St. John's Road West offers clear views to drivers approaching from the west of the principal building (and spire and upper floors) of the RHK complex. There is also a glimpse of Bully's Acre with a dense line of trees along the northern boundary of the RHK lands screening views towards the site in the centre ground and a belt of mature trees also partially screens the RHK
Proposed View	The proposed upper level of the taller block is partially visible above the trees with the rest of the development screened by the trees.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The small visible section of the proposed development is largely screened by trees and is far enough away from the RHK, in what would be a glimpsed view, as to be barely perceptible. This impact is considered to be an imperceptible neutral long term visual impact on views of the RHK.
Cumulative Impacts	Though the view is already altered by the construction of the road, boundary wall to the north and the Criminal Courts of Justice glimpsed above it in the distance, the outline proposed commercial tower element would be very visually prominent in this view and would significantly alter the glimpsed appreciation of the RHK and its setting. This impact is considered to be a significant negative long term impact

Photomontage View 18	**View east from St John's Road West.**

Existing View	This summer view from the railway overbridge shows part of the Clancy Quay residential development on the left, with glimpses of the Brunel building from phase 1 of the HSQ development just glimpsed above the tree-line. The construction cranes for the new Garda Command Centre under construction on Military Road are visible over the trees on the northern boundary of the RHK. Part of the north range of the RHK, particularly its spire, is visible between the belt of mature trees.
Proposed View	A small section of the proposed upper levels of the taller block is visible above the trees. Winter views would provide some more filtered views of the upper parts of the development, but the dense tree trunks would effectively screen views of the majority of the development.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The small visible section of the proposed development is largely screened by trees and is far enough away from the RHK, in what would be a glimpsed view, as to be barely perceptible. This impact is considered to be a slight neutral long term visual impact on any surrounding historic structures.
Cumulative Impacts	Though the view is already altered by the construction of the road and boundary wall to the north, the outline proposed commercial tower element would be very visually prominent in this view and would significantly alter the glimpsed appreciation of the RHK and its setting when taken cumulatively with the proposed SHD development. This impact is considered to be a significant negative long term impact

Photomontage View 19	**View southeast from Magazine Fort in the Phoenix Park**
Existing View	To the centre left (north) of this summer view, the walls of the Magazine Fort, a protected structure, are visible. To the right of this a belt of mature trees are in leaf, with the very top of the

	Wellington Monument just discernible above them. To the centre of the view, the irregular outline of phase 1 of the HSQ development can be seen, with other recent development evident in and around it, including the Clancy Barracks development to the right of the tower of the north range of the RHK. The construction cranes to the right of the image are associated with the Children's Hospital which is under construction in James's Street. Collectively, this has fundamentally changed the character and appearance of its historic setting and views to and from it.
Proposed View	This view shows the proposed new buildings largely screening the earlier phase of the HSQ development, and appear on the skyline as a more regular and unified stepped composition. In general, the new buildings are consistent with the development trend visible from this viewpoint. Winter views show intervening trees provide little screening from this viewpoint.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	Distant from site and adjoining modern developments minimise the negative visual impact on this viewpoint. This impact is considered to be moderate neutral visual impact long term impact on the views from the Magazine Fort in the Phoenix Park
Cumulative Impacts	The view is already altered by the construction of the Clancy Quay development, St. James's Hospital and irregular form of the phase 1 HSQ development. Though the latter would be partially screened by the proposed SHD scheme, the scale of the outline silhouette of the proposed commercial tower element would be very visually prominent in this view and would significantly alter the appreciation of views from this vantage point. This impact is considered to be significant negative long term impact

Photomontage View 20	View south from Chesterfield Avenue, Phoenix Park
Existing View	This view shows the parkland setting of the Wellington Monument with the Dublin Mountains partially visible above the trees. The road, Chesterfield Avenue, dominates the foreground of this view. To the centre left of the view there are mature trees in leaf above which can just be discerned the irregular silhouette of phase 1 of the HSQ development. To the centre of the view, in the gap between the trees, cranes from the St. .James's Hospital site can be discerned. The Wellington Monument dominates the centre left of the view.
Proposed View	The tallest tower element of the proposed development can just be seen above the canopy of mature trees to the west of the tall buildings of the existing HSQ site, but will have a modest impact on the already altered view. Winter views are no different as the intervening trees are evergreen.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. There will be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	It is distant from the site and the irregular silhouette of phase 1 of the HSQ development, in tandem with adjoining modern developments, minimise the negative visual impact on this viewpoint. The impact is considered to be a slight negative visual impact long term on the setting of, and views to and from, the Wellington Monument.
Cumulative Impacts	The view is already altered by the construction of the irregular form of the phase 1 HSQ development. The scale of the outline silhouette of the proposed commercial tower element would be very visually prominent in this view and would alter the appreciation of views from this sensitive vantage point. The impact is considered to be significant negative long term.

Photomontage View 21	View south from Chesterfield Avenue, Phoenix Park
Existing View	This view down Chesterfield Avenue shows view over the city on the left with the earlier HSQ phase visible over the intervening trees of the Phoenix Park. The view is referenced in the SDRA guiding principles with respect to views from the City Quays and the Wellington Monument. In this view, the pavement that runs along the western side of Chesterfield Avenue is bordered by a historic lamp standard, with the Guinness brewery discernible in the distance to the centre left. Iron railings and parkland dominate the foreground. To the centre right of the view there are mature trees in leaf, above which can just be discerned the irregular silhouette of phase 1 of the HSQ development and the cranes from the St. James's Children's Hospital site
Proposed View	The tallest tower element of the proposed development can just be seen above the canopy of mature trees to the west of the tall buildings of the existing HSQ site.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	It is distant from site and the irregular silhouette of phase 1 of the HSQ development, in tandem with adjoining modern developments, minimise the negative visual impact on this viewpoint. The impact is considered to be slight negative long term visual impacts on the surrounding historic structures
Cumulative Impacts	The view is already altered by the construction of the irregular form of the phase 1 HSQ development. The scale of the outline silhouette of the proposed commercial tower element would be very visually prominent in this view and would alter the appreciation of views from this sensitive vantage point both when taken cumulatively with the existing phase 1 HSQ development and the proposed SHD development but also as a single entity in isolation. The impact is considered to be significant negative long term impact.

Photomontage View 22	View south from DPP's Office Infirmary Road
Existing View	This slightly elevated winter view is from the car park of Office of the Director of Public Prosecutions building is north of the proposed site. Part of the Central Criminal Courts building is visible on the left of the image, and trees and vegetation line the area behind the parked cars right the way across the rest of the centre of the view.
Proposed View	The proposed development is shown in outline and a filtered view of the proposed buildings is just visible through the intervening vegetation.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The proposed development is distant, would be screened by intervening vegetation and the receptor (a car park) is not sensitive so would have no negative visual impact. Imperceptible neutral visual impact long term.
Cumulative Impacts	This barely perceptible, already altered view is not a significant view and would experience little change when the proposed SHD scheme and the proposed outline commercial scheme are viewed collectively. This impact is considered to be slight neutral long term.

Photomontage View 23	View southwest from Pocket Park, Wolf Tone Quay
Existing View	This view is taken from a small park located to the north-east of the proposed site. The mature park is located at a busy junction beside the Liffey Quays, Sean Heuston Bridge and the Luas Line. The eastern elevation of Dr. Steevans' Hospital is visble to the left of the view. Heuston Station stands prominently in the centre ground, and the massing of the pre-existing Eir building from Phase 1 of the HSQ development is highly visible to the

	rear (west) of the station complex.
Proposed View	This view is taken from a small park located to the north-east of the proposed site. The mature park is located at a busy junction beside the Liffey Quays, Sean Heuston Bridge and the Luas Line. The eastern elevation of Dr. Steevans' Hospital is visible to the left of the view. Heuston Station stands prominently in the centre ground, and the massing of the pre-existing Eir building from Phase 1 of the HSQ development is highly visible to the rear (west) of the station complex.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	The view has already been altered by phase 1 of the HSQ development and various more recent transport infrastructure. Consequently, as only a barely perceptible section of roofline of the proposed new development would be visible, it would not have a negative visual impact. This impact is considered to be imperceptible neutral long term visual impact on the views of Heuston Station.
Cumulative Impacts	Though the view towards Heuston Station has been already altered by phase 1 of the HSQ development, and the proposed outline development will partially screen it, the scale and height of the proposed outline (commercial) development would be very visually prominent in the view. This impact is considered to be significant negative long term.

Photomontage View 24	**View from Croppies Acre, Wolf Tone Quay**
Existing View	This view is taken from Croppies Acre, a mature narrow rectangular park located between Benburb Street and Wolfe Tone Quay, to the north-east of the proposed site. The mature park is located at a busy junction beside the Liffey Quays, Sean Heuston Bridge and the Luas Line. The roof profile of Dr. Steevans' Hospital is visible to the left of the view. Heuston Station stands prominently in the centre ground. Between its

	main range and its standalone cupola, the Eir building from Phase 1 of the HSQ development can be glimpsed to the rear (west) of the station complex.
Proposed View	This view is taken from Croppies Acre, a narrow rectangular park located between Benburb Street and Wolfe Tone Quay, to the north-east of the proposed site.. The mature park is located at a busy junction beside the Liffey Quays, Sean Heuston Bridge and the Luas Line. The roof profile of Dr. Steevans' Hospital is visible to the left of the view Heuston Station stands prominently in the centre ground. Between its main range and its standalone campanile (to the north), the Eir building from Phase 1 of the HSQ development can be glimpsed to the rear (west) of the station complex.
Construction Phase Impacts	There will be no, or imperceptible, construction phase impacts on the historic structure(s) in the vicinity as they are a significant distance away from the construction site. This impact is considered to be a slight neutral short-term visual impact due to the presence of cranes in the skyline, and construction-related traffic in the vicinity.
Operational Phase Impacts	This view has already been altered by various more recent transport infrastructure and a glimpse of phase 1 of the HSQ development. None of the proposed new SHD development would be visible so there would be no visual impact. This impact is considered to be an imperceptible neutral long term visual impact on the views of Heuston Station.
Cumulative Impacts	Though the view towards Heuston Station has been altered already by transport infrastructure, the scale and height of the proposed outline (commercial) development would be very visually prominent in the view, would further obscure the gap between the architecture of the main range of Heuston Station and its standalone campanile (to the north) and dominate the setting of the station. This impact is considered to be significant negative long term.

14.5.3 Cumulative Impacts

As already stated, the photomontages showing the cumulative impact are only rendered as an undesigned outline of a single commercial building and a plinth, and not a finalised expression of what the scale, massing and materiality will be, the assessment of impact is therefore limited to what is outlined at this stage by the blue line. The commercial element will be the subject of a separate application, therefore a

separate EIAR will accompany it and will assess the impact of its finalised form. The cumulative impact has ben assessed with reference to existing and proposed development as set out in Appendix 1B.

The assessment of the cumulative impact on views includes the SHD scheme alongside the unfinalised blueline for the adjoining commercial site and the (Phase 1) HSQ block, which has already significantly altered the setting of the RHK and its formal gardens. It has also considered the large scale Clancy Barracks development which has also altered views to and from the Phoenix Park and the RHK.

There are a number of important near and far views in and around the RHK, its gardens and wider setting and from the Phoenix Park, where there is the potential to have a significant negative long term impact when the cumulative impact of the scale of the unfinalised outline proposal is considered,

14.6 Do Nothing Scenario

Given the site is located in zoned lands - and is part of a larger development that was never completed because of the economic climate in the early-2000's - it is unlikely that such a centrally located, well connected site so well served by parks, gardens, cultural attractions of national significance and a burgeoning restaurant scene, would remain undeveloped for very long. Any residential development similar to this proposed scheme is therefore likely to result in a similar level of impact on the surrounding setting in terms of scale and mass. The unfinished undercroft parking structures and fake grass element of the temporary landscaping associated with Phase 1 of the HSQ development would remain the eyesores they are today in a 'Do Nothing Scenario' and the former link between the site and the formal gardens of the RHK would not be reinstated.

14.7 Hazards or Accidents

There is potential risk to the boundary wall of the RKH formal garden wall due to the its proximity to the development site. There are potential risks to surrounding historic structures during the construction phase of works arising from poor construction site management, and traffic to and from the site.

14.8 Mitigation Measures

In response to the potential impacts outlined a number of mitigation measures are proposed to ensure minimal disturbance and impact on the protected structures around site. Early engagement with the design team and client has allowed for a number of these mitigation measures to be incorporated into the design proposals.

14.8.1 Construction Phase

Appropriate measures will be taken to mitigate any potentially adverse construction-related effects such as noise, vibration and temporary lighting and signage on designated and other architectural heritage of note in the vicinity of the proposed development site. The operation of a well-managed organised and planned construction site, with adequate control of construction traffic and working activity, is key to

avoiding or minimising impact. A construction environmental management plan (CEMP) has been submitted with the planning application, which details mitigation measures during the construction phase.

Measures are required to mitigate against significant impacts arising from the proposed gate from the subject site into the RHK gardens. A method statement for the removal of the wall fabric, in line with best conservation practice, will be prepared by a suitably qualified conservation architect for use by the appointed contractor.

Table 14.8.1 Table of Mitigation Measures for the Construction Phase

Character of potential impact	
Construction Phase	
Items of Architectural Note.	There is potential to discover further elements of architectural or archaeological note during this stage. Monitoring of the construction site will occur during groundworks.
Disturbance impacts could potentially be significantly negative but temporary	This could be mitigated by appropriate site protection and monitoring, or, in a least favourable scenario, repair, in line with best conservation practice. A full record of the RHK boundary wall, which is in close proximity to the development site will be taken in the form of photographic survey and stone accurate survey drawings prior to construction. A suitably qualified Conservation Architect will review this record to ensure it is sufficiently detailed. Protection measures for the wall will be developed ahead of the works, to ensure that there is no damage from construction debris etc. A suitably qualified Conservation Architect will review the protection measures to be put in place. Careful vibration monitoring will be undertaken during the construction phase to ensure that there is no vibration impact on the wall. Should monitoring be required on any other structures within the RHK grounds, this will also be undertaken during construction.
Visual Impact	There will be minimal, and short-term visual impact during the construction phase. The contractor will implement the agreed CEMP to minimise visual impact during construction.

Table 14.8.2 Table of Mitigation Measures for the Operational Phase

Character of potential impact	
Operational Phase	
Landscape public	The proposed landscaping plan will be implemented. This scheme incorporates design and planting of the highest quality, to create

realm	meaningful public realm which would help soften and leaven the proposed development and help create good placemaking as mitigation.
Lighting	The proposed lighting plan is to be implemented as proposed to prevent/minimise light spill into the adjoining RHK gardens.
Signage	Signage within the site should be of the highest quality of design and fabrication.

14.9 Residual Impacts

There will be residual visual impact as outlined in our assessment of the views, in table 14.5.2.2.1. These residual visual impacts are the result of high density residential / commercial development at the subject site, and have been minimised where possible through the design, modulation, proportions and materiality of the proposed development and the implementation of green roof terraces.

14.10 Interactions Arising

The relevant environmental interactions for Architectural Heritage are with Landscape and Visual Impact and noise and vibration.

Interactions with the Landscape and Visual Impact Assessment arise due to the impacts on the setting and views of protected and historic structures, in particular the RHK. Landscape proposals for the scheme have been developed in conjunction with the Landscape Visual Impact Assessment Consultants, project Ecologists and Architectural Heritage Consultants. During the construction phase this interaction is between the boundary edges of the site to the RHK formal gardens, and is negative, moderate and short term. During the operational phase this interaction is neutral and moderate.

Interactions between Architectural Heritage and Noise and Vibration occur primarily during the construction phase when works at the site might impact upon the structural integrity of architectural heritage features just outside of the site, e.g. the boundary wall to the RHK gardens. Information from Chapter 10 indicates that vibration during the construction phase will be monitored and therefore impacts on adjoining structures will not occur. In this way, construction phase interactions are imperceptible. Interactions are not anticipated during the operational phase.

14.11 Monitoring

Table 14.11.1 Table of Monitoring Requirements

Character of potential impact	
Construction Phase	

Features of Architectural Heritage	On site monitoring will be carried out by a Conservation Architect throughout the construction phase of the works to ensure adequate protections are put in place, and anything of significance is fully recorded.

15 LANDSCAPE AND VISUAL IMPACT ASSESSMEMT

15.1 Introduction

This chapter has been prepared by Landscape Architect David O'Sullivan M. Ag. Sc. (HORT), M.L.A., MLI of doyle + o'troithigh landscape architecture. David has prepared Landscape & Visual Impact reports for a wide range of projects including mixed residential, care homes, hotels, student accommodation and a number of solar projects throughout the country. The purpose of this study is to appraise the existing landscape settings of the site and to assess the potential and predicted landscape and visual impacts arising from the proposed development and describe the proposed mitigation measures. The Council of Europe defines 'Landscape as an area, as perceived by people, whose character is a result of action and interaction of natural and/or human factors'. This definition of Landscape, , which is referenced in the 3rd edition of the Landscape Institute's Guidelines on Landscape and Visual Impact Assessment and is included in the Planning and Development Amendment Act 2010 (No. 30), broadens the concept of landscape further than solely framed in terms of aesthetics and visual amenity. This definition of landscape is what will be used in this report.

This assessment should be read in conjunction with Chapter 3 Description of Development and Alternatives Examined and in conjunction with the Photomontages prepared for the scheme (refer to Appendix 14A).

15.2 Assessment Methodology

This assessment has been based on the following guidelines:

- Environmental Protection Agency (EPA)– Guidelines and the information to be contained in Environmental Impact Statements (EPA 2002) and Advice Notes on Current Practice and the Preparation of Environmental Impact Statements (EPA 2003). and, Draft Guidelines on the Information to be contained in Environmental Impact Statements (2017)
- 'Guidelines for Landscape and Visual Assessment', 3rd Ed., The Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- *Urban Development & Building Heights,* Dept. of Housing Planning & Local Government 2018

This assessment has involved:

- Undertaking a desk-top study of the site; including reviewing ordnance survey mapping and aerial photography.
- Reviewing the plans, sections, and elevations of the proposed scheme.
- A review of statutory planning and other documentation in order to ascertain the local and wider; significance; and

- Visiting the site and surrounding area, including the Royal Hospital Kilmainham and its gardens, during the spring of 2020 / 2021 and preparing a photographic record of views and landscape features.

15.2.1 Nature of Impacts

Impact on landscape arising from development has two distinct but closely related aspects as outlined in Chapter 2 of the 3rd edition of the Landscape Institute's Guidelines for LVIA and in the EPA Draft Advice Notes for Preparing an EIS. The first is impact in the form of change to character of the landscape that arises from the insertion of the proposed development into the existing context. The second aspect is the visual impact, which depends on the degree and nature of change in the visual environment.

It is recognised that the combined impact on character and views will draw responses, the significance of which will be partly informed by an individual's subjective perception of how much the changes matter.

The assessment of landscape and visual impacts include:

Off Site: -

- Designated tourism Routes – roads, paths, trails and associated view points;
- Public Roads, paths and access areas;
- Residences, hotels and amenities;
- Sites and monuments of archaeological, architectural or historical interest.

Site and environs: -

- Topography and drainage;
- Enclosures;
- Settlement patterns and land-uses;
- Natural features;
- Archaeological, architectural, historical or cultural features;
- Visual foci – external and internal;
- Vegetation;
- Circulation routes

15.2.2 Significance Criteria

Whenever appropriate the following terms are used to describe the degree, quality and duration of an impact: (Note this is based on the EPA Advice Notes and Guidelines) and provided in table 15.2.2.1 below.

Table 15.2.2.1 Impact Significance Criteria

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

Terms used to describe the quality of change:

- Positive effect A change which improves the quality of the enviromnent.
- Neutral effect: A change that does not affect the quality of the environment.
- Negative / adverse effect: A change that reduces the quality of the environment.

Terms relating to the duration of impacts as described in the EPA Guidelines are listed as follows:

- Temporary effect: Lasting one year or less
- Short-term effect: Lasting one to seven years
- Medium-term effect: Lasting seven to fifteen years
- Long-term effect: Lasting fifteen to sixty years
- Permanent effect: Lasting over sixty years.

15.2.2.1 Cumulative Impacts

Cumulative impacts are described in the EPA Guidelines (2002) as *the addition of many small impacts to create one larger, more significant, impact.* The EPA Guidelines (2017) states: - *in July 2004, regulations transposing the Strategic Environmental Assessment Directive (2001/42/EC) introduced requirements for environmental assessment of certain plans and programmes. This had significant implications for the extent to which EIA*

needed to assess aspects such as cumulative effects and alternatives. Therefore, *the project needs to be considered in its entirety for screening purposes. This means that other related projects need to be identified and assessed at an appropriate level of detail. This will identify the likely significance of cumulative and indirect impacts thus providing the competent authority (CA) with a context for their determination.*

The Guidelines for Landscape and Visual Impact Assessment (3rd Ed.) defines cumulative visual impacts as the effects on views and visual amenity enjoyed by people, which may result from either adding the effects of the project being assessed to the effects of the other projects on the baseline conditions or from their combined effect. This may result from changes in the content and character of the views experienced in particular places due to the introductions of new elements or removal of or damage to existing ones.

The baseline study area, as defined by the photomontage location map (Fig. 15.2.3.1), , relates to the general area of the site and includes important features and vistas which are relevant to the study. The study area was developed by site visits and visual assessment of the site and surrounding area. It also included the review of Dublin City Council existing and proposed planning applications in the area and for those projects outside the normal public planning process such as the Section 5 Irish Rail building in Heuston Station and the new Garda Security Centre buildings under construction on Military Road. The location of National Monuments and National Inventory of Architectural Heritage listed buildings as listed in the Historic Environment Viewer of Archaeology.ie identified those National Monument sites and listed buildings that could be impacted by the development proposals. The interaction with Dublin City Council regarding photomontage locations that would give a factual representation of the visual impacts of the proposed development also guided the extent of the study area.

15.2.3 Photomontages

A collection of 24 photomontages have been prepared surrounding the site to fully illustrate the physical and visual nature of the proposed development. The initial locations of the proposed photomontages were issued to Dublin City Council and following discussions with the Council additional viewpoint locations were added to give a total of 24 no. viewpoints spread around the site. Pre-application consultation with DCC was undertaken on 2 July 2020, 18 August 2020 and 16 September 2020, A Tripartite consultation meeting with An Bord Pleanála and DCC was held on 23 March 2021 (ABP Ref. 309058-20). An Bord Pleanála issued an Opinion dated 22 April 2021.

A cumulative impact has also been added to show the current Strategic Housing Development (SHD) application and the proposed commercial phase to the north of the site and proposed and granted developments relevant to the study. The Photomontages have been prepared from locations that are representative of views of the scheme from surrounding areas (Appendix 15A). Existing views and proposed versions both summer & winter of most views have been provided, (winter views in some cases were not possible due to these images being included at a late stage of the study when summer foliage was present on the trees) and the photomontage views have been taken at the following locations: -

Figure 15.2.3.1 Location of photomontages (see Modelworks submission for full map & locations)

Table 15.2.3.1 View Locations

View	Description	Location
View 01	View Southwest from St John's Road West / Heuston St.	Northeast
View 02	View west from car park Dr. Steevens' Hospital	East
View 03	View northwest from James's Street	Southeast
View 04	View north from rear of Deputy Masters House	Southwest
View 05	View north from rear of Deputy Masters House	Southwest
View 06	View northeast from the central axis of the Royal Hospital	Southwest
View 07	View northeast from in front of Royal Hospital	Southwest
View 08	View northeast from top of RHK garden access steps	Southwest
View 09	View east from the central focal point of the RHK formal gardens	West
View 10	View east from the pavilion in the formal garden RHK	West
View 11	View east from northern end of RHK formal gardens	West
View 12	View east from corner of the formal garden RHK.	West
View 13	View east from western edge of formal gardens	West
View 14	View east from centre of Bully's Acre.	West
View 15	View northeast from Bully's Acre	Southwest

View 16	View northeast from Richmond Tower, South Circular Road	Southwest
View 17	View east from St John's Road West.	West
View 18	View east from St John's Road West.	West
View 19	View southeast from Magazine Fort in the Phoenix Park	Northwest
View 20	View south from Chesterfield Avenue, Phoenix Park	North
View 21	View south from Chesterfield Avenue, Phoenix Park	North
View 22	View south from DPP's Office Infirmary Road	North
View 23	View southwest from Croppy Acre, Wolf Tone Quay	Northeast
View 24	View southwest from Wolfe Tone Quay	Northeast

NOTE: Refer to Appendix 15A for locations of Photomontage viewpoints and Modelworks for their submission

15.3 Receiving Environment

15.3.1 Site Description

The site is located in the Heuston South Quarter district on St John's Road, Dublin 8 and is part of a Strategic Development and Regeneration Area (SDRA) zoned area which commenced in 2005 with a mix of residential, commercial and retail.

The proposed SHD site area is at the lower car park level within the Heuston South Quarter (HSQ) development was temporarily landscaped as an open grass area with tree planting. Dense tree screen planting was installed at the edges of the open car park edge pending further development. To the south and east of the site lie the various contemporary designed buildings of the earlier development phase. St John's Road and Heuston Station and associated infrastructure is to the north and the historically important Royal Hospital Kilmainham (RHK) lies to the west. The RHK and its formal gardens is an important historic and cultural location constructed in 1684 as a hospital and retirement home for soldiers. The buildings were set on high ground on the south bank of the Liffey with wide views over the Royal Hunting Park which is now known as the Phoenix Park and the wider surrounding area. The section of lands to the north of this application site will form the basis of a commercial development for a later planning application which is in the design stage, but the outline of the future development has been included in the photomontages to indicate potential cumulative impacts from the overall development.

15.3.2 Existing Character and Visibility

This SHD site is set to the rear of earlier Phase 1 HSQ buildings that face onto Military Road. To the west of the site are the formal gardens of the RHK which are at an elevated level compared to the existing site lands. The base of an earlier unfinished building phase lies to the north of the site fronting onto St John's Road and the unfinished rising structural elements have been clad in a visually neutral green material. This will form the site of the next commercial HSQ Phase at a later date. Formal hedge features line the

boundary of the RHK's formal gardens and the site allowing some glimpse views into the site from the gardens from the upper terraces of the formal gardens to the rear of the Deputy Master's House. When developed the upper levels of the proposed 3 to 18 storey buildings will be visible from a range of viewpoints around the area as described in the photomontages. The view northwards from the North Range of the RHK has changed over time with the development of Heuston Station and associated infrastructure and the growth of trees which partially screen views northwards. Views generally from the north of the north range of the RHK are of mainly residential apartment developments, which include the tall blocks of the Kilmainham Square residential development to the west visible over the trees in Bully's Acre and the recently completed residential development at Clancy Quay. The relatively recently constructed residential developments along Conyngham Road to the north and the residential elements of the existing HSQ development to the east. The character of the immediate site is that of an area that has experienced significant infrastructural, residential and office development adjoining a long established culturally important building and grounds which comprise the RHK. Significant proposed development on a site on Parkgate Street adjoining Sean Heuston Bridge and across the Liffey from Heuston Station will include a tall tower which will be visible from a wide area. Given the proximity of the site lands to the RHK grounds and the strategic nature of the site requiring a significant level of floor area, it is inevitable that at elements of the proposed new buildings will be visible from the RHK. The proposed design and arrangement of the various elements of the building and open spaces should mitigate for any loss of context brought about by the development.

15.3.3 Landscape Policy Context

The site is Zoned Z5 in the Dublin City Council Development Plan 2016 to 2022, *to consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity*. The site is located in SDRA 7 and a number of guiding principles are listed in this development area centred on Heuston Station but including the RHK and a section on the north bank of the Liffey. Points relevant to this Chapter include:

2. To incorporate sustainable densities in a quality contemporary architecture and urban form which forges dynamic relationships with the national cultural institutions in the Heuston environs.

4. To protect the fabric and setting of the numerous protected structures and national monuments, many of which are major national cultural institutions.

7. As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy.

8. The 'cone of vision', as set out in the 2003 Heuston Framework Plan, represents a significant view between, the Royal Hospital Kilmainham and the Phoenix Park extending from the west corner of the north range of the Royal Hospital Kilmainham, and the north-east corner of the Deputy Master's House to the western side of the Magazine Fort and east edge of the main elevation of the Irish Army Headquarters (former Royal Military Infirmary) respectively. Any new developments within this 'cone' shall not adversely affect this view. A visual impact analysis shall be submitted with planning applications to demonstrate this view is not undermined.

9. Other important visual connections to be respected include Chesterfield Avenue to Guinness Lands and from key parts of the City Quays to the Phoenix Park (Wellington Monument).

15.3.4 Relevant Development Plan Objectives

15.3.4.1 Green Infrastructure General Policies

GI1: *To develop a green infrastructure network through the city, thereby interconnecting strategic natural and semi-natural areas with other environmental features including green spaces, rivers, canals and other physical features in terrestrial (including coastal) and marine areas.*

GI5*: To promote permeability through our green infrastructure for pedestrians and cyclists.*

15.3.4.2 Landscape Policies

GI7*: To continue to protect and enhance landscape, including existing green spaces through sustainable planning and design for both existing community and for future generations in accordance with the principles of the European Landscape Convention.*

GI8*: To protect and enhance views and prospects which contribute to the appreciation of landscape and natural heritage.*

15.3.4.3 Landscape Objectives

GIO8*: To undertake a 'Views and Prospects' study to identify and protect the key views and prospects of the city. Additional views and prospects may be identified through the development management process and local area plans.*

The Dublin City Development Plan 2016-2022 outlines several policies and objectives relating to protected views: -

SC7: To protect and enhance important views and view corridors into, out of and within the city, and to protect existing landmarks and their prominence.

SC04: To undertake a views and prospects study, with the aim of compiling a list of views and prospects for protection and/or enhancement which will be integrated with and complement the urban form and

SC16: To recognise that Dublin City is fundamentally a low-rise city and that the intrinsic quality associated with this feature is protected whilst also recognising the potential and need for taller buildings in a limited number of locations subject to the provisions of a relevant LAP, SDZ or within the designated strategic development regeneration area (SDRA).

SC17: To protect and enhance the skyline of the inner city, and to ensure that all proposals for mid-rise and taller buildings make a positive contribution to the urban character of the city, having regard to the criteria and principles set out in Chapter 15 (Guiding Principles) and Chapter 16 (development standards). In particular, all new proposals must demonstrate sensitivity to the historic city centre, the River Liffey and quays, Trinity College, the cathedrals, Dublin Castle, the historic squares and the city canals, and to established residential areas, open recreation areas and civic spaces of local and citywide importance.

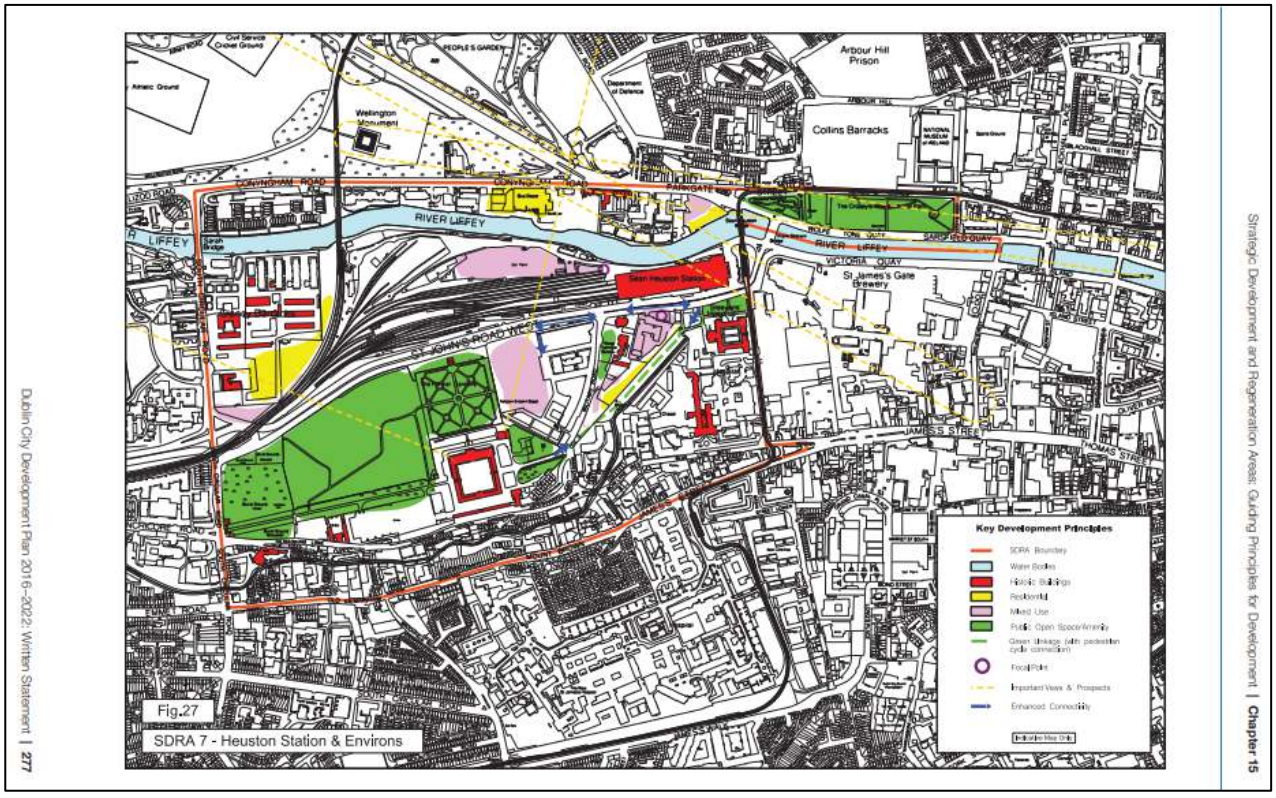
SC18: To promote a co-ordinated approach to the provision of tall buildings through local area plans, strategic development zones and the strategic development and regeneration areas principles, in order

to prevent visual clutter or cumulative negative visual disruption of the skyline.

SDRA 7 - Heuston and Environs

8: The 'cone of vision', as set out in the 2003 Heuston Framework Plan, represents a significant view between, the Royal Hospital Kilmainham and the Phoenix Park extending from the west corner of the north range of the Royal Hospital Kilmainham, and the north-east corner of the Deputy Master's House to the western side of the Magazine Fort and east edge of the main elevation of the Irish Army Headquarters (former Royal Military Infirmary) respectively. Any new developments within this 'cone' shall not adversely affect this view. A visual impact analysis shall be submitted with planning applications to demonstrate this view is not undermined.

Figure 15.3.4.1 Fig 27 (DCC Development Plan 2016-2022) SDRA 7 Showing 'Cone of Vision'



The design proposals for the site are guided by the above policies and objectives with respect to addressing the visual impact of the development in terms of height and massing. It also includes the siting of the lower elements of the development closer to the listed features of the RHK. The 'Cone of Vision' and the development proposals are considered fully in Section 15.5.1.2.

Figure15.3.4.1 Strategic Green Network (DCC Development Plan 2016-2022)

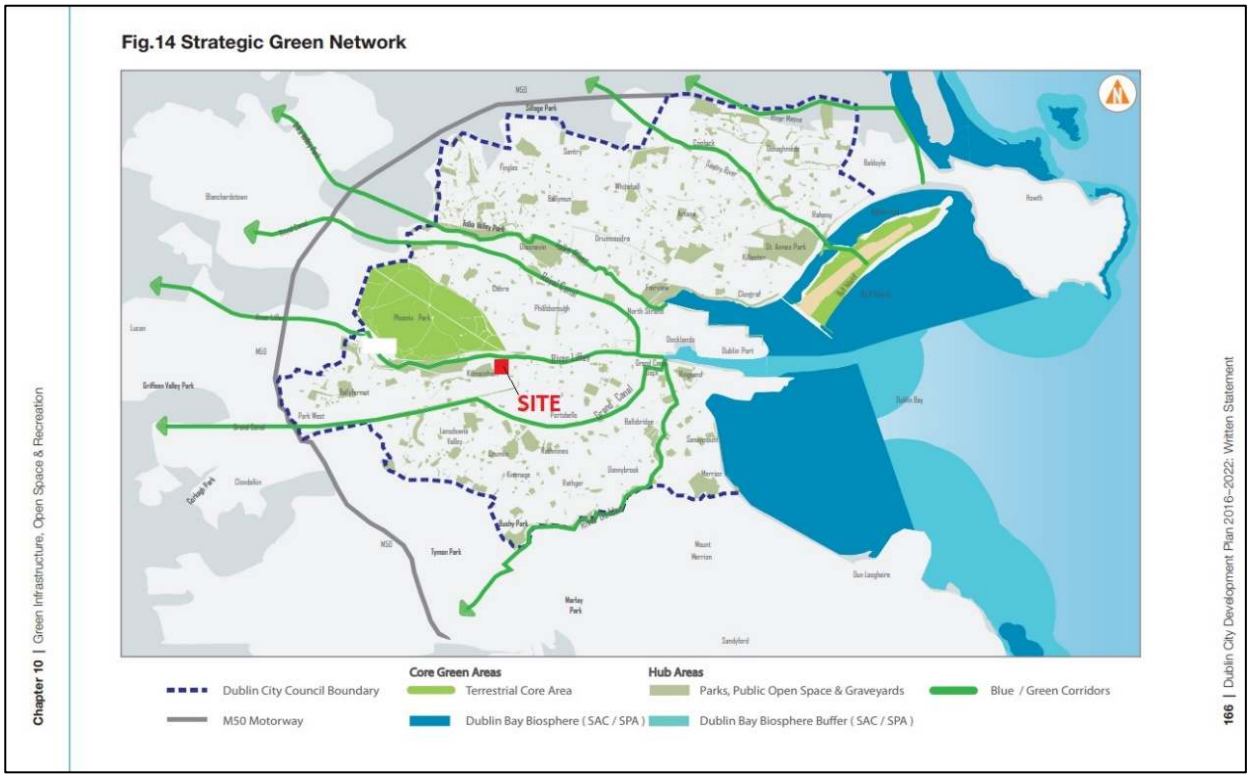
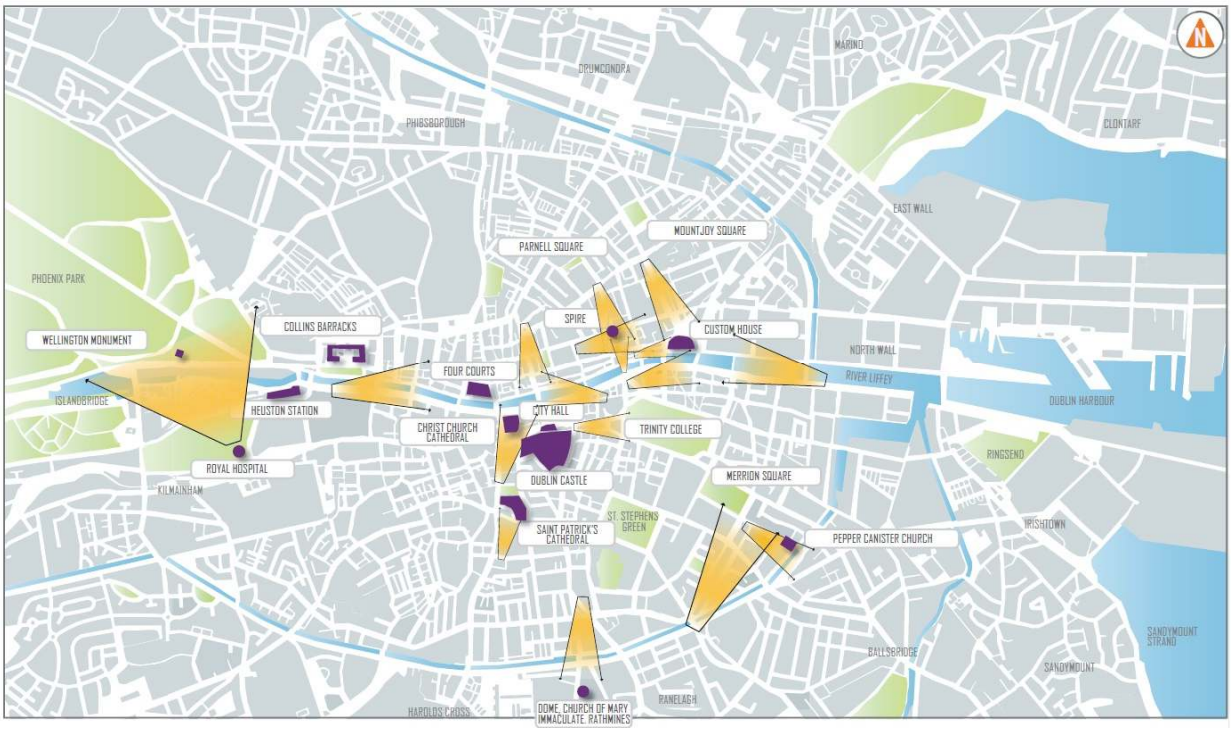


Figure 15.3.4.2 – Protected Views (DCC Development Plan 2016-2022)



15.3.5 Urban Development and Building Heights

In the Guidelines for Planning Authorities, The Dept. of Housing, Planning and Local Government, 2018 refers to the National Planning Framework and policy objectives to provide more compact forms of urban development. It quotes National Planning Objective 13, *'In urban areas, planning, and related standards, including in particular building height and car parking will be based on performance criteria that seek to achieve well-designed high-quality outcomes in order to achieve targeted growth. These standards will be subject to a range of tolerance that enables alternative solutions to be proposed to achieve stated outcomes, provided public safety is not compromised and the environment is suitably protected.'* This development adheres to these guidelines while respecting the environment with regard to the Landscape & Visual Impacts of the Proposed Development.

15.3.6 Site Images

A selection of views of the site area are included to give an indication of the character of the site and its surrounds.

Figure 15.3.6.1 Site Image Locations – 8 Site Views.

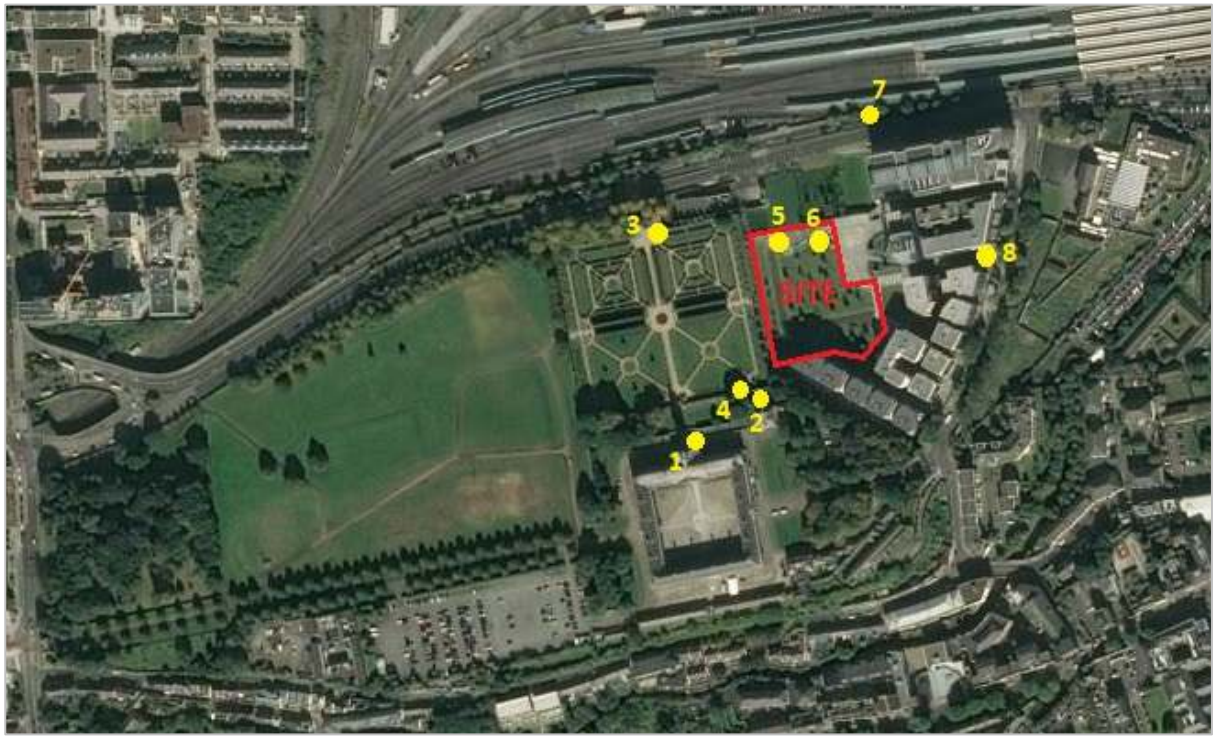


Figure 15.3.6.2 View 1 - northeast from upper terrace of RHK with formal gardens and earlier HSQ buildings.

Figure 15.3.6.3 View 2 – Northeast from terrace at rear of Deputy Master's House with view into site.

Figure 15.3.6.4 View 3 – Southeast from beside garden pavilion towards Phase 1 HSQ

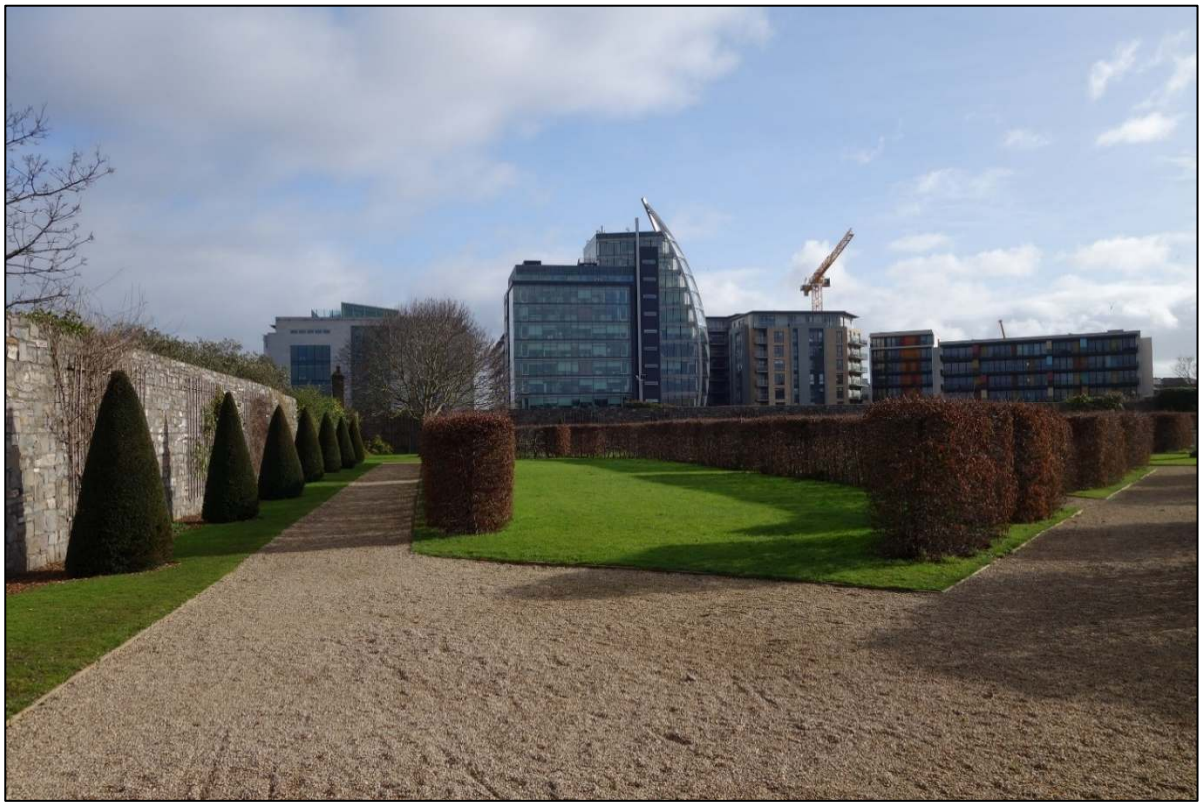


Figure 15.3.6.5 View 4 – Northeast from lower level of formal garden towards Phase 1 of HSQ

Figure 15.3.6.6 View 5 – Southwest towards boundary secant wall with Deputy Master's House on left.

Figure 15.3.6.7 View 6 – Southeast across site with HSQ Phase 1 in background

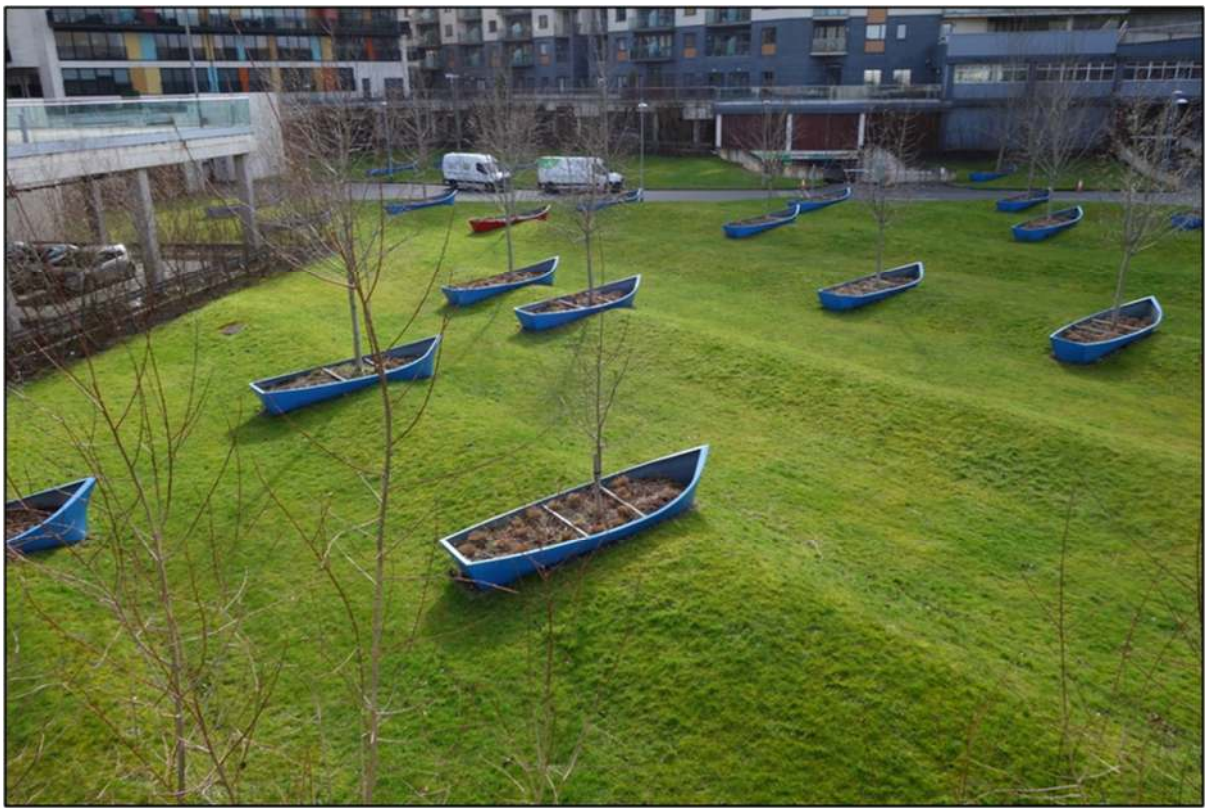
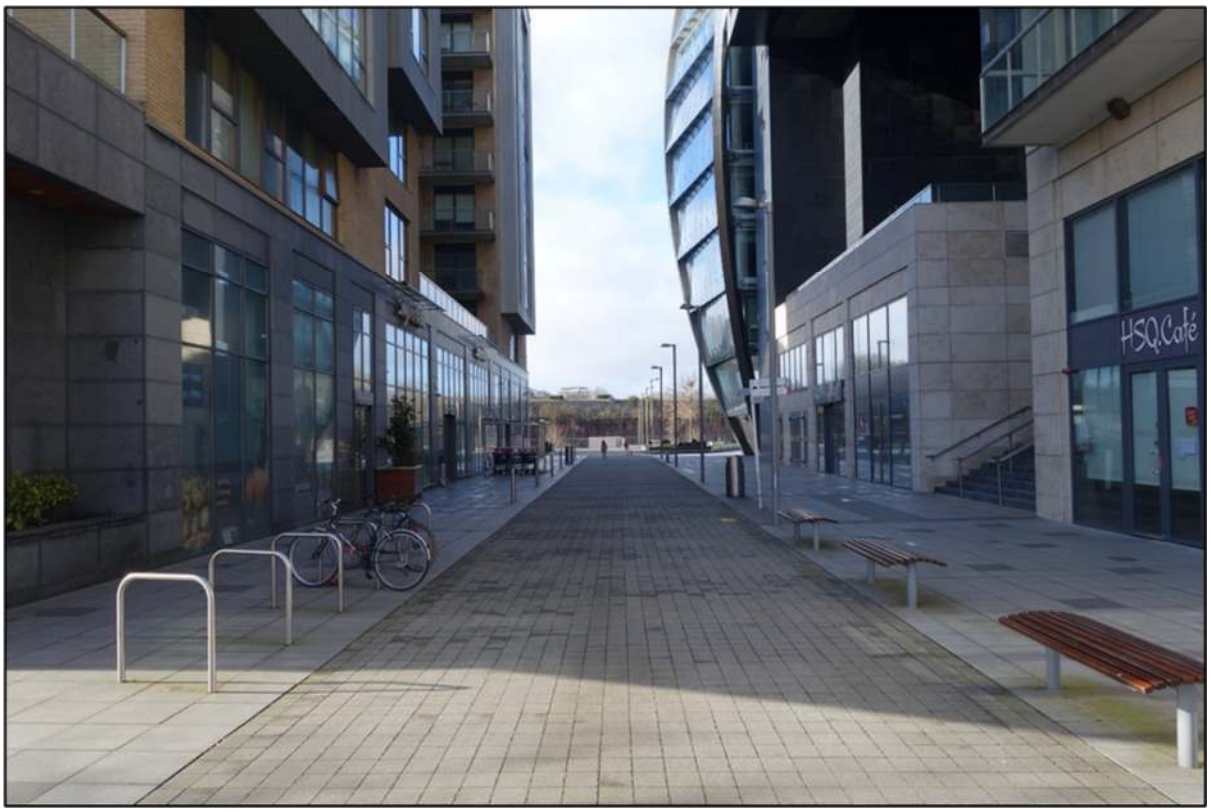


Figure 15.3.6.8 View 7 – Southwest from St John's Road West towards site.

Figure 15.3.6.9 View 8 – West between Brunel and Kestrel Building with RHK boundary wall in distance.



15.4 Characteristics of the Development

The proposed development will consist of a residential development of 399 no. 'Build To Rent' residential units and all ancillary and associated uses, development and works, and a retail unit of 120 sq m, on a site of 1.08 ha. The proposed development consists of:

- Site clearance and localised demolitions to remove part of the podium and Basement Level -1 reinforced concrete slabs at the interface of the proposed Blocks A and B, together with the incorporation of part of the existing double basement level structure extending to approximately 7,613 sq.m over two levels (excluding an area of 3,318 sq.m that will be backfilled at Basement Level -1) within the proposed development.

- The construction of 5 no. buildings (Blocks A to E) ranging in height between 3- to 18-storeys over double basement level / podium level to provide a residential / mixed use development to provide 399 Specific BTR (Build to Rent) units with a total gross floor area of 29,391 sq.m, comprising 46 no. studios, 250 no. one bedroom units, 90 no. 2 bedroom / 4 person units and 13 no. 2 bedroom / 3 person units; internal communal ancillary residential services / amenities to include a shared co-working area / lounge (178 sq.m) and gym (102 sq.m) at lower ground floor level, and lounges on either side of a residential foyer at ground floor / podium level within Block A (196 sq.m), and a TV Room / lounge (57 sq.m) at ground floor / podium level within Block C.

- An independent retail unit (120 sq.m) is proposed at ground floor / podium level within Block B.

- A double basement is provided that will be integrated within the existing basement levels serving the wider HSQ development and will be accessed from the existing vehicular ramped accesses/egresses onto/off St. John's Road West and Military Road to the north and east, respectively. Basement level -1 provides: a refuse store; 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces); 4 no. motorcycle parking spaces; and, secure bicycle parking / storage in the form of 251 no. double stacked cycle parking spaces providing capacity for 502 no. secure bicycle storage spaces for residents. An additional 49 no. Sheffield type bicycle stands are provided at basement level -1 to provide 98 no. visitor cycle spaces (inclusive of 8 no. designated cargo bike spaces, that will also be available for the shared use with residents of the scheme) and a further 55 no. Sheffield type bicycle stands are provided at podium level to provide 110 no. cycle parking spaces (108 no. visitor cycle parking spaces (inclusive of 6 no. designated cargo bike spaces) and 2 no. cycle parking spaces in connection with the retail unit). All bicycle parking at basement level is accessed via a dedicated cycle lift from podium to basement level -1 that is situated to the south of Block B.

- Works proposed along the St John's Road West frontage include the omission of the existing left-turn filter lane to the vehicular ramped access to the HSQ development and re-configuration of the pedestrian crossings at the existing junction together with the re-configuration of the existing pedestrian crossing over the westbound lanes of St. John's Road West leading to an existing pedestrian refuge island. Re-alignment of the existing footpath along the site frontage onto St John's Road West to tie into the reconfigured junction arrangement and provision of a link to a new lift to provide wheelchair access from St John's Road West to the HSQ podium.

- Communal Outdoor Amenity space is provided for residents in the form of rooftop terraces (totalling 1,179sqm), and lower-level communal courtyards between blocks (totalling 960sqm).

- Hard and soft landscaping works are proposed at podium level which includes the extension and completion of the public plaza to the east of Block A; the provision of footpaths; a MUGA (Multi Use Games Area) and informal play areas for children (totalling 1,670sqm).

- A double ESB substation/switch room at ground / podium level within Block A, and a single substation/switch room at ground / podium level within Block B together with associated site development works, which includes the realignment / reprofiling of an existing vehicular access ramp at the southern end of the site between basement levels -1 and -2 and the closure / removal of a second vehicular access ramp between the subject site at basement level -1 and the raised basement level -1 under the Telford building.

15.4.1 Landscaping Proposals

The landscape design includes three separate areas within the proposed development namely, The Lower Ground Floor Level, Ground Floor / Podium Level and Roof Terraces. Each of these areas provide a design challenge with respect to shading, physical and visual connections to the existing Phase 1 and the RHK and in the case of the roof terraces exposure to variable weather conditions. The design brief established at an early stage, the importance of permeability and connection with the surrounding built environment and the RHK. A strong, formally planted, east west pedestrian link with the formal gardens of the RHK is the focal point of the design approach along with the proposal to create a strong visual landscape with year-round interest along with areas for active and passive recreation. The proposed open spaces are woven into the scheme to provide regular breaks to the built form. Therefore, the designed landscape amenity areas offer comfort, passive supervision, ease of access, a high amenity value and a safe space for all users.

15.4.2 Design Measures to Reduce Visual Impacts

Consideration of the impact on landscape and visual aspects has been integral in the design and layout of the scheme as the design proceeded. The layout and design of the buildings vis a vis the existing adjoining historical and cultural context of the RHK and the earlier parts of the HSQ to the east are the main considerations in the design process to minimize negative visual impacts.

The following measures have been included in the design of the scheme to reduce visual impacts:

- Arranging the different blocks to step up from the area nearest the RHK to the highest 18 storey block away from the RHK.

- Designing the façade and fenestration of the blocks facing the RHK to complement the style and rhythm of the architecture of the RHK to help blend in the new buildings.

- Creating an axis view through the proposed gateway from the formal gardens through the proposed buildings to allow views through to Military Road.

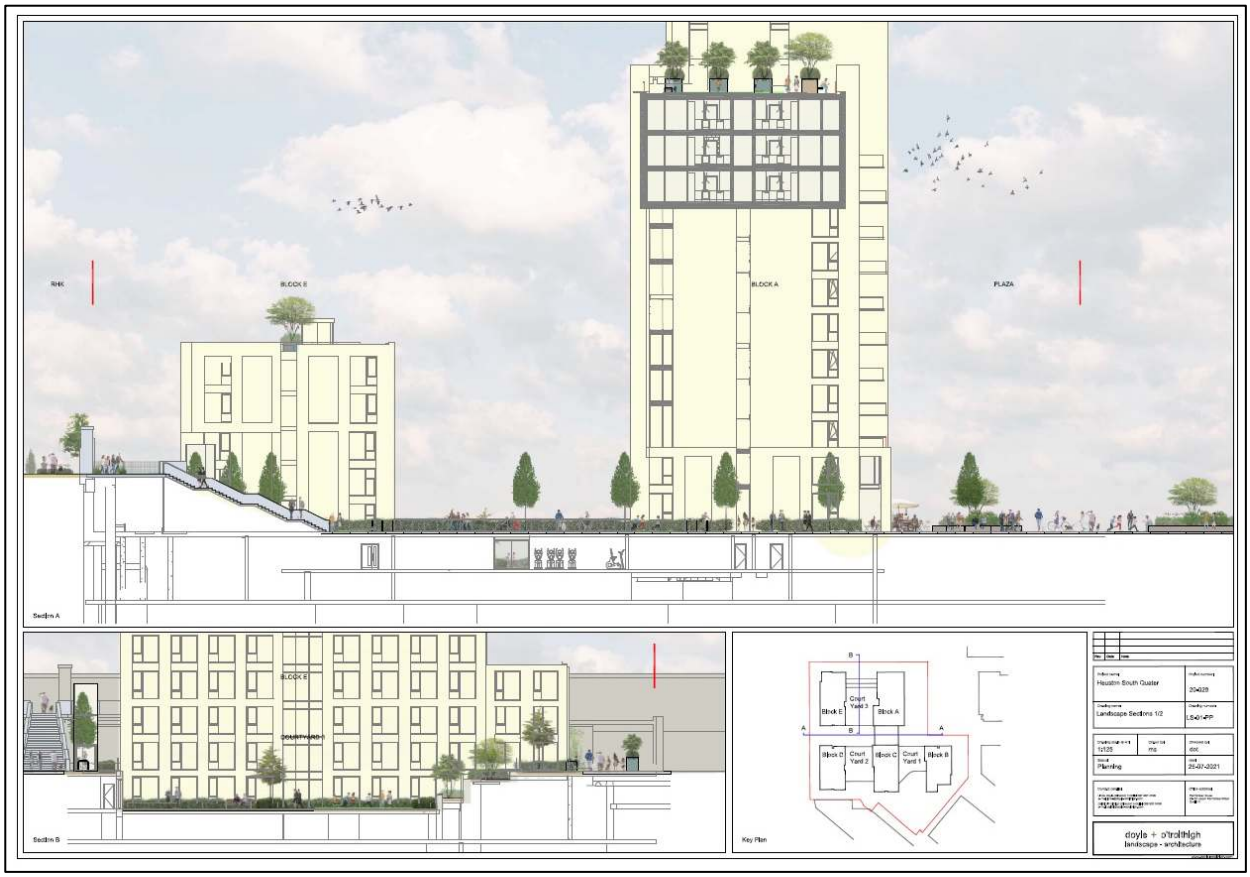
- Arranging formal planting on the terrace of the new building to link with the arrangements of the trees and shrubs in the formal garden.

- The DCC Green Infrastructure Policies and Objectives for development sites close to Green Corridors and adjoining green areas are recognised by maintaining the integrity of the existing landscape elements and the inclusion of significant planting within the scheme and the use of green roofs.

- Encouragement of biodiversity by planting native species, nectar producing plants and 'greening' the buildings with climbing and trailing plants.
- The use of high quality hard and soft landscape materials a significant planting of semi mature trees (See Doyle O'Troithigh Planting Plans (See planning application documentation and HSQ SHD website)) befitting of a new scheme and suitable to the existing landscape.
- Integrating the landscape elements of this extensive development into the surrounding built environment and connecting pathways and cycleways.
- Provision of a landscape design compatible with the existing landscape elements and respectful of the adjoining RHK formal gardens

Figure 15.4.2.1 – Landscape Plan (excluding roof garden terraces)

Figure 15.4.2.2 – Landscape Sections East West & North South



15.5 Identification of Likely Significant Impacts

The landscape impacts would entail the removal of an existing temporarily grassed area with boat and tree features and the removal of the temporary screening trees at the edge of the car park which would result in the loss of some amenity from the site for existing residents and office staff. This loss would be mitigated by the creation of additional landscaped active and passive open space areas within the development. The location of the site surrounded by existing residential and commercial development and adjoining the grounds of the culturally important Royal Hospital in Kilmainham have the potential for the proposed development to create important visual impacts The visual impacts arising from the heights of the proposed buildings versus the existing residential buildings and the potential visual impact from the height of the proposed buildings would have the potential to create an overbearing impact on the RHK formal gardens. However, the proposal to set the lower buildings at the lower ground level beside the RHK formal gardens will reduce the visual impact of the proposed development on users of the RHK grounds".

15.5.1 Impact on Landscape Character

15.5.1.1 Construction Phase

The construction stage impact tends to be the greatest at the initial 'site disturbance' or 'breaking ground'

stage. The adjoining residential and office developments to the east and south will be the most impacted from the construction activity particularly due to the proposed elevation of the buildings and the proximity of the construction works to the existing built environment. Similarly, users of the formal gardens of the RHK will also experience visual impacts from the development proposals, however the existence of the secant wall between the development site and the RHK formal gardens means that the construction activity will initially be screened from the RHK gardens. The development will be phased and move from south to north though the site. As one element is completed another will be under construction ensuring that the construction impacts will be lessened.

The development at ground level is partially screened by existing buildings to the east and south and the busy St Johns Road and Heuston Station rail lines lie to the north. The main visual impacts other than to the existing apartment and office buildings of HSQ Phase 1 will be to the west of the site, i.e., the adjoining RHK formal gardens and lands further to the west. The initial phases of construction will be partially screened as the site lands are significantly lower than the adjoining lands of the RHK and the ground level public walkways and terraces of the earlier phase of the HSQ. (See Doyle O'Troithigh Section Drawings which are part of this application). The erection of cranes and site lighting columns will be the initial visible elements of the development works and more of the development will become visible as it is constructed.

Overall, the impact of the construction phase on the landscape will be moderate in that the development will alter the character of the environment in a manner that is consistent with existing and emerging trends of the surrounding area.

15.5.1.2 Operational Phase

The proposed development has a number of potential impacts primarily on the visual amenity of the area given its location and scale. The landscape impacts relate to the existing site with its temporary landscape features as shown in Image 15.3.6.6 above. There would be the loss of the ground level grass area which will be replaced by buildings. However, the proposed landscape design as described in 15.4.1 and Doyle O'Troithigh Landscape Masterplan LP-01-PP, (Doyle O'Troithigh Landscape drawings will form part of this planning application and will be available on the HSQ SHD website) would be linking visually with the formal gardens of the RHK through the formally planted east west pathway and would enhance the proposed development area creating a series of landscape open spaces as one moves along the central east west axis. The inclusion of informal play areas in the open spaces along with a MUGA court offers play opportunities for children and more active sport for residents. The inclusion of blocks of native species planting will also create areas of biodiversity on the site as the existing relatively biologically sterile formal gardens and the wide areas of paving in the Phase 1 HSQ reduce local species diversity.

The existing residential and office accommodation in the HSQ blocks of the earlier phase of the development to the east and south of the site will have their existing views westwards and northwards screened to some extent by the new development. However, given the strategic location and the relatively unfinished nature of the Phase 1 development the site was always in line for development. The existing landscape of the site area is composed of grass with mounding and planters with trees where the site had previously been cleared for development and levels lowered for the undercroft parking and while there would be a perceived loss of open space for the residents there would be only a minor landscape impact from the proposals.

Views eastwards from the terraces and formal gardens of the RHK will be impacted by the new

development however, the existing buildings that form the earlier sections of the HSQ development with their various shapes and forms are clearly visible from the RHK grounds and the new development will screen the original buildings as well as reacting in an architecturally cohesive manner to views from the RHK. The proposed range of 5 storey buildings along the RHK boundary will provide a cohesive visual edge to the formal gardens.

A 3M high rubble stone wall with a now blocked up gateway forms the boundary of the RHK formal gardens with the site and the ground drops steeply into the site at this point (See Doyle O'Troithigh Section Drawing 15.4.2.1). There are also a range of clipped evergreen oak trees along part of the RHK boundary wall which will filter views of the proposed buildings for users along this section of the formal gardens. The existing HSQ buildings are visible above this boundary wall from most parts of the formal gardens and similarly the proposed new buildings will also be visible from the formal gardens but are designed to provide a more cohesive edge sympathetic with the formal gardens.

Views northeast from the RHK northern range will also have some level of visual impact from the development. The taller 12 and 18 storey elements of the design will be visible from a range of locations around the area but not from the internal courtyard of the RHK which retains views only of the four ranges of the RHK.

The 'Cone of Vision' view northwards from the north range of the RHK to the Magazine Fort and the former Royal Military Infirmary as described in the Development Plan will also have some level of impact from the proposals. There is a significant level of tree growth to the rear of the Deputy Master's House which means the cone of vision is already reduced somewhat, as shown in Photomontage 4. Similarly Views of the Magazine Fort are also obscured by trees and in addition by part of the recently constructed Clancy Quay apartment development. Photomontage 5 shows that the proposed buildings will screen views of Gandon's Cupola however views of the distant Cupola make up only a minor aspect of the overall vista and the visual analysis of the view classifies it as 'Slight Negative' in the operational phase. A section has been added to the photomontage analysis in 15.5.2 which identifies those views relevant to the 'Cone of Vision'.

The consultant conservation architects on this project, Howley Hayes, comment on the 'Cone of Vision' are as follows: -

The cone of vision set out on the north side of the Royal Hospital Kilmainham, in the DCC development plan, describes a north-facing view from the central axis of the main entrance front and formal garden over the Phoenix Park. At the eastern edge of the cone, across the valley, is the distant view of James Gandon's former Royal Military Infirmary. Of this building a small part of the pediment and the cupola are visible above the tree line. On the western edge of the cone is the former Magazine Fort, which is no longer visible due to mature trees and more recent development, including the recent large-scale development at Clancy Barracks. While there is no formal planned arrangement between these three structures, the view towards the park, and the Gandon cupola, is at its best from the central axis. When moving eastwards, towards the eastern splay of the cone, the visual relationship between the Royal Hospital and the view becomes less significant, and by the time the viewer reaches the Deputy Master's House, the Gandon cupola of the former Military Hospital is no longer visible, while the visual impact of recent development along the north bank of the Liffey is much more prominent.

When considering the impact of development on the cone of vision, it should be recognised that the most

significant view is from the central axis and not the extremities, where the views are compromised with the distant landmarks unseen. Viewpoints to either side of the central axis are therefore less significant as they are effectively creating new and different cones of vision. Of greater relevance in these locations is the way the form and composition of any adjoining development relates to the existing context and geometrical formality of the Royal Hospital and its splendid garden setting. If the proposed development is of the highest design quality, with a composition that respects the proportions, formality and materiality of the historic setting, while maintaining the visual link between the Royal Hospital and the Gandon Cupola from the central axis, there should be no adverse impact on the cone of vision.

The proposed development screens the irregular forms of the first phase of the HSQ development and other large more recent structures in the 'Cone of Vision'and responds to the formality and materiality of the historic setting, while maintaining the visual link between the Royal Hospital and the Gandon Cupola from the central axis. Accordingly, there is no adverse impact on the cone of vision.

Overall, the impact of the operational phase on the landscape of this area will be slight i.e., creating an impact which causes noticeable changes in the character of the environment without affecting its sensitivities.

15.5.1.3 Cumulative Impacts

It is proposed to develop the northern section of the site in due course where there was previous unfinished development works and these have lain undeveloped for some time. The proposed buildings are at any early stage of design development, but the height and massing of the buildings have been included in the photomontages (except for Views 3 and 16 where a blue outline indicates the position of the proposed building) to give an indication of the cumulative impacts of the proposals.. Given the position of the later stage of the development to the north of this application site it will be partially screened by this phase when viewed from the RHK grounds.

Other projects under construction, such as the new Garda Security Centre on Military Road and the proposed CIE Signalling Building in Heuston Station or the proposed high-rise development on Parkgate Street which is in the planning phase have been included in the cumulative impact analysis. Taking the wider aspect of the cumulative impact of development in the area there has been a considerable amount of development in the study area in the past number of years and this current SHD proposal will add to this. The reason for the level of development is that the area was relatively undeveloped and given that the Kilmainham lies close to the city and is well serviced by road and rail transport development was going to be inevitable. As discussed above the design and layout of the buildings and open space in this application form the western side of the HSQ site and sensitively address the important formal gardens of the RHK and the listed buildings on the site. The cumulative impact of the current SHD proposals are therefore minimised by the design and layout of the buildings and associated landscaped open space.

Overall, the impact of the cumulative impacts of development on the landscape of this area will be slight to moderate depending on the viewer's location, i. e. creating an impact which causes noticeable changes in the character of the environment without affecting its sensitivities and an impact that alters the character of the environment in a manner that is consistent with the existing and emerging trends.

15.5.2 Visual Impact Assessment

In this section, the photomontages prepared by Modelworks are assessed to describe the potential impacts arising from the proposed development and the cumulative impacts of future commercial development on the adjoining lands. Please refer to Appendix 15A for the photomontage views for the project.

Table 15.5.1– List of Views and Location Relative to Site

View	Description	Location
View 01	View Southwest from St John's Road West / Heuston St.	Northeast
View 02	View west from car park Dr. Steevens' Hospital	East
View 03	View northwest from James's Street	Southeast
View 04	View north from rear of Deputy Masters House	Southwest
View 05	View north from rear of Deputy Masters House	Southwest
View 06	View northeast from the central axis of the Royal Hospital	Southwest
View 07	View northeast from in front of Royal Hospital	Southwest
View 08	View northeast from top of RHK garden access steps	Southwest
View 09	View east from the central focal point of the RHK formal gardens	West
View 10	View east from the pavilion in the formal garden RHK	West
View 11	View east from northern end of RHK formal gardens	West
View 12	View east from corner of the formal garden RHK.	West

View 13	View east from western edge of formal gardens	West
View 14	View east from centre of Bully's Acre.	West
View 15	View northeast from Bully's Acre	Southwest
View 16	View northeast from Richmond Tower, South Circular Road	Southwest
View 17	View east from St John's Road West.	West
View 18	View east from St John's Road West.	West
View 19	View southeast from Magazine Fort in the Phoenix Park	Northwest
View 20	View south from Chesterfield Avenue, Phoenix Park	North
View 21	View south from Chesterfield Avenue, Phoenix Park	North
View 22	View south from DPP's Office Infirmary Road	North
View 23	View southwest from Croppy Acre, Wolf Tone Quay	Northeast
View 24	View southwest from Wolfe Tone Quay	Northeast

Photomontage View 01	**View Southwest from St John's Road West / Heuston St.**
Existing View	The viewpoint is 500M northeast of the site with the listed Heuston Station building on the right, Dr Steeven's Hospital behind the trees on the left and the Heuston South Quarter (HSQ) buildings in the centre of the image. St John's Road West runs between the station and the Heuston South Quarter buildings. The tower cranes of the new Garda Security Centre buildings are visible above the trees on the left.
Proposed View	The upper floors of the proposed development are partially visible above the earlier section of the HSQ buildings. The cumulative view shows the taller element of the adjoining proposed development rising above the existing HSQ and this application's development. The proposed Garda Security Centre Buildings with a 4 to 6 storey height will potentially be visible where the tower cranes are located on the left of the image.
Construction Phase Impacts	Slight negative short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact
Buildings and permitted and	Slight negative cumulative impact

proposed developments within the scope of the cumulative landscape and visual impact assessment	
DCC 'Cone of Vision' View	This view does not come within the 'cone of vision'

Photomontage View 02	**View west from car park Dr. Steevens' Hospital**
Existing View	This viewpoint is 400M to the east of the development site contains a number of listed buildings, Dr Steevens Hospital on the right, the former College of Nursing in the centre and St Patrick's Hospital on the left. The earlier phase of the HSQ buildings is visible beyond the hospital buildings. The view is dominated by the parking areas associated with the hospital.
Proposed View	The proposed new buildings are generally screened by the existing HSQ Phase 1 and therefore there would be minimal visual impact on this view. The cumulative view shows a portion of the proposed adjoining building visible above the existing HSQ buildings. The proposed 4 to 6 storey Garda Security Centre buildings may also be visible in this view.
Construction Phase Impacts	Slight neutral short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Moderate neutral cumulative impact
DCC 'Cone of Vision' View	This view does not come within the 'cone of vision'

Photomontage View 03	**View northwest from James's Street**
Existing View	The view is from the busy junction of Bow Lane and James's Street approx. 500M southeast of the site. The trees visible in the middle distance are in the grounds of St Patrick's Hospital.
Proposed View	The proposed development is screened by intervening vegetation and buildings even in the winter view, therefore there would be no visual impact arising from the proposals on

	this viewpoint. The cumulative view is screened by the existing buildings.
Construction Phase Impacts	Imperceptible neutral short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Imperceptible neutral cumulative impact
DCC 'Cone of Vision' View	This view does not come within the 'cone of vision'

Photomontage View 04	**View north from rear of Deputy Masters House**
Existing View	The summer view shows the screening trees and fence on the right-hand side, the apartment buildings on Conynham Road, the Wellington Monument, and the Garden Pavilion with the pieces of sculpture in the foreground. The winter view shows a little more of the buildings on Conynham Road and Gandon's Cupola on the former Royal Infirmary building is screened by intervening vegetation.
Proposed View	The summer view of the Proposed Development shows the lower western edge of the development with the higher elements shown in red outline off image screened by the intervening trees. The planting on the roof level softens the building's visual impact and links with the vegetation of the gardens. In the winter view the taller elements of the development are visible behind the trees. The cumulative view shows only a small section of the proposed next phase adjoining building as they are screened in this view by the proposed current phase. A proposed 5 storey Irish Rail building under section 5 Planning is under construction to the rear of Heuston Station and there may be potential views of this building from this viewpoint.
Construction Phase Impacts	Moderate negative short term visual impact
Operational Phase Impacts	Imperceptible neutral visual impact long term
Buildings and permitted and proposed developments within	Imperceptible neutral cumulative impact

the scope of the cumulative landscape and visual impact assessment	
DCC 'Cone of Vision' View	This view, from the rear of the RHK's Deputy Master's House is within the 'Cone of Vision' as described in the Dublin City County Development Plan (2016-2022). The winter view shows that Gandon's Cupola on the former Royal Infirmary and the Magazine Fort in the Phoenix Park are not visible as they are obscured by intervening vegetation.

Photomontage View 05	**View north from rear of Deputy Masters House**
Existing View	This view northwards from the rear of the Deputy Master's House on the intermediate terrace level is across the formal gardens with part of the Central Criminal Courts building on the right, Gandon's cupola on the former royal Infirmary, the apartment blocks on Conynham Road, the Wellington Monument in the Phoenix Park and the RHK Garden pavilion
Proposed View	The proposed new buildings adjoining the formal gardens screen out some of the rail infrastructure and apartment buildings and the distant Gandon's cupola. The new building's recessed window reveals, and articulations match the formality of the gardens. The roof terrace and parapet planting softens the sharp profile of the adjoining buildings The cumulative view appears as an extension to the proposed development.
Construction Phase Impacts	Moderate negative short term visual impact
Operational Phase Impacts	Slight negative tending towards imperceptible neutral long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Imperceptible neutral cumulative impact. The proposed Irish Rail signalling building in Heuston Station may also be visible in this view.
DCC 'Cone of Vision' View	This view from the terrace below the rear of the Deputy Masters House is within the 'Cone of Vision' and the winter view shows that Gandon's Cupola is visible approx. 700m in the distance to the north. The proposed development obscures views of the Cupola in this photomontage.

Photomontage View 06	View northeast from the central axis of the Royal Hospital
Existing View	The view is across the formal gardens from the top terrace in front of the north range of the RHK. The Central Criminal Courts building and the former Royal Infirmary cupola visible on the right background with the apartment buildings and rail infrastructure also centre background. The Wellington Monument in the Phoenix Park is partially screened by trees.
Proposed View	The proposed new buildings adjoining the formal gardens screen out some of the rail infrastructure and apartment buildings while retaining the view of Gandon's cupola on the former Royal Infirmary in the background. The new buildings recessed window reveals and articulations match the formality of the gardens. The cumulative view appears as an extension to the proposed development. The proposed Irish Rail signalling building may also be visible in this view.
Construction Phase Impacts	Moderate negative short term visual impact
Operational Phase Impacts	Slight negative tending towards imperceptible neutral long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Imperceptible neutral cumulative impact
DCC 'Cone of Vision' View	This view from the formal garden access steps at the centre of the main axis is within the 'Cone of Vision' and the winter view shows that Gandon's Cupola is visible on the right of the image. The proposed low level element development is visible to the right of the image addressing the formal gardens and screening out views of the Conygham Road bus garage. The proposed cumulative development retains views of the Cupola and further provides an edge to the formal gardens and screens out discordant views to the rear.

Photomontage View 07	View northeast from in front of Royal Hospital
Existing View	The view includes a side view of the Deputy Masters House, and the trees close to this building. The rear of the Eircom office

	building and the Central Criminal Courts appear to the rear of the development site. Gandon's cupola and the former Royal Infirmary building are centre left with the apartment blocks on Conynham Road on the left.
Proposed View	This view shows the proposed low-level buildings closest to the formal gardens with the taller elements stepping up in height to the rear of the development. The top of the Central Criminal Courts building is visible to the rear as is Gandon's cupola on the former Royal Infirmary. The roof garden of the lower-level buildings provides visual linkage with the formal gardens of the RHK. The taller block of the cumulative view match the form of the proposed building.
Construction Phase Impacts	Moderate negative short term visual impact
Operational Phase Impacts	Slight neutral tending towards imperceptible neutral long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment.	Slight to moderate negative cumulative impact The proposed Irish Rail signalling building, part of the proposed new Garda Security Centre 4 to 6 storey buildings and the upper levels of the proposed 29 storey Parkgate Street building may also be visible in this view.
DCC 'Cone of Vision' View	This angled view from the terrace in front of the RHK's North Range Tower and is within the 'Cone of Vision'. The winter view shows that Gandon's Cupola is visible on the left of the image. The proposed low-level element of the development addresses the formal gardens and forms a formal edge to the gardens. The proposed cumulative development retains views of the Cupola and further provides an edge to the formal gardens and screens out discordant views to the rear.

Photomontage View 08	**View northeast from top of RHK garden access steps**
Existing View	This view over the formal gardens has the existing range of buildings styles of the earlier HSQ development on the right with the central Criminal Courts building in the centre background with the former Royal Infirmary and Gandon's cupola centre left. The apartment blocks on Conynham Road are visible on the left of the picture.
Proposed View	The proposed buildings screen out the earlier HSQ phase with the top of the Courts building and Gandon's cupola visible centre left. The raised arch feature of the proposed building

	creates a viewpoint through the building. The building in the cumulative view step up in height above the proposed buildings.
Construction Phase Impacts	Moderate negative short term visual impact
Operational Phase Impacts	Slight neutral tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight to moderate negative cumulative impact The proposed Irish Rail signalling building may also be visible in this view and the upper levels of the proposed 29 storey Parkgate Street building may also be visible in this view.
DCC 'Cone of Vision' View	This angled view from the lower terrace in front of the RHK's North Range Tower and is within the 'Cone of Vision'. The winter view shows that Gandon's Cupola is visible on the left of the image. The proposed low-level element of the development addresses the formal gardens and forms a formal edge to the gardens. The proposed cumulative development retains views of the Cupola and further provides an edge to the formal gardens and screens out discordant views to the rear.

Photomontage View 09	**View east from the central focal point of the RHK formal gardens**
Existing View	The view eastwards from the centre of the formal gardens shows the avenue of pleached limes framing the view of the original HSQ buildings with a visible gap between the curved Kestrel Building and the Brunel block. A blank limestone rubble wall, where the former gateway, existed, closes the view at the focal point at the edge of the formal gardens. The tower cranes visible in the view are in the proposed Garda Security Centre site under construction on Military Road.
Proposed View	The proposed view shows the taller elements of the scheme framing a view through the proposed reopened gateway towards the original HSQ buildings and beyond. The roof gardens of the new blocks soften the skyline of the building. The cumulative building is partially screened by the proposed development and the vegetation. The proposed new Garda Security Centre will be partially visible in this view.
Construction Phase Impacts	Moderate negative short term visual impact

Operational Phase Impacts	Slight negative tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight negative cumulative impact
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 10	**View east from the pavilion in the formal garden RHK**
Existing View	The view is taken from in front of the Pearce's Garden pavilion approx. 70M west of the site and shows the earlier phase of the HSQ development with the tower cranes from the new Garda Security Centre buildings in the background.
Proposed View	The proposed development effectively screens most of the earlier HSQ phase with the lower elements rising slightly above the boundary of the formal gardens. The proposed roof planting softens the visual impact of the buildings providing a visual linkage with the gardens. The cumulative view buildings, while reflecting the shape and form of the proposed development rise above the development. The proposed and cumulative development step sequentially from the earlier HSQ buildings northwards away from the RHK buildings.
Construction Phase Impacts	Moderate negative short-term visual impact
Operational Phase Impacts	Slight neutral tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Moderate negative cumulative impact
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 11	**View east from northern end of RHK formal gardens**
Existing View	The RHK's formal gardens are characterized by clipped hedging and radial pathways bordered by lawn areas. This view is approx.

	120M west of the site and the earlier phase of the HSQ development with the white rendered Eir building on the left and the other buildings stepping down to the right of the image. The Deputy Master's House is visible on the right among the trees.
Proposed View	The proposed view shows the blocks partially screening the earlier HSQ buildings and the steeping up in height from the existing southern residential block of HSQ Phase 1. The proposed blocks are visually unified by their fenestration and render treatment. The cumulative view shows the building stepping up further in height but matching the form of the proposed buildings.
Construction Phase Impacts	Moderate negative short-term visual impact
Operational Phase Impacts	Slight neutral tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Moderate negative cumulative impact
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 12	**View east from corner of the formal garden RHK.**
Existing View	The view 150M from the site on the western side of the formal gardens shows the Deputy Masters House with the north range and tower on the right with the earlier phase HSQ buildings in the distance. The cranes are in the new Garda Security Centre under construction on Military Road.
Proposed View	The proposed buildings step up in height from the earlier HSQ phase with the Telford residential building visible above the proposed development. The cumulative view buildings are on the extreme left of the view.
Construction Phase Impacts	Moderate negative short-term visual impact
Operational Phase Impacts	Slight neutral tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative	Slight neutral cumulative impact

landscape and visual impact assessment	
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 13	**View east from western edge of RHK formal gardens**
Existing View	In this view along the formal pleached screen avenue the view terminates at the limestone boundary wall of the gardens with the dramatic curved Kestrel building framing the view on the left. The rear of the Eircom building is partially visible on the left of the image. The Deputy Master's House is screened behind evergreen trees on the right.
Proposed View	The proposed arched building frames the view eastwards through the buildings with the earlier phase partially visible in the background. Part of the Eircom building is still visible on the left of the image. The proposed roof garden on top of the building softens the parapet level visually linking with the formal gardens. The cumulative view buildings are to the left of the proposed building.
Construction Phase Impacts	Moderate negative short term visual impact
Operational Phase Impacts	Slight negative tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Moderate negative cumulative impact. The proposed new Garda Security Centre will be partially visible in this view.
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 14	**View east from centre of Bully's Acre.**
Existing View	The viewpoint is over 300M to the west of the site with the wall of the formal garden in the mid distance. Parts of the north and west range of the RHK are visible on the right with the earlier HSQ phase visible in the distance. The RHK trees provide a visual break between the RHK buildings and the HSQ.
Proposed View	The proposed arched building allows views through this phase of the development with part of the residential Telford building

	visible at the southern edge of the development. The cumulative development view shows the stepping of height from the Telford Building up to the highest element to the north.
Construction Phase Impacts	Moderate negative short term visual impact
Operational Phase Impacts	Slight neutral tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Moderate negative cumulative impact. The proposed new Garda Security Centre will be partially visible in this view.
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 15	**View northeast from Bully's Acre**
Existing View	The viewpoint across open grassland is over 400m to the west of the site and shows the trees lining the western approach Avenue, part of the west range of the RHK and the tower on the north range. Trees screen the southern part of the earlier HSQ development, and the top of the Brunel building is visible with the Kestrel and Eir offices centre of image
Proposed View	The view shows the new development partially screening the original Phase 1 HSQ development with the taller slender tower rising above the development. The lower level of the development adjoining the formal gardens stretches along the length of the gardens. The cumulative view shows the range of buildings to the north of the proposed phase.
Construction Phase Impacts	Slight negative short term visual impact
Operational Phase Impacts	Slight neutral tending towards imperceptible long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight negative cumulative impact. The proposed 29 storey building at Parkgate Street will also be visible in this view.
DCC 'Cone of Vision' View	While this view is not within the 'Cone of Vision' the development proposals do not impact on the view of Gandon's Cupola.

Photomontage View 16	View northeast from Richmond Tower, South Circular Road
Existing View	The view is taken from beside Kilmainham Court House towards the RHK with the castellated Richmond Gate in the centre of the view with the tree lined avenue stretching away in the distance. The proposed site is approx. 600M northeast of this viewpoint
Proposed View	The proposed view shows the outline of the development screened by the boundary walls of the RHK and the trees of the Bully's Acre lands. The winter views screen both the proposed and cumulative building forms.
Construction Phase Impacts	Imperceptible neutral short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Imperceptible neutral cumulative impact
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 17	View east from St John's Road West.
Existing View	This location offers clear views of the RHK buildings and part of Bully's Acre with a dense line of trees along the northern boundary of the RHK lands screening views towards the site. The Central Criminal Courts building is partially visible behind the wall on the left.
Proposed View	The proposed upper level of the taller block is partially visible above the trees with the rest of the development screened by the trees. The cumulative building rises higher and the upper levels are more visible in this view.
Construction Phase Impacts	Slight negative short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact.
Buildings and permitted and proposed developments within the scope of the cumulative	Slight neutral to positive cumulative impact The proposed 29 storey building on Parkgate Street will also be visible in this view. The positive impact would arise from the creation of

landscape and visual impact assessment	landmark buildings as one enters the city from the west.
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 18	**View east from St John's Road West.**
Existing View	This view from the railway overbridge shows part of the Clancy Quay residential development on the left with the construction cranes for the new Garda Security Centre under construction on Military Road visible over the trees on the northern boundary of the RHK. Part of the north range of the RHK is visible between the trees.
Proposed View	A small section of the proposed upper levels of the taller block is visible above the trees. Winter views would provide some more filtered views of the upper parts of the development, but the dense tree trunks would effectively screen views of the majority of the development. The tall block in the cumulative view is clearly visible above the intervening screening trees.
Construction Phase Impacts	Slight negative short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact.
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight neutral to positive cumulative impact The proposed 29 storey building on Parkgate Street will also be visible in this view. The positive impact would arise from the creation of landmark buildings as one enters the city from the west.
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 19	**View southeast from Magazine Fort in the Phoenix Park**
Existing View	The listed Magazine Fort is on the left with the top of the Wellington Monument visible over the trees in the distance. The earlier phase of the HSQ is visible in the centre of the image approx. 1.3Kms to the southeast and the Clancy Quay Development to the right of the RHK buildings with the tower on the north range visible on the skyline. The construction cranes to the right of the image are associated with the Children's Hospital which is under construction in James's

	Street.
Proposed View	This view shows the proposed new buildings in a stepped formation with the new development appearing as a unified building treatment compared to the range of building types in Phase 1. In general, the new buildings are consistent with the development trend visible from this viewpoint. The cumulative view shows the white rendered building stepping up in height from the proposed. Winter views show intervening trees provide little screening from this viewpoint. Distance from the site and adjoining modern developments minimise the negative visual impact on this viewpoint
Construction Phase Impacts	Imperceptible neutral short term visual impact
Operational Phase Impacts	Imperceptible neutral visual impact long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight neutral cumulative impact. The proposed 29 storey building on Parkgate Street will also be visible in this view.
DCC 'Cone of Vision' View	This view taken from beside the Magazine Fort in the Phoenix Park is at the western edge of the 'Cone of Vision' and it is noticeable that the North Tower and roof of the RHK is only partially visible in this winter view with buildings and vegetation screening views between the RHK and Magazine Fort.

Photomontage View 20	**View south from Chesterfield Avenue, Phoenix Park**
Existing View	This view shows the parkland setting of the Wellington Monument with the Dublin Mountains partially visible above the trees. The early phase of the HSQ development is just visible above the tree line on the left approx. 600m to the south. The cranes of the Children's Hospital are visible between the trees in the distance.
Proposed View	The proposed development buildings are partially visible above the Phoenix Park trees. Winter views are no different as the intervening trees are evergreen. The cumulative view shows a large portion of the proposed cumulative development in this view from the north.
Construction Phase Impacts	Slight negative short term visual impact

Operational Phase Impacts	Imperceptible neutral visual impact long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight negative to neutral cumulative impact
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 21	**View south from Chesterfield Avenue, Phoenix Park**
Existing View	This view down Chesterfield Avenue shows view over the city on the left with the earlier HSQ phase visible over the intervening trees of the Phoenix Park. The view is referenced in the SDRA guiding principles with respect to views from the City Quays and the Wellington Monument.
Proposed View	One of the proposed buildings is visible over the Phoenix Park trees with the rest of the development screened behind the trees even in winter views. The proposed is similar in height to the existing HSQ buildings. In the cumulative view a large section of the proposed building is visible.
Construction Phase Impacts	Slight negative short term visual impact
Operational Phase Impacts	Imperceptible neutral visual impact long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight negative cumulative impact
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 22	**View south from DPP's Office Infirmary Road**
Existing View	This slightly elevated winter view only from the Office of the Director of Public Prosecutions building is approx. 500m north of the proposed site. Part of the Central Criminal Courts building is visible on the left of the image and trees and vegetation are to the rear of the car parking area.

Proposed View	The proposed development is shown in outline and a filtered view of the proposed buildings is visible through the intervening vegetation. The cumulative view shows the taller element of the development partially visible above the vegetation.
Construction Phase Impacts	Imperceptible neutral short term visual impact
Operational Phase Impacts	Imperceptible neutral visual impact long term
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight neutral cumulative impact
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 23	**View southwest from Croppy Acre, Wolf Tone Quay**
Existing View	The small park is located approx. 600M to the southwest of the site. The mature park is located at a busy junction beside the Liffey Quays and Luas Line with the listed Heuston Station in the centre of the image and the early phase of the HSQ partly visible to the rear of the station complex.
Proposed View	The proposed development being set to the rear of the existing HSQ buildings is barely visible in this image and other than tower cranes in the construction phase there would be minimal negative visual impact from the proposals. There is little screening effect of vegetation on views. The cumulative view shows a large section of the proposed building above the earlier HSQ phase
Construction Phase Impacts	Imperceptible neutral short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment	Slight neutral cumulative impact. The proposed 29 storey building on Parkgate Street will also be visible in this view.
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

Photomontage View 24	View Southwest from Wolfe Tone Quay
Existing View	The view is taken from the junction of Wolfe Tone Quay and temple Street West beside the headquarters of the Dublin Civil Defence. The HSE Headquarters are partially visible on the left with the cranes from the new Garda Security Centre to the left of the Heuston Station building. A small section of the existing HSQ building is visible above the station building.
Proposed View	The proposed building is shown in outline and is fully screened by the station's buildings although tower cranes would be visible at the construction stage. The cumulative view shows a large section of the proposed building appearing above the station's buildings.
Construction Phase Impacts	Imperceptible neutral short term visual impact
Operational Phase Impacts	Imperceptible neutral long term visual impact
Buildings and permitted and proposed developments within the scope of the cumulative landscape and visual impact assessment.	Slight negative cumulative impact. The proposed 29 storey building on Parkgate Street will also be visible on the right of this view.
DCC 'Cone of Vision' View	This view is not relevant to the 'Cone of Vision'

15.6 Mitigation Measures (Ameliorative, Remedial or Reductive Measures)

There are a number of mitigation measures which will be implemented by the Developer to prevent and reduce significant impacts during the construction and operational phases.

15.6.1 Construction Phase

Appropriate measures will be taken to mitigate' any potentially adverse construction-related effects on immediately adjoining neighbours, particularly on the residents of the existing apartments overlooking the site and users of the RHK buildings and grounds. Operation of a well-managed organised and planned construction site, with adequate control of construction traffic and working activity, is key to avoiding or minimising impact. A Construction and Environmental Plan (CEMP) has been submitted with the planning application, which details all of the mitigation measures which will be implemented by the Developer during the construction phase.

Table 15.6.2.1 Construction Phase Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Protecting of existing street trees	Provision of secure hoarding / tree protection measures for existing retained trees.
Materials falling from a height	Use of screening and webbing to prevent materials falling from a height endangering local residents / office staff / visitors.
Site lighting	Directing site lighting away from existing residents / office / retail / creche.
Building phasing	Phasing of development in order that the buildings and surrounding landscape works are completed as soon as possible.
Landscape Contractor selection	Landscape Architect to ensure a competent experienced landscape contractor is appointed to undertake the work
Landscape tender implementation	Landscape Architect to oversee soil preparation, planting and hardworks commissioning to be as specified in the in the Landscape Drawings and Landscape Hardworks and Softwoks specifications.

15.6.2 Operational Phase

Consistent and effective maintenance of hard and soft landscape areas, (in particular entrance areas, open space area and walkways) together with quality site and building management are key to avoiding or minimising negative landscape and visual impacts arising from the operation of the proposed development given the sensitivity of the site location and the various indoor and outdoor cultural activities associated with the RHK.

The design and layout of the proposed open space is considered appropriate in terms of its character, zoning and context. The proposed scheme (Refer to Figure 15.2) includes for a series of measures that will ensure a long-term positive impact, as follows: -

Table 15.6.2 Operational Phase Mitigation Measures

Character of potential impact	Mitigation measure
Operational Phase	
Landscape Maintenance	Given the location of the development and proposed connection into the RHK grounds a comprehensive landscape maintenance scheme is proposed
Landscape Review	Site administration to organise reviews of the hardworks, and softworks and

	update / repair / replant as required to mitigate against public liability issues which may arise.

15.7 Residual Impacts

The predicted impacts as displayed in the photomontages as described above include proposed mitigation as formulated during the design process, such as layout, planting, render colour etc. Slight to moderate negative visual impacts will arise in the construction phase with hoarding, cranes and scaffolding being the most obvious negative visual features during the construction phase and these will increase in magnitude as the buildings rise out of the ground, but these will be short-term temporary visual impacts which will be eliminated as the buildings and the landscape works are completed.

The residual slight negative visual impacts arise mainly in relation to views from the adjoining RHK terraces and formal gardens and in the fact that the view of Gandon's Cupola in the former Royal Infirmary as listed in the Dublin City County Development Plan will not be available from a section of the terrace to the rear of the Deputy Master's House. However, given that the relatively unfinished aspects of the Phase 1 development will be screened by a cohesive building arrangement that addresses the formal gardens and respects the height of the RHK buildings by stepping up in height away from the listed buildings it is predicted that the new buildings will become part of the accepted landscape of the area.

The moderate negative cumulative visual impacts arise in the western part of the RHK formal gardens and grounds where the greatest quantum of the proposed next phase is visible. However, as the photomontage modelling is only indicative of a height and massing at this early design stage of the development proposed on the adjoining site to the Proposed Development, fenestration and rendering and final adjustments are predicted to reduce the cumulative moderate negative visual impacts of the development proposed for the adjoining site

15.7.1 Construction Phase

The residual moderate to slight short term negative visual impacts arising during the construction phase will relate primarily to the rising buildings and associated hoarding, scaffolding and cranes when viewed from the surrounding area. As these are short term the completed buildings and associated hard and soft landscape elements will tie the development into its surrounds. It is not envisaged that there would be any residual impacts from the construction phase other than the usual developing and establishing planting and other normal minor landscape maintenance and replacement issues.

15.7.2 Operational Phase

The residual impacts in the operational stage range from imperceptible and neutral to slight negative when viewed from the RHK terraces and formal gardens and relate to the viewer's position and experiences pre and post construction. The photomontages taken from the east show that the proposed development is screened by the Phase 1 buildings and the visual impacts are imperceptible. Views from the south and west, mainly from the grounds of the RHK are classified as slight negative tending to imperceptible as the landscape matures. More distant views from the northwest, north and northeast are classified as slight neutral to imperceptible.

15.7.3 Cumulative Residual Impacts

The photomontage analysis shows an outline of the proposed next phase of development on the site adjoining the proposed development and the cumulative negative visual impacts are mainly experienced from viewpoints to the west and northwest with the proposed current phase screening the majority of the following development phase. The cumulative impacts are classified as imperceptible neutral when in views from the east and south as they next phase of development is generally screened by the current SHD development. Views are classified as moderate negative in views from the RHK formal gardens and Bully's Acre where the greatest quantum of the next phase of buildings are visible.

The study area, as defined by the photomontage location map, in the vicinity of the site is experiencing a range of building projects with the Section 5 granted 5 storey National Train Control Centre 340M to the west of Heuston within the viewshed of views from the north range of the RHK. The former Hickeys Fabric site at Parkgate St. / Sean Heuston Bridge where a tall 29 storey tower is proposed for the development which will be visible from a wide area. The new Garda Security Centre is a 4 to 6 storey development, on the eastern side of Military Road and the Children's Hospital in James's Street is a large development which will be visible from a wide area. The development at Clancy Quay is almost complete. Given the nature of the property in the general area of Kilmainham it is likely that there would be some level of redevelopment ongoing should this project be given planning approval. However, other than the proposed adjoining next phase of development there are no obvious projects proposed that would lead to a further cumulative visual impact from this development.

15.8 Do Nothing Impact

The site is located in zoned lands and are part of a larger development that stalled due to the economic situation in the early 2000's. Given that the lands are part of a SDRA and are zoned for development and they are located in an area where residential development is ongoing and close to existing transport infrastructure and shopping / restaurants / schools and open space it is likely that the lands would not remain undeveloped for very long.

Any residential development similar to this proposed scheme is likely to result in a similar level of impact on the surrounding landscape and visual environment.

15.9 Monitoring

Soft landscape works will be monitored to check establishment during the first 12 months post-planting. Plant failure during this defects liability period shall be replaced within the following planting season (i.e. November to March) as necessary.

Aftercare to a high standard of both hard and soft landscape elements throughout the scheme will form part of the annual management/maintenance programme which shall be adopted as part of the scheme.

Regular monitoring of existing trees on site shall be carried out as necessary to ensure the tree stand is largely maintained. The ongoing monitoring shall identify trees which will require surgery works/potential

removal which will be essential for the ongoing duty of care associated with the site. Paving will also require ongoing maintenance with the high level of through pedestrian traffic linking the various parts of the site

15.10 Reinstatement

Post construction, all soft landscape areas shall be top-soiled (to the required depths), cultivated and seeded or planted in line with the landscape proposals. Should any plants fail during the first 12 months post construction, replacement planting shall be carried out within the following planting season (i.e. November to March) as necessary.

15.11 Interactions

The pertinent environmental interactions for landscape and visual are with Human Beings, Biodiversity and Cultural Heritage. In this regard, landscape proposals for the scheme have been developed in consultation with the Project Ecologists and the Cultural Heritage Consultants. Given the existing nature of the site, i.e., having been cleared and excavated in the past there are no existing mature flora and fauna issues related to the site other than the existing young ornamental trees and the closely spaced car park screening trees which are to be removed. The LVIA study also interacted with the Cultural Heritage Consultants with respect to the impact of the proposed development on Gandon's Cupola and the Cone of Vision and this is discussed in Section 15.5.1.2 Operational Phase Impacts.

With respect to interactions with human receptors, Chapter 5 outlines the impacts on population & human health. The main receptors visually impacted by the proposed development would those living and working close to the development site, primarily those residents and office workers in the first phase of the HSQ development and the adjoining Eircom building. The construction stage would be the most visually disruptive with the operational stage being tending towards imperceptible. The positive aspects to these residents and workers would be the completion of a long planned for development and the increased amenity associated with the development and new access routes offered by the proposals. Another group of visually impacted receptors would be the users of the RHK particularly, the formal gardens which adjoin the site area. Again, the construction stage would be the most visually negative with the operational stage visual analysis ranging from imperceptible to slight negative. The architectural treatment of the buildings overlooking the gardens and the proposed planting would help integrate the development with the existing formal gardens.

15.12 Difficulties Encountered

There were no specific difficulties encountered during the preparation the landscape and visual impact assessment other than the cumulative impacts of the commercial development presenting some difficulty for the compilation of this report as the development is still in the early design process. Similarly, the proposed new Garda Security Centre and the Irish Rail signalling centre did not go through the normal public planning process and no little information on the massing of the buildings and associated antennae is available.

15.13 References

Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2017) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2017) ; and,

'Guidelines for Landscape and Visual Assessment', 3nd Ed., The Landscape Institute and Institute of Environmental Management and Assessment, 2013.

Urban Development & Building Heights, Dept. of Housing Planning & Local Government 2018

16. INTERACTIONS OF THE FOREGOING

16.1 Introduction

All environmental factors are inter-related to some extent. Article 3(1) of the EIA Directive states the following;

1. 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). ' (Emphasis added)

Accordingly, this EIAR seeks to identify all potential impacts of the subject scheme, and this chapter has been compiled to list in one location all of the interactions identified already in Chapters 5 to 15.

This chapter has been prepared by Sinéad O'Connor in Declan Brassil & Company limited. Sinéad holds a degree in Natural Science, specialising in Environmental Science, from Trinity College Dublin, and a Masters in Regional and Urban Planning from University College Dublin. Sinéad has over 10 years' experience in the preparation of EIAR for residential and commercial projects.

16.1.1 Description of Development

The proposed development will consist of 399 no. Build to Rent apartments, comprising 46 studios, 250 no. 1 bed apartments, and 103 no. 2 bed apartments. The apartments are arranged in 5 blocks (Blocks A to E) that vary in height from 3 storeys to 18 storeys in height over double basement level / podium level. The application site extends to 1.08 ha or 10,825 square metres (sqm).

- Block A is a rectangular shaped block that occupies the north-eastern corner of the application site. This block rises in height to 18-storeys above podium level and includes a lower ground floor level to provide a total of 154 no. apartments (comprising 12 no. studios; 108 no. 1 beds and 34 no. 2 beds). Block A has a Gross Floor Area (GFA) of 11,814 sqm.

- Block B is a rectangular shaped block that occupies the south-eastern corner of the application site. This block is part 8- and part 12-storeys in height above podium level and includes a lower ground floor level to provide a total of 81 no. apartments (comprising 9 no. studios; 60 no. 1 beds and 12 no.

2 beds). Block B has a Gross Floor Area (GFA) of 5,446 sqm, which includes a retail unit at the northern end of the block at podium level of approximately 120 sqm (GFA).

- Block C is situated between Block B to the east and Block D to the west. Block C varies in height up to a maximum of 12-storeys above podium level and includes a lower ground floor level to provide a total of 86 no. apartments (comprising 19 no. studios; 45 no. 1 beds and 22 no. 2 beds). Block C has a Gross Floor Area (GFA) of 6,024 sqm,

- Block D is a 5-storey over basement level rectangular block that occupies the south-western corner of the application site. It accommodates a total of 35 no. apartments (comprising 1 no. studio; 16 no. 1 beds; 6 no. 2 bed /3 person and 12 no. 2 beds). This block has a Gross Floor Area (GFA) of 2,786 sqm.

- Block E is a part 3-, part 5-storey over basement level rectangular block that occupies the north-western corner of the application site to the west of Block A. It accommodates a total of 43 no. apartments (comprising 5 no. studios; 21 no. 1 beds; 7 no. 2 bed / 3 person and 10 no. 2 bed / 4 person units). This block has a Gross Floor Area (GFA) of 3,321 sqm.

Site clearance and localised demolitions to remove part of the podium and Basement Level -1 reinforced concrete slabs at the interface of the proposed Blocks A and B, together with the incorporation of part of the existing double basement level structure extending to approximately 7,613 sqm over two levels (excluding an area of 3,318 sqm that will be backfilled at Basement Level -1) within the proposed development.

It is proposed to provide a Retail unit of 120 sqm at podium level in Block B. The Retail space has a small garden to the east with an area dedicated for outdoor seating (150 sqm).

Indoor communal facilities with a total area of 533 sqm are proposed as follows; a shared co-working area / lounge (178 sqm) and gym (102 sqm) at lower ground floor level, and lounges on either side of a residential foyer at ground floor / podium level within Block A (196 sqm), and a TV Room / lounge (57 sqm) at ground floor / podium level within Block C.

Communal Outdoor Amenity space is provided for residents in the form of rooftop terraces (totalling 1,179sqm), and lower-level communal courtyards between blocks (totalling 960sqm). Hard and soft landscaping works are proposed at podium level which includes the extension and completion of the public plaza to the east of Block A; the provision of footpaths; a MUGA (Multi Use Games Area) and informal play areas for children (totalling 1,670sqm).

A double basement is provided that will be integrated within the existing basement levels serving the wider HSQ development and will be accessed from the existing vehicular ramped accesses/egresses onto/off St. John's Road West and Military Road to the north and east, respectively. Basement level -1 provides: a refuse store; 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces); 4 no. motorcycle parking spaces; and, secure bicycle parking / storage in the form of 251 no. double stacked cycle parking spaces providing capacity for 502 no. secure bicycle storage spaces for residents. An additional 49 no. Sheffield type bicycle stands are provided at basement level -1 to provide 98 no. visitor cycle spaces (inclusive of 8 no. designated cargo bike spaces, that will also be available for the shared use with residents of the scheme) and a further 55 no. Sheffield type bicycle stands are provided

at podium level to provide 110 no. cycle parking spaces (108 no. visitor cycle parking spaces (inclusive of 6 no. designated cargo bike spaces) and 2 no. cycle parking spaces in connection with the retail unit). All bicycle parking at basement level is accessed via a dedicated cycle lift from podium to basement level -1 that is situated to the south of Block B.

Works proposed along the St John's Road West frontage include the omission of the existing left-turn filter lane to the vehicular ramped access to the HSQ development and re-configuration of the pedestrian crossings at the existing junction together with the re-configuration of the existing pedestrian crossing over the westbound lanes of St. John's Road West leading to an existing pedestrian refuge island. Re-alignment of the existing footpath along the site frontage onto St John's Road West to tie into the reconfigured junction arrangement and provision of a link to a new lift to provide wheelchair access from St John's Road West to the HSQ podium.

A double ESB substation/switch room at ground / podium level within Block A, and a single substation/switch room at ground / podium level within Block B together with associated site development works, which includes the infilling of an existing vehicular access ramp at the southern end of the site between basement levels -1 and -2.

16.1.2 Methodology

This chapter has been by compiled from the interactions assessments undertaken in chapters 5 to 15 of this report. This information has been used to complete the matrix of interactions in Figure 16.1.2.1 below.

Impact interactions and inter-relationships have been considered throughout the Report in the preparation of the individual, topic specific chapters so that it can take into account the broader picture of how the proposed scheme may affect the various environmental media. All environmental topics are interlinked to a degree such that interrelationships exist on numerous levels. A summary matrix has been provided below in Figure 16.1.2.1 to identify key interactions that exist with respect to this scheme. This matrix has been prepared having regard to Figure 3.6 of the EPA's draft 'Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports' 2017.

Figure 16.1 Matrix of Interactions

Interaction **Con: Construction Phase** **O.P.: Operational Phase**		**Population & human Health**	**Biodiversity**	**Land, Soil & Geology**	**Water:**	**Air, Dust & Climatic Factors**	**Noise & Vibration**	**M.A. Traffic & Transport**	**M.A. Water Supply, Drainage and Utilities**	**Cultural Heritage : Archaeology**	**Architectural Heritage**	**Landscape & V.I.A.**
Population &Human Health	**Con.**		X	✓	X	✓	✓	✓	✓	X	✓	✓
	Op.		X	X	X	✓	✓	✓	✓	X	✓	✓
Biodiversity	**Con.**			✓	✓	✓	✓	X	X	X	✓	X
	Op.			X	✓	X	✓	X	X	X	✓	X
Land, Soils & Geology	**Con.**				✓	✓	✓	X	X	X	X	X
	Op.				X	X	X	X	X	X	X	X
Water	**Con.**					X	X	X	X	X	X	X
	Op.					X	X	X	X	X	X	X
Air, Dust & Climatic Factors	**Con.**						X	✓	X	X	X	X
	Op.						X	✓	X	X	X	X
Noise & Vibration	**Con.**							✓	X	X	✓	X
	Op.							✓	X	X	✓	X
M.A. Traffic &Transport	**Con.**								X	X	X	X
	Op.								X	X	X	X
M.A. Water Supply, Drainage & Utilities	**Con.**									X	X	X
	Op.									X	X	X
Cultural Heritage: Archaeology	**Con.**										X	X
	Op.										X	X
Architectural Heritage	**Con.**											✓
	Op.											✓
Landscape & V.I.A.	**Con.**											
	Op.											

Key	**Definition**
Con.	Construction Phase
Op.	Operational Phase
✓	Interaction
X	No Interaction

16.2 Description of Interactions and Interrelationships

The consideration of impact interactions has been addressed during the preparation of this EIAR in each of the individual impact chapters. The following section provides a series of tables to show the reader which chapter each interaction is described and assessed.

16.2.1 Population and Human Health

The following table Lists the receptor interactions and interrelationships with **Population and Human Health**.

Table 16.2.1 Population and Human Health - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Biodiversity	No interaction identified.
Land, Soil & Geology	These interactions have been considered in Chapter 7 'Land, Soil & Geology'.
Water	No interaction identified.
Air, Dust & Climatic Factors	These interactions have been considered in Chapter 9 'Air, Dust and Climatic Factors'.
Noise and Vibration	These interactions have been considered in Chapter 10 'Noise and Vibration'.
Material Assets: Traffic & Transport	These interactions have been considered in Chapter 11 'Material Assets: Traffic & Transport'.
Material Assets: Water Supply, Drainage & Utilities.	These interactions have been considered in Chapter 12 'Material Assets: Water Supply, Drainage and Utilities'.
Cultural Heritage Archaeology	No interaction identified.
Architectural Heritage	These interactions have been considered in Chapter 14 'Cultural Heritage: Architectural Heritage'.
Landscape & Visual Amenity	These interactions have been considered in Chapter 15 'Landscape and Visual Impact Assessment'.

16.2.2 Biodiversity

The following table Lists the receptor interactions and interrelationships with **biodiversity.**

Table 16.2.2 Biodiversity - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 15.2.1 above
Land, Soil & Geology	These interactions have been considered in Chapter 6 'Biodiversity'.
Water	These interactions have been considered in Chapter 6 'Biodiversity'.
Air, Dust & Climatic	These interactions have been considered in Chapter 6 'Biodiversity'.
Noise and Vibration	These interactions have been considered in Chapter 6 'Biodiversity'.
Material Assets: Traffic & Transport	No interaction identified.
Material Assets: Water Supply, Drainage & Utilities.	No interaction identified.
Cultural Heritage Archaeology	No interaction identified.
Architectural Heritage	These interactions have been considered in Chapter 14 'Cultural Heritage: Architectural Heritage'.
Landscape & Visual Amenity	No interaction identified

16.2.3 Land, Soils and Geology

The following table Lists the receptor interactions and interrelationships with **Land, Soils and Geology.**

Table 16.2.3 Land, Soils and Geology - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Water	These interactions have been considered in Chapter 8 'Water'.
Air, Dust & Climatic Factors	These interactions have been considered in Chapter 7 'Land, Soil & Geology'.
Noise and Vibration	These interactions have been considered in Chapter 7 'Land, Soil & Geology'.
Material Assets: Traffic & Transport	No interaction identified
Material Assets: Water Supply, Drainage & Utilities.	No interaction identified
Cultural Heritage Archaeology	No interaction identified
Architectural Heritage	No interaction identified
Landscape & Visual Amenity	No interaction identified

16.2.4 Water

The following table Lists the receptor interactions and interrelationships with **Water.**

Table 16.2.4 Water- Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Land, Soil & Geology	See Table 16.2.3 above
Air, Dust & Climatic Factors	No interaction identified
Noise and Vibration	No interaction identified
Material Assets: Traffic & Transport	No interaction identified
Material Assets: Water Supply, Drainage & Utilities.	No interaction identified
Cultural Heritage Archaeology	No interaction identified
Architectural Heritage	No interaction identified
Landscape & Visual Amenity	No interaction identified

16.2.5 Air, Dust and Climatic Factors

The following table Lists the receptor interactions and interrelationships with **Air, Dust and Climatic Factors.**

Table 16.2.5 Air, Dust and Climatic Factors - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Land, Soil & Geology	See Table 16.2.3 above
Water	See Table 16.2.4 above
Noise and Vibration	No interaction identified
Material Assets: Traffic & Transport	These interactions have been considered in Chapter 11 'Material Assets: Traffic & Transport'.
Material Assets: Water Supply, Drainage & Utilities.	No interaction identified
Cultural Heritage Archaeology	No interaction identified
Architectural Heritage	No interaction identified
Landscape & Visual Amenity	No interaction identified

16.2.6 Noise and Vibration

The following table Lists the receptor interactions and interrelationships with **Noise and Vibration.**

Table 16.2.6 Noise and Vibration - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Land, Soil & Geology	See Table 16.2.3 above
Water	See Table 16.2.4 above
Air, Dust & Climatic Factors	See Table 16.2.5 above
Material Assets: Traffic & Transport	These interactions have been considered in Chapter 11 'Material Assets: Traffic & Transport'.
Material Assets: Water Supply, Drainage & Utilities.	No interaction identified
Cultural Heritage Archaeology	No interaction identified
Architectural Heritage	These interactions have been considered in Chapter 14 'Cultural Heritage: Architectural Heritage'.
Landscape & Visual Amenity	No interaction identified

16.2.7 Material Assets: Traffic and Transport

The following table Lists the receptor interactions and interrelationships with **Material Assets: Traffic and Transport**

Table 16.2.7 Material Assets: Traffic and Transport - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Land, Soil & Geology	See Table 16.2.3 above
Water	See Table 16.2.4 above
Air, Dust & Climatic Factors	See Table 16.2.5 above
Noise and Vibration	See Table 16.2.6 above
Material Assets: Water Supply, Drainage & Utilities.	No interaction identified
Cultural Heritage Archaeology	No interaction identified
Architectural Heritage	No interaction identified
Landscape & Visual Amenity	No interaction identified

15.2.8 Material Assets: Water Supply, Drainage and Utilities

The following table Lists the receptor interactions and interrelationships with **Material Assets: Water Supply, Drainage and Utilities.**

Table 16.2.8 Material Assets: Water Supply, Drainage and Utilities - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Land, Soil & Geology	See Table 16.2.3 above
Water	See Table 16.2.4 above
Air, Dust & Climatic Factors	See Table 16.2.5 above
Noise and Vibration	See Table 16.2.6 above
Material Assets: Traffic & Transport	See Table 16.2.7 above
Cultural Heritage Archaeology	No interaction identified
Architectural Heritage	No interaction identified
Landscape & Visual Amenity	No interaction identified

16.2.9 Cultural Heritage: Archaeology

The following table Lists the receptor interactions and interrelationships with **Cultural Heritage: Archaeology.**

Table 16.2.9 Cultural Heritage and Archaeology - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Land, Soil & Geology	See Table 16.2.3 above
Water	See Table 16.2.4 above
Air, Dust & Climatic Factors	See Table 16.2.5 above
Noise and Vibration	See Table 16.2.6 above
Material Assets: Traffic & Transport	See Table 16.2.7 above
Material Assets: Water Supply, Drainage & Utilities.	See Table 16.2.8 above
Architectural Heritage	No interaction identified
Landscape & Visual Amenity	No interaction identified

16.2.10 Cultural Heritage: Architectural Heritage

The following table Lists the receptor interactions and interrelationships with **Cultural Heritage: Architectural Heritage.**

Table 16.2.10 Cultural Heritage and Archaeology - Key Impact Interactions and Interrelationships

Interaction	Description of Key Impact Interactions and Interrelationships
Population & Human Health	See Table 16.2.1 above.
Biodiversity	See Table 16.2.2 above.
Land, Soil & Geology	See Table 16.2.3 above
Water	See Table 16.2.4 above
Air, Dust & Climatic Factors	See Table 16.2.5 above
Noise and Vibration	See Table 16.2.6 above
Material Assets: Traffic & Transport	See Table 16.2.7 above
Material Assets: Water Supply, Drainage & Utilities.	See Table 16.2.8 above
Cultural Heritage & Archaeology	See Table 16.2.9 above
Landscape & Visual Amenity	These interactions have been considered in Chapter 14 'Cultural Heritage: Architectural Heritage'.

16.2.11 Landscape and Visual Assessment

Tables 16.2.1 to 16.2.10 above provide an overview of the reception interactions and inter-relationships with Landscape and Visual Assessment.

17 MITIGATION MEASURES

For ease of reference and clarity, all mitigation measures contained in this EIAR have been compiled below. All measures included below form part of the proposed development and will be implemented in full.

17.1 Population and Human Health

Character of potential impact	Mitigation measure
Construction Phase	
None Proposed	
Operational Phase	
None Proposed	

17.2 Biodiversity

Character of potential impact	Mitigation measure
Construction Phase	
Disturbance of nesting birds	Remove trees outside of the restricted nesting season (March-August)
Protection of water quality	Implementation of Outline Construction Management Plan including the following provisions: • Management of suspended solids in run-off • Control of concrete run-off • Management of accidental spills and leaks
Operational Phase	
Protection of water quality	Surface water drainage design in accordance with principles of SuDS is to be implemented as proposed.

17.3 Land, Soil and Geology

Character of potential impact	Mitigation measure
Construction Phase	
Contaminated Soil	The excavated material will be monitored and assessed to determine the most suitable disposal outlet. Material will be categorised according to the Landfill Directive and will be sent to appropriately licensed facilities for treatment/disposal. This will entail carrying out soil analysis to determine the appropriate waste facility for disposal. Where applicable, material on site will be segregated and divided into material re-use, material re-cycling and waste material streams in accordance with current guidelines and best practice.
Demolition Material	The material generated from the demolition shall be segregated and divided into material re-use, material re-cycling and waste material streams in accordance with current guidelines and best practice.
Dust	Dust suppression measures will be implemented to minimise dust generation during extended dry periods. Dust monitoring will be conducted through the excavation period. The provision of vehicle wheel wash facilities at site exits and implementation of a road sweeping programme will reduce effect on surrounding road network. Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust. In addition, water-based dust suppression systems (such as Dust Boss) shall also be used to greatly reduce the extent of dust and windborne particulates.
Groundwater Flow	The basement could act as a barrier to the groundwater flow and the potential for ground water levels to rise on the up-stream side of the site. It is noted that the perimeter secant pile cut-off wall was installed in 2003. This cut-off wall extended into the relatively impermeable clays. As a result, it is inferred that the ground water flow regime in the area has regularised in the intervening eighteen-year period. It is not possible to mitigate the risk, but the risk is seen as negligible.
Noise, Vibration,	During the demolition and excavating phase of the works monitoring will be ongoing for noise, vibration, gas & water levels as well as ground contamination as described in the section below on Monitoring. Noise monitoring shall be in accordance with Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 Noise and Vibration. Vibration monitoring shall comply with BS 5228-1:2009+A1:2014 & BS 5228-2:2009+A1:2014. Gas and water levels shall be monitored via installed Pierzometers on site.

Impact on Adjoining Buildings	The perimeter secant pile wall was installed in 2003 to facilitate excavation of the site and mitigate risks of movement or deflection of adjoining lands or buildings.
Disposal of Ground Water	The disposal of groundwater shall be in accordance with the licensed requirements of Dublin City Council and will be on a short-term basis. All conditions of this licencing agreement will be complied with.
Site Compound	The site compound will be temporary in nature and will be constructed on hardstanding, which will be removed upon completion of construction and disposed off to a licenced facility.
Operational Phase	
	None Proposed.

17.4 Water

Character of potential impact	Mitigation measure
Construction Phase	
Environmental Management	Prior to construction the Contractor will be required to develop an Construction Management Plan which will incorporate mitigation measures such as containment procedures, audit and review schedules and an Emergency Response Plan in the event of spills, flooding or other incidents that may contribute to pollution to water during construction.
Surface Water Run off	All batching and mixing activities will be located in areas away from watercourses and drains.
Surface Water Run off	Protection measures will be put in place to ensure that all materials used during the construction & demolition phase are appropriately handled, stored and disposed of in accordance with recognised standards and manufacturer's guidance.
Surface Water Run off	Surface water drainage around the batching plant will be controlled and washout from mixing plant will be carried out in a designated, contained impermeable area.
Surface Water Run off	Spills of concrete, cement, grout or similar materials will not be hosed into drains.
Surface Water Run off	Rainwater that accumulates on site will be discharged to the DCC sewer system, under an appropriate discharge licence.

Site Management	The Contractor will comply with the following guidance documents: • CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001) • CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004).
Surface Water	Dewatering and surface water discharges on the site, during construction and prior to completion will be controlled. All necessary facilities will be incorporated such as settlement ponds/tanks, oil/grit interceptors with shut down valves, bunded oil storage tanks adjacent to a petrol interceptor for storage of any recovered oil. A monitoring programme including sampling for water quality before discharge to the Council sewer during construction will be carried out to ensure that only clean surface water is discharged to the receiving systems.
Operational Phase	
Flood Risk	The provision of a reduced storm water discharge rate will mitigate against off site flooding form the development. As the site is located in Flood Zone 'C' the risk of site flooding from external sources is not significant.
Surface Water run off (site flooding)	The provision of flow control with storm-water attenuation will ensure the rate of discharge of surface water is limited to greenfield run-off rates of 2 litres/second/hectare with a total allowable surface water discharge of 5.0 litres/second in line with the recommendations of the Greater Dublin Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study.
Surface Water run off (unattenuated flow)	The provision of flow control with storm-water attenuation will ensure the rate of discharge of surface water is limited to greenfield run-off rates of 2 litres/second/hectare with a total allowable surface water discharge of 5.0 litres/second in line with the recommendations of the Greater Dublin Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study.
Surface Water (River Liffey & Camac)	Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system.
Groundwater	As the proposed development will not include any works to extend or deepen the existing basement as the required basement is already constructed. The potential for on-site flooding from groundwater sources has been mitigated against.

17.5 Air, Dust & Climatic Factors

Character of potential impact	Mitigation measure
Construction Phase	
Dust	A designated Site Agent will be assigned overall responsibility for Dust Management;
Dust	Implementation of the Construction Management Plan.
Dust	The design of the site and Construction programme considers dust impact management and chooses design approaches to minimise dust emissions;
Dust, general air quality	An effective training programme for site personnel will be implemented for the duration of the Construction Programme;
Dust, general air quality	A strategy for ensuring effective communication with the local community will be developed and implemented;
Dust	A programme of dust minimisation and control measures will be implemented and regularly reviewed;
Dust	A monitoring programme will be implemented.
Dust	Activities with potential for significant emissions will wherever possible be located at a position as far as possible removed from the nearest residential and commercial receptors;
Dust	The areas on site which vehicles will be travelling on will generally be hard-surfaced or compressed ground thus significantly reducing the potential for dust emissions from the vehicles;
Dust	The construction compound area will have hard standing areas to minimize dust generation from windblow.
Dust	In order to minimise the potential for wind-generated emissions from material storage bays, these bays will be oriented away from the dominant wind direction to minimise the effects of wind on release of dust and particulate.
Dust	Fixed and mobile water sprays will be used to control dust emissions from material stockpiles and road and yard surfaces as necessary in dry and/or windy weather.
Dust	A daily inspection programme will be formulated and implemented in order to ensure that dust control measures are inspected to verify effective operation and management.
Dust	A dust deposition monitoring programme will be implemented at the site

	boundaries for the duration of the construction phase in order to verify the continued compliance with relevant standards and limits.
Aspergillus Risks	The National Guidelines will be followed with regard to the effective management of Aspergillus risks.
	Operational Phase
Climatic Factors	The scheme shall only contain thermally efficient buildings and Mechanical Ventilation and Heat Recovery (MVHR) systems shall be incorporated into the design of the buildings. All buildings shall contain thermally enhanced glazing and window and door frames.

17.6 Noise and Vibration

Character of potential impact	Mitigation measure
Construction Phase	
Traffic and plant noise	Avoid unnecessary revving of engines and switch off equipment when not required;
Traffic noise	Keep internal haul routes well maintained and avoid steep gradients;
Impact noise	Use rubber linings in chutes and dumpers to reduce impact noise;
Impact noise	Minimise drop height of materials;
Traffic and plant noise	Start-up plant and vehicles sequentially rather than all together;
Traffic and plant noise	In accordance with best practicable means, plant and activities to be employed on site will be reviewed to ensure that they are the quietest available for the required purpose;
Traffic and plant noise	Where required, improved sound reduction methods, e.g. enclosures should be used;
Plant noise	Site equipment should be located away from noise sensitive areas, as much as is feasible;
Traffic and plant noise	Regular and effective maintenance by trained personnel should be carried out to reduce noise and/or vibration from plant and machinery;
Traffic and plant noise	Limit noisy construction works to 8am to 6pm weekdays with Saturday working from 8am to 1pm unless otherwise agreed with the local authority. Relatively quiet construction activities could be carried out outside these

	hours, subject to controls in place;
General site noise	Maintain ongoing contact with local residents to ensure any complaints relating to construction phase noise for the project from local residents can be addressed. Also, prior to any particularly noisy activities, local residents should be contacted in order to minimise the perceived noise impact;
Traffic and plant noise	The contractor shall erect construction site hoarding along noise sensitive boundaries, particularly where no existing screening such as boundary walls are in place at the nearest NSRs.
General site noise	The contractor should appoint a community relations officer who will deal on a one-to-one basis with local stakeholders and will notify them before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works. The community relations officer shall also distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.
General site noise	The contractor should prepare a Noise and Vibration Management Plan (NVMP) which will deal specifically with on-site activities in a strategic manner to remove or reduce significant noise and vibration impacts associated with the construction works.
Construction noise	The contractor shall ensure that when work is undertaken on the rising floors that an acoustic synthetic barrier shall be employed along the external facade to minimise noise transmission to the surrounding environment.
Generators	Generators should be located as far as possible from sensitive boundaries especially the residential buildings.
Concrete breaking	Concrete breaking is one of the activities forecast to have the highest potential noise impact. During concrete breaking, the activity shall be screened with localised temporary barriers in order to break line of sight to the sensitive receptors. This may give up to a 10 dB reduction in noise levels which would ensure compliance with the required limits even when other activities are underway.
Foundation Works	Although CFA Piling is virtually vibration free and is the lowest noise level technique for piling routinely available, there are associated activities with potential to cause disturbance. The cutting of steel for the piles will give rise to significant noise levels when carried out in close proximity to residential receptors. It is therefore proposed that this activity shall be carried out at locations removed from the boundary of the site wherever possible to minimise noise impact. Where this is not feasible, an acoustic shroud / barrier shall be employed to minimise noise impact.

Monitoring	It is proposed to undertake vibration monitoring when the demolition works are underway and during the installation of piles. Noise monitoring will also be undertaken throughout the demolition and construction phase in accordance with Dublin City Council Good Practice Guide as follows.
Operational Phase	
	None Required

17.7 Material Assets: Traffic and Transport

Character of potential impact	Mitigation measure
Construction Phase	
Reduction of adjacent road junctions' operational performance due to vehicular trips to/from proposed development	Deliveries and material removal trips will be scheduled outside of peak hour periods
	HGV movements to and from the site will be staggered
	Haulage vehicles will be prevented from travelling in convoys of more than two vehicles at any time
	Haulage vehicles will be spaced by a minimum of 250m at all times
Obstruction of adjacent roadways by parked or queuing construction vehicles	All loading and unloading operations will be conducted within the site
	Limited essential parking for construction personnel and visitors will be provided within the site
	Construction personnel will be supported in making use of public transport and/or in cycling, when commuting to site
	Parking restrictions and parking management measures will be implemented on surrounding streets
Fouling of adjacent roadways by construction-related dirt/debris	All loading and unloading operations will be conducted within the site
	A vehicle wheel wash will be installed at the exit from the site
	A road sweeper will be deployed as necessary to keep surrounding streets clean

CMP	All mitigation measures in the Construction Management Plan will be implemented
Operational Phase	
Reduction of adjacent road junctions' operational performance due to vehicular trips to/from proposed development	The development design includes a limited internal car parking provision
	The development design includes a high provision of internal bicycle parking
	A residential car-share club will be established for the exclusive use of residents
	A Residential Travel Plan will be implemented
Residential Travel Plan	A Residential Travel Plan Coordinator will be appointed to implement the Residential Travel Plan

17.8 Material Assets: Water Supply, Drainage and Utilities

Character of potential impact	Mitigation measure
Construction Phase	
Environmental Management	Temporary discharge utilising the existing, or permitted sewerage network will be in agreement with Dublin City Council & Irish Water. All necessary health and safety measures and best practice will be undertaken to ensure the safety and welfare of construction personnel, the public and road users during construction of the foul infrastructure.
Damage to Public System	The contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water & Dublin City Council. A water meter will be installed to monitor water consumption on the site and to enable early detection of any potential leaks. Inspection and acceptance of connections will be required prior to services being allowed.
Site Management	Good site governance to ensure storm generated on site is disposed into the storm system and foul into the temporary foul system so that no miss connections occur.
Electrical Supply	The contractor will engage with ESB to facilitate the installation of the required infrastructure. Site ductwork and sub-stations will be constructed to ESB technical standards and will remain locked and under full control of the ESB once power is provided to the site. Prior to excavation the Contractor will carry out additional site investigation,

	including camera survey of existing ducts, in order to determine the exact location of the electricity network in close proximity to the works area. All works in the vicinity of ESB Networks infrastructure will be carried out in ongoing consultation with ESB Networks and will be in compliance with any requirements or guidelines they may have including procedures to ensure safe working practices are implemented when working near live overhead/underground electrical lines Where new services are required, the Contractor will apply to ESB Networks for a connection permit where appropriate and will adhere to their requirements
Gas Supply	Prior to any excavation adjacent to gas services the Contractor will carry out additional site investigation to determine the exact location of the gas network in close proximity to the works area. This will ensure that the underground gas network will not be damaged during the construction phase. All works in the vicinity of GNI infrastructure will be carried out in ongoing consultation with GNI and will be in compliance with any requirements or guidelines they may have including procedures to ensure safe working practices are implemented when working near live gas mains.
Operational Phase	
Foul	The proposed foul network when completed will not be vested to Irish Water. As such the management company will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the units maintenance company. Any issues going forward will there for be addressed and mitigation against.
Water Supply	The proposed potable water network when completed will not be vested to Irish Water. As such the management company will have responsibility for the on-going maintenance and operation of the service. Private drainage areas, such as the various apartment blocks, will be maintained by the units maintenance company. Any issues going forward will there for be addressed and mitigation against.
Reduction in Ringsend WwTP.	Ringsend WwTP, is currently the subject of up-grade works to ensure its fitness for purpose. The up-grade works will ensure that future capacity for the greater Dublin region is available.

17.9 Cultural Heritage & Archaeology

Character of potential impact	Mitigation measure
Construction Phase	
Recorded Monuments DU018-112 and DU018-020528.	Give notice to the Minister for Housing, Local Government and Heritage two months before commencing work at the site.
Operational Phase	
None Proposed	

NOTE: All mitigation measures expressed in respect of Archaeology are subject to the approval of The Department of Culture, Heritage and the Gaeltacht and the relevant local authorities. As the statutory body responsible for the protection of Ireland's archaeological and cultural heritage resource, the Department may issue alternative or additional recommendations.

17.10 Architectural Heritage

Character of potential impact	Mitigation measure
Construction Phase	
Items of Architectural Note.	There is potential to discover further elements of architectural or archaeological note during this stage. Monitoring of the construction site will occur during groundworks.
Disturbance impacts could potentially be significantly negative but temporary	This could be mitigated by appropriate site protection and monitoring, or, in a least favourable scenario, repair, in line with best conservation practice. A full record of the RHK boundary wall, which is in close proximity to the development site will be taken in the form of photographic survey and stone accurate survey drawings prior to construction. A suitably qualified Conservation Architect will review this record to ensure it is sufficiently detailed. Protection measures for the wall will be developed ahead of the works, to ensure that there is no damage from construction debris etc. A suitably qualified Conservation Architect will review the protection measures to be put in place. Careful vibration monitoring will be undertaken during the construction phase to ensure that there is no vibration impact on the wall. Should monitoring be required on any other structures within the RHK grounds, this will also be undertaken during construction.

Visual Impact	There will be minimal, and short-term visual impact during the construction phase. The contractor will implement the agreed CEMP to minimise visual impact during construction.
Operational Phase	
Landscape public realm	The proposed landscaping plan will be implemented. This scheme incorporates design and planting of the highest quality, to create meaningful public realm which would help soften and leaven the proposed development and help create good placemaking as mitigation.
Lighting	The proposed lighting plan is to be implemented as proposed to prevent/minimise light spill into the adjoining RHK gardens.
Signage	Signage within the site should be of the highest quality of design and fabrication.

17.11 Landscape and Visual Assessment

Character of potential impact	Mitigation measure
Construction Phase	
Protecting of existing street trees	Provision of secure hoarding / tree protection measures for existing retained trees.
Materials falling from a height	Use of screening and webbing to prevent materials falling from a height endangering local residents / office staff / visitors.
Site lighting	Directing site lighting away from existing residents / office / retail / creche.
Building phasing	Phasing of development in order that the buildings and surrounding landscape works are completed as soon as possible.
Landscape Contractor selection	Landscape Architect to ensure a competent experienced landscape contractor is appointed to undertake the work
Landscape tender implementation	Landscape Architect to oversee soil preparation, planting and hardworks commissioning to be as specified in the in the Landscape Drawings and Landscape Hardworks and Softwoks specifications.
Operational Phase	
Landscape Maintenance	Given the location of the development and proposed connection into the RHK grounds a comprehensive landscape maintenance scheme is proposed

Landscape Review	Site administration to organise reviews of the hardworks, and softworks and update / repair / replant as required to mitigate against public liability issues which may arise.

17.12 Monitoring

Where monitoring is proposed in the foregoing chapters, these requirements have been summarised below.

Character of Potential Impact	Monitoring Proposed
Chapter 6. Biodiversity	
Environmental Officer.	A written log of site inspections for environmental issues will be maintained during the entire construction phase and will be available for inspection by relevant third parties.
Chapter 7. Lands, Soil and Geology	
Contaminated Soils	Testing and monitoring of soil and Made ground that will be excavated for any potentially contaminated material to ensure adequate classification and disposal.
Water Movement	Monitoring of the retaining wall using for example, inclinometers and monitoring of water movements either seepages or through control points.
Movement	Monitoring of neighbouring structures immediate to the development site for the effects of any vibration, movement and settlement arising from the excavation works based on condition surveys carried out by the Contractor prior to the works.
Construction Phase	Monitoring of interrelated impacts such as noise and vibration levels, groundwater levels, dust emissions etc. dealt with in the other chapters in this EIAR. The Contractor will be required to produce an Air Quality and Dust Management Plan including Best Practice Measures to control dust and, in particular, measures to prevent dust nuisance.
Surface Water run off	Testing and monitoring of water and gas during excavation works.
Chapter 8. Water	
Construction Phase:	All on site monitor works connected to the proposed project will be under the prepared (and approved by Dublin City Council) construction plans. These plans will clearly outline the safety measures required to ensure that the proposed

Character of Potential Impact	Monitoring Proposed
Construction Plans	development is constructed in accordance with current best practice & legislative requirements.
Operational Phase Monitoring of stormwater System	The completed stormwater system will remain under the control of a management company and will not be offered to be taken in charge by the Local Authority. As such operational and maintenance requirements will be addressed by the company's maintenance contractor. Issues which my interfere with the stormwater network pertain to blockages and the lack of appropriate jetting and cleaning of gullies, drains and main sewers are required.
Chapter 9. Air, Dust & Climatic Factors	
Air Quality and Dust Management	The Contractor will be required to produce an Air Quality and Dust Management Plan including Best Practice Measures to control dust and, in particular, measures to prevent dust nuisance. A dust deposition monitoring programme will be implemented during the Construction Phase in order to verify the continued compliance with relevant standards and limits.
Chapter 10. Noise and Vibration	
Monitoring	Monitoring of the noise levels at sensitive receptor locations for comparison with limits and background levels during the construction works will be completed and the measurement results will be passed onto the Site Manager and will be used to assist the scheduling of works to ensure that the noise emissions from the various works are kept within the limits.
Noise and Vibration Management Plan	Noise and Vibration Management Plan (NVMP) will be prepared and will deal specifically with on-site activities in a strategic manner to remove or reduce significant noise and vibration impacts associated with the construction works.
Chapter 11. Material Assets: Traffic and Transport	
Construction Management Plan	The lead contractor appointed for the construction of the development will be required to prepare a site-specific Construction Management Plan (CMP) that shall include a plan for the scheduling and management of construction traffic.
Construction Phase Travel	The lead contractor will be required to monitor the travel habits of construction personnel and to tailor supports for public and shared transport use accordingly. Surrounding streets will be monitored to ensure that no nuisance parking associated with construction activity takes place.

Character of Potential Impact	Monitoring Proposed
Residential Travel Plan	The Residential Travel Plan Coordinator shall be responsible for monitoring the travel habits of development occupants and visitors.
Chapter 12. Material Assets: Water Supply, Drainage and Utilities	
Foul and Potable Water Infrastructure	Ongoing monitoring of the foul & potable water systems to be constructed for the development will be carried out as part of the operational and maintenance set of procedures for the scheme post construction. This will include inspections to ensure that the systems are operational and fit for purpose.
Chapter 14. Architectural Heritage	
Features of Architectural Heritage	On site monitoring will be carried out by a Conservation Architect throughout the construction phase of the works to ensure adequate protections are put in place, and anything of significance is fully recorded.
Chapter 15. Landscape and Visual Assessment	
Landscape Works	Soft landscape works will be monitored to check establishment during the first 12 months post-planting. Plant failure during this defects liability period shall be replaced within the following planting season (i.e. November to March) as necessary.
Aftercare	Aftercare to a high standard of both hard and soft landscape elements throughout the scheme will form part of the annual management/maintenance programme which shall be adopted as part of the scheme.
Trees	Regular monitoring of existing trees on site shall be carried out as necessary to ensure the tree stand is largely maintained. The ongoing monitoring shall identify trees which will require surgery works/potential removal which will be essential for the ongoing duty of care associated with the site. Paving will also require ongoing maintenance with the high level of through pedestrian traffic linking the various parts of the site